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A COGNITIVE APPROACH TO 2D – 3D SKETCHING INTERACTIONS IN INDUSTRIAL DESIGN

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PREFACE

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Sinan ÖDEKAN

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ABBREVIATIONS

A	: Asking
CT	: Change/Close Theme
D	: Drawing
DI	: Develop Idea
ER	: External Reference
L	: Listening
MD	: Make Decision
Mh	: Model Holding
Mm	: Model Making
MP	: Make Point
MS	: Make Statement
Mt	: Model Transforming
Mu	: Model Using
NDD	: Novel Design Decision
NI	: New Idea
PP	: Prepare Presentation
Q	: Question
R	: Reading
RD	: Review/Revise Decision
RI	: Review/Revise Idea
S	: Speech
ST	: Set Theme
T	: Thinking
TI	: Test Idea
W	: Writing

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ÖZET

Çizim, bir tasarım aracı olarak, tasarım sürecinin farklı aşamalarında farklı amaçlara yönelik olarak kullanılmaktadır. Tasarımın erken dönemlerinde kullanılan çizimler ürünün temsili bir gösterimi olarak değil, tasarım fikirlerinin yansımaları ve yeni fikirlerin oluşumuna aracılık eden tasarım unsurları olarak değerlendirilmelilerdir. Tasarımın bilişsel süreci içerisindeki bu rolü eskizi çok ilgi çekici bir araştırma alanı yapmaktadır.

Ancak eskiz konusu üzerine yapılan araştırmaların çoğu metodolojilerini tasarım sürecinde çizimin kullanımı üzerine kurmuşlardır. Bu araştırmanın amacı, kil-model kullanımının alternatif bir eskiz aracı olarak incelenmesidir. Bu inceleme üç boyutlu model ile iki boyutlu çizimlerin tasarım sürecindeki etkileşimleri bağlamında yapılandırılmıştır.

Model kullanımının kavramsal tasarım evresine katkılarının anlaşılabilmesi ancak tasarımcının bilişsel aktivitesinin incelemesiyle mümkün olacaktır. Alternatif araştırma metotları arasında tutanak analizi yöntemi, tasarım aktivitesinin ayrıntılı dökümünü oluşturmaya uygun yapısı göz önünde bulundurularak yeğlenmiştir. Araştırma kapsamında tutanaklardaki modelleme aktivitesinin incelenebilmesini sağlayacak bir kodlama sistemi de oluşturulmuştur. Bu kodlama sistemi kullanılarak modellemenin süreç içerisinde değişen rollerinin belirlenmesi amaçlanmıştır.

Endüstri Ürünleri Tasarımı öğrencilerine yapılan uygulamanın incelenmesi sonucunda kil-modelin bir eskiz aracı olarak yaratıcı süreç içerisinde eskiz kavramının gerektirdiği özellikleri gösterebildiği ve son ürünün kalitesine önemli katkılarda bulunduğu gözlenmiştir. İleride bu alanda yapılacak araştırmaların üç boyutlu eskizin tasarım sürecine en uygun ve verimli biçimde nasıl eklenebileceği konusunda aydınlatıcı bilgiler vermesi mümkündür.

A COGNITIVE APPROACH TO 2D – 3D SKETCHING INTERACTIONS IN INDUSTRIAL DESIGN

SUMMARY

Drawings are utilized for different purposes at different stages of the design process. The drawings that are produced within the early stages of a design process are not only rough drafts of a design, but they also represent some design ideas as well as they contribute to the development of new ones. These cognitive implications of sketching make it an attractive area of research.

However most of the studies performed on sketching have built their methodologies upon the use of drawings. The aim of this study was to explore potentials of clay modeling as an alternative sketching tool within the context of the interactions of conventional sketching and 3D sketching throughout the design process.

It is obvious that cognitive activities of designers have to be captured, in order to have a better understanding of the contributions of modeling activity to the conceptual design phase. Amongst alternative research methods, protocol analysis with its ability to capture design activity in its detailed description is chosen to be the method of the study. Furthermore, a new coding scheme is proposed for analysis of modeling activity within the protocols. This coding scheme is used for determining the altering roles of modeling activity.

Analysis of protocols of industrial design students have shown that modeling as an alternative tool for sketching is capable of simulating the creative properties of sketching and contributes to the quality of the design product. Further research on this area may shed light on the ways of implementing 3D sketching into the design process.

1. INTRODUCTION

Drawings are used for different purposes on different stages of the design process. This is common for all areas of design. In the early stages of design, which is identified as conceptual or preliminary design phase in design research, relatively ambiguous and incomplete figures are produced. These 'sketches' not only represent some ideas on paper but also they contribute to the development of new design ideas. Therefore, researchers focus on the role of sketching in conceptual design phase and place great emphasis on determining the relation between creativity and sketching.

The potentials of sketching have always been an attractive area of research. Sketching in its literal meaning is 'an outline or rough draft or plan of any design'. However, as long as the role of sketching in design is concerned, it can be told that it covers more than being just 'an outline'. Many researchers dealing with the investigation of the potentials of sketching come up with comprehensive descriptions of 'sketching'.

Purcell and Gero (1998) stated that there are different types of drawings associated with the design process. The 'relatively unstructured and ambiguous' ones are utilized in the early stages. According to them these drawings are called 'sketches'.

The same properties are highlighted by Kavakli (1998), where she denotes, that incompleteness, ambiguity, fluency of its production and the way it captures the essence of form and space are characteristic properties of a 'sketch'. She refines the definition of sketching by calling 'the initial free-hand drawn externalizations produced by a designer of envisioned or partially envisioned entities' as sketches. This definition draws attention to the cognitive implications of sketching.

Suwa et al. (1998) also stress the fact that sketches play an essential role in the 'early conceptual design process'. They add that exploration of how sketches are essential for the formation of new ideas is expected to bring some important implications for design education and design support systems. They claim that little research has been

done empirically to examine the way in which designers cognitively interact with their own sketches.

Verstijnen et al.(1998) categorize sketches and designate the sketches that are made in the early phases of design as 'idea-sketches', and emphasizes that the idea-sketching will have an important role in creative process because of their early appearance in the design process.

Moreover, they underline the fact that the detailed study of sketching behavior may provide a fruitful approach to understanding the relationship between cognition, the sketch and sketching.

1.1 Objective of the Study

Different definitions made by researchers indicate that sketching has to be handled in a way that more than being a documentation or report of reflecting mental images, sketching participates in the mental cycle of creation.

However, most of the research in the area of design on the subject of the role of 'sketching' is based on drawings made by the designer throughout the design process. It is not to deny that drawing seems to be the most common and effective way of representing mental activities in conceptual design phase and communicating with the 'design' ideas. Considering the fact that a pen and paper is the only requirement for sketching, it is not a surprise that drawing became the most effective and yet the conventional way of sketching.

On the other hand, very little research is performed about alternative ways of 'representations', which may be used in conjunction with 'conventional' drawings within the design process. It is hardly possible to grasp the limitations of sketching, without having an extensive understanding of various methods that may be utilized to communicate with the design situation without sacrificing from the essence of sketching.

Looking at the professional area, it can be realized that clay models are used as supplementary sketching elements. The driving force behind this study lies in this observation.

The objective of this study is to examine the use of clay models as an alternative and/or complementary sketching tool. Considering the fact that these models are used for representing design ideas in the way that idea-sketches do, they also will be designated as sketches in this study. This will underline the fact that both drawing and modeling will be handled as supporting sketching tools for the conceptual design stage. On the other hand, the distinct character of drawing and modeling will be further refined by designating the drawings as '2D sketches', since they are performed on a two dimensional space and the clay models as '3D sketches' because of their three dimensional nature. It should be taken into account that this description is used for the clay models that are produced within the conceptual design phase. The models that are produced and used at later stages of the design process are called prototypes and they are mostly utilized for testing purposes.

Drawings communicate with the mind through visual perception. Two important characteristics are underlined by researchers. First one is that sketches may be used as 'external memory aids', where the designer echoes the content of his/her short term memory on the paper, before it is depressed by newer items in the memory. The second one is the reinterpretations in mental imagery that may lead to new design ideas. These reinterpretations are initiated by visual cognition of previously made sketches.

On both occasions vision takes its role as an input channel to the memory. When using a 3D sketch tactile perception is used along with visual perception. This leads to the question; 'Does use of sketch-modeling enhance the capability of representation as long as the communication between the designer's mind and the design situation is concerned?'

Although the roots of this question lie within the realm of psychology, it is possible to start examining the interactions of conventional sketching and sketch modeling within the design process. This will give an insight into the potential roles of alternative methods of sketching. The intension is not to replace existing methods, but to strengthen them, and enhance their capabilities by describing supplementary tools.

Summing up all these, the aim of this research is to contribute to the development of more efficient design approach improved by the use of 3D sketching.

1.2 Limitations of the Study

In this study 3D sketching is investigated within the context of the relations of sketching and design decisions. The interaction of sketch drawings and sketch-models is of primary concern. Moreover, this relation is particularly explored within the early stages of the design process, namely in the preliminary (conceptual) design phase.

The area of interest is to determine the reflections of 3D sketching on industrial designers. Industrial design students are chosen to take part at this research. Hence the design task has to be planned accordingly. The product has to be feasible, in the sense that alternative representations of it can easily be modeled by using clay. Wire-frame structures, for example, are not likely to be modeled by clay.

Since both the design product and participants are chosen from a specific field, potential use of 3D sketching in other disciplines of design, like architecture or interior design, is not within the realm of this study.

The method used in this study is protocol analysis, where the protocol is based on the concurrent verbal account of the participants through a design session. Neither of the participants has taken part in a research with protocol analysis or 'think-aloud' procedure before. They also reported that they had not utilized any kind of 3D sketching as a distinct design tool in their design experience.

2. SKETCHING IN DESIGN

2.1 Researches on the Role of Drawings as 2D Sketching Elements

Drawings are widely used in various disciplines related to design. They usually come in different forms. Abstract and incomplete ones called as 'sketches' are related to early design stages whereas more definite and detailed ones are produced at the presentation level. In order to understand the essence of drawings and their role in design process, sketching should be handled at a higher level than being just a representation. Its cognitive implications make it possible to relate the use of sketching to the designers' cognitive activity. Many researchers have developed models that represent the inner dynamics of design as a problem solving mechanism. Researches based on these models shed light on the cognitive role of sketching. The first part of this section exhibits the models used for describing design activity within the context of their contribution to the knowledge concerning the role of sketching.

In most of these researches the same methodology is utilized. Protocol analysis, which relies on the verbal reports of designers regarding their design process, delivers the most comprehensive information about the mechanisms of design. Researchers develop coding schemes in order to be able to analyze design protocols, where they try to devise a general taxonomy of the content of designer's cognitive processes. The different coding schemes and their development are going to be handled in the second part.

2.1.1 Models for Describing Design Activity

In recent years researchers have come up with several models for describing design activity. Although they seem to diverge in their taxonomy, they all are similar in the way they define design as a problem solving experience and design tasks as ill-structured problems. Moreover the design progress is also divided into certain phases, the 'level of abstractness' of which decreases as the design develops.

Sketching is underlined in these models in the sense that it plays an important role in the early phases of design.

Schön (1983) outlined a new approach in design methodology, which is designated as 'reflection-in-action'. In his model he claims that the designer is in a 'conversation with the design situation'. Reflection-in-action mechanism is a process of naming, framing, making moves and evaluating the moves. Naming, in his work, corresponds to the identification of the objects of the design situation. In the framing section the general perception of the design situation is constructed. Within the context of the frame, the designer makes a move, which is then evaluated. If the move is a reasonable one according to the evaluation new moves are planned. However an inadequate move leads to reframing of the design situation. This design cycle is similar to the basic design cycle of 'analysis-synthesis-simulation and evaluation'.

Based on this model, Schön and Wiggins (1992) analyzed design protocols, in order to have an understanding of the role of sketching in design process. They emphasize the fact that sketches act as a visual-display which can be potentially perceived in different ways. This experience is considered to be the source of reinterpretations. Reinterpretations are images produced in the 'mind's eye' as a consequence of visual perception of drawings. Schön and Wiggins evaluated the occurrences of reinterpretations as moves within the design process. The stage related to reasoning of the consequences of a move is called 'seeing'. Their model describes design cycles as sequences of seeing-moving-seeing. They argue that move may have both intentional and unintentional consequences. Unintended consequences of a move in the design cycle allow the designer to incorporate a larger amount of his knowledge into the design situation.

Goldschmidt (1991) has performed a series of protocol analysis on novice and expert designers. She intended to develop a model to capture the role of sketching within the design process and the cognitive processes involved within. Design as being a reasoning process can be divided into strategic elements. She classified these segments that build up the design process as moves and arguments. Moves are elements that divide the stream of design activity in smallest units. Arguments on the other hand are statements about the design situation or aspects of it. Arguments are further classified as 'seeing-that' and 'seeing-as' by Goldschmidt. The statements that are about non-figural properties of a move are 'seeing-that' arguments. The

figural ones, on the other hand, are 'seeing-as' arguments, where the designer is interpreting the figural properties of a sketch. The 'seeing-as' arguments have important cognitive implications, since they are candidate segments for being sources of reinterpretations. Goldschmidt denotes that the dialectics between these arguments and sketching is building a bridge between abstract and conceptual properties and physical properties of a design. As far as the conceptual mechanism of design is concerned this dialectic structure of sketching activity is of primary concern.

Akin and Lin (1995) underline the fact that verbal and visual data coexist in design protocols and devise an activity based dual mode model which deals with verbal-conceptual and visual-graphic data in design protocols simultaneously. In their research they correlated design decisions, being the indications of 'emergence' in design, to the activity categories established. They divided the design protocols into three major segments: conception, development and representation. At the conception level the overall approach of the solution is outlined. The development stage is where the design product is developed and the representation stage corresponds to the period where the designer prepares the presentation drawings. Using this model they investigated the relation of the visual and verbal data forms.

An alternative model was developed by Goel (1995). He underlined that the characteristics of the design process is related to the ill-defined nature of design-problems. According to Goel design moves from the preliminary stage through refinement into a detailed design. He adds that the level of details and explicitness increases towards the end of the design process as far as the drawings produced by the designer are concerned. The drawings that are produced during the preliminary phase are unstructured sketches whereas at the latter stages of the design process drawings become detailed presentations. Comparing protocols in problem solving literature with his own experiments where he analyzed protocols of design sessions he observed two types of transformations on drawings. The 'lateral transformations' correspond to a move from one idea to another one at the same level of abstractness. The 'vertical transformations' on the other hand take the design to a higher level of concrete definition. He claims that 'lateral transformations' are mostly observed within the preliminary design stage and 'vertical transformations' are associated with the refinement and detailed design phases.

The same phenomenon is carefully analyzed by Oxman (1997) where she proposed a model for visual reasoning in design. She denotes that sketch is a medium for the transaction between the designer and the representation. She adds that it is these transactions with the external representations that illuminate the designers' visual-mental processes. She proposes a model of the cognitive mechanisms and abilities that underlie and enable sequential states of graphical re-representation in design. According to Oxman, sequence of sketches can act as a record of reasoning process. She claims that the re-representational model provides a foundation for the theory of creativity. She develops the following concepts from empirical studies, where she underlines the role of sketches as representation elements:

- *Human ability to transform implicit knowledge to representational structure enables modification or change.*

- *The capability to transform knowledge into representational structures underlies the ability to make novel modifications and changes within, or through those representations.*

- *Establishment of the right representation may be considered to be a creative act.*

Verstijnen et al. (1998) experimentally studied sketching behavior with the aim of developing helpful computer tools for the early phases of design. Two mental processes emerged as essential elements of creative processes: Restructuring and Combining. They claim that this distinction sheds light on the issue of sketching. Combination tasks are easily performed by the mental imagery, whereas restructuring processes are difficult to be executed in mental imagery and need to be supported by sketching.

These studies have shown that sketching not only represents some figural properties of design situation but also have strong contributions to the development of the design by participating in an interactive process with the cognitive activities of the designer. With its unique properties such as ambiguity and incompleteness, it delivers the necessary formation for creative tasks such as combination, reconstruction or re-representation. This makes sketching an indispensable element of conceptual design phase.

2.1.2 Methodologies for Capturing Design Activity

Protocol analysis is widely employed in design research for capturing sketching activity. According to Dorst and Dijkhuis (1995) two classical approaches exist in protocol analysis: process-oriented approach and content-oriented approach. The first one is utilized for describing design as a problem-solving mechanism, where problem-states, goals, acts, strategies are of primary concern. Conversely, the second method aims to reveal the content of the mental activity. Suwa et al. (1998) denote that this approach is considered to be more suitable for capturing designers' interaction with their sketches.

A general model for protocol analysis is developed by Suwa and Tversky (1996) that improves the quality of information gathered through protocol analysis, related to the process and content of a design session. The basic elements of this model are segmentation and action categories. Segments are smallest units within the protocol belonging to the same intention. Action categories, on the other hand, are used for coding designers' cognitive actions. Spatial relations, functional relations, conceptual relations or background knowledge are designated with different codes in this encoding system. This model is further developed by Suwa et al.(1998) where the action categories consist of four categories with several subclasses: Physical, Perceptual, Functional and Conceptual actions. The relations between actions belonging to different levels are also encoded. The modified version by Suwa et al. is considered to be the most comprehensive model that covers both content and process related information.

Suwa et al. (1998) used this coding scheme in their research where they expected to lay the foundation for microscopic analyses of how particular types of action contribute to design ideas. Additionally they tried to set a basis for macroscopic analyses of how designers cognitively interact with their own sketches. The results of this study has shown that the design sketches not only serve as external memory elements and as visual cues for association of non-visual information but also provide physical setting in which ideas are constructed on the fly.

Recently, Kavakli and Gero (2001) analyzed design protocols of novice and expert designers in order to show the differing balances between their approaches in terms

of cognitive actions. In their study they utilized the theory of mental imagery to explain the distinctions.

It is possible to utilize these description methods when analyzing design protocols, however the flexible structure of protocol analysis method makes it possible to define a specific coding scheme for a certain phenomena. Since modeling activity is not covered within these encoding systems it can be incorporated to an existing one or a new coding scheme can be devised.

2.2 Researches on the Role of 3D Models as Creative Design Elements

Researches on the use of 3D models as design elements are mainly concerned on the role of prototypes within the design process. Milanski and Wang (1996) have conducted protocol studies on users where they utilized 3D behavioral prototypes in order to test design ideas. In a subsequent study Milanski (1997) has performed think-aloud experiments where a full size model of the product is employed, which worked like the actual one but did not look like it.

However these experiments use 3D models with the aim of testing a design idea that is already developed. Since it is intended to cover and investigate the potentials of 3D models as sketching tools within the preliminary design stages and their cognitive implications are important, it is evident that the use of 3D models as prototypes is not within the realm of this study.

3. RESEARCH METHODOLOGY

3.1 Alternative Research Methods

In order to be able to decide on the methodology, it was essential to compare alternative methods that might be utilized for this research, such as survey, interview, case study, observation, experiment and retrospective verbal accounts and protocol analysis.

Considering the fact that the aim of the study is capturing the mental activity in order to come up with a detailed description of the relations and interactions of using modeling as a sketching tool in the conceptual design phase, the method chosen has to be capable of representing the mental activity as it was.

The latter four alternatives are commonly used in researches related to design process and mental activities. Case study is also applicable, but it is essential to form a conceptual framework of 3D sketching before going into real life examples.

It should be considered that the different methods have their advantages as well as disadvantages. However protocol analysis together with think-aloud method turned out to be the most appropriate way of studying the essentials of 3D sketching in conceptual design phase. The four methods mentioned above are compared with potential scenarios in the following sections.

3.1.1 Observation

Two different approaches may be utilized when considering 'observation' as a suitable approach to gather information about the use of modeling in interaction with sketching throughout the design process.

First approach would be setting up an experimental situation, where one or more students are given a design task and expected to come up with a product within a certain time span. They may be observed and/or recorded throughout the design

process. Then by using the observation notes and the recordings as the data, modeling activities may be compared.

As an alternative approach, students working in the studio on their individual projects may be observed. Since this is an ethnographic observation, no experimental setup is needed. However the observation period might be extended to a whole semester, depending on the context of a project task.

This approach has both its advantages and disadvantages as compared to the former one. Since the students are working on their own environment, they are disturbed to a minimum degree by the experimental situation. Considerable amount of sketches and models might be collected. Different approaches may be observed simultaneously, thus it becomes easier to interpret and compare the motivations for using 3D sketches.

3.1.2 Experiment

Another approach may be the experimental method. According to Verstijnen et al.(1998), protocol analysis or introspection, which will be discussed in the following section, are not appropriate to reveal creative processes extensively making use of visual thinking. They claim that these methods might even obstruct them. They state that the experimental method is a better way of approaching mental processes.

In an experiment, it is not possible to address the problem directly. Therefore, experimental process relies on deductions made from the results of certain experimental tasks.

When planning an experiment on sketching, first thing to consider is a proper design task. Unlike the other methods, an experimental task is usually based on the question whether the designer is or is not able to perform a certain task.

Experiment, as a research method, is used for studies exploring issues such as creativity, expertise and mental processes related to design including mental imagery, restructuring and combining. It is not to deny that experiment would be the most suitable method for investigating the resemblance of 2D sketching and 3D sketching or comparison of their mental reflections. Some of the main properties of sketching like ambiguity or incompleteness may be investigated by an experiment.

3.1.3 Protocol Analysis

From the viewpoint of design as a discipline, protocol analysis in general is the method of examining design activities by verbal accounts given by the designers. The idea behind this method is capturing the detailed process of the designer's mental activity, both in visual-graphical as well as verbal-conceptual terms. As compared to the other methods applicable in design research, protocol analysis delivers the most intense information about the designer's mental activity.

Two alternatives exist, when considering protocol analysis as a research method. First one is retrospective or introspective verbalization and the second one is called 'think-aloud' or concurrent verbalization. The former method relies on the verbal accounts of the designer about what he/she recalls after the design process, whereas the latter one makes use of verbalization of the designer throughout the design process. Therefore the concurrent verbalization delivers a better conception of the details.

However both of these methods are preferable, as compared to observation and experiment, when a detailed description of design process is of particular interest.

3.1.3.1 Retrospective Verbal Accounts

Designers can use this method for studying their own design process. Same method however, can also be used by researchers, who want to analyze other designers, tackling of a design problem. Either way the method relies on the verbal reports of the designers, about what they were thinking during the design process. On both occasions, when studying other peoples or ones own design process verbal accounts are highly subjective and may be reflecting the ideologies of the designer.

Retrospective reports are collected after a certain task is accomplished, a design process in this case. Hence an important point that should be considered is, the self-reports about completed processes suggest retrieving information from the 'long term memory'. Since most of the mental activity during design process is handled with the 'short term memory', detailed information cannot be collected. Moreover, retrospective reports might contain biased or misinterpreted declarations of the designer. Video recordings might be utilized in order to overcome these problems.

Summing up all these, retrospective reports lack in embodying the mental activity in detail, because of the absence of representational quality of the method as long as the short term memory is concerned. Moreover they are subjective, because they rely on the interpretation of the designer about the design process.

3.1.3.2 Think-Aloud or Concurrent Verbalization

Think-aloud processes are self-reports which differ from introspection in an important way. In contrast to the retrospective verbalization method, the concurrent one is capable of revealing the contents of the 'short term memory', since information is collected during the process of creative discovery. Ericsson and Simon (1984) stated, that 'the information vocalized is a verbal encoding of the information in the 'short term memory'.

As it can be inferred from the term 'think aloud', the designer is expected to keep talking about what he/she is thinking, while tackling with the design process. Emerging as a research method in social sciences and being used in psychological studies first, 'think aloud' method was widely accepted and used by the researcher in different disciplines. Newel and Simon (1972) employed 'think-aloud' method for studying rational problem solving. First protocol analysis study on designers is carried out by Eastman (1970) on architects. Following this, the number of protocol analyses together with 'think-aloud' method increased rapidly. This may be related to the fact that this method is capable of capturing and representing the cognitive activity of the designer to the highest level amongst the other research methods.

It is not to deny that protocol analysis has its drawbacks. However, being aware of its limitations, it is the most suitable method for analyzing the potential role of 3D sketching as a design tool in the conceptual design phase.

The advantages and the disadvantages of this method will be compared in the next section.

3.2 Limitations of the Methodology

It is obvious that protocol analysis is the most efficient method in capturing designers' thoughts. Think-aloud protocols deliver more 'in depth' information about the cognitive activity of the designer as compared to retrospective protocols.

Although protocol analysis is widely performed in design research, it is still problematic in certain aspects.

Dorst (1997) summarized these drawbacks as follows:

- *There could be unintended effects from verbalization, which could cause changes in the designer's behavior or their cognitive performance.*
- *What the designer reports may well be incomplete accounts of his/her cognitive activity.*
- *There are also side effects of the experimental situation: The designer is isolated from his/her normal working environment.*
- *The subject may inadvently give irrelevant accounts.*
- *The designer may report what they believe they are thinking, what they want to communicate to the researcher, what they think the researcher wants to hear, or what they were thinking recently.*

Knowing these limitations the research has to be designed accordingly.

3.3 Design of the Research

Planning the research is the essential part. Before going on with the experiment the researcher has to find answers to the following questions:

- How many participants will take place in this experiment and according to which criteria will they be selected?
- How will be the research environment, apparatus and stimuli?
- What will be the design task? In which context will the design brief allow or restrict the designer as far as the use of models as a tool for sketching is concerned.
- What kind of modeling clay should be used? Are there any specific properties that should be taken into account when selecting proper modeling clay?
- What will be the procedure of the experiment?
- Which encoding process is going to be followed? Should an existing coding scheme be utilized for this study, or is it appropriate to define new coding scheme for this study?

These questions were considered when setting up the layout of the study. Starting from the establishment of the design brief, answers to these questions will be explicitly presented in the following sections.

3.3.1 The Design Brief

The design brief is one of the most important elements in this research. It has to provide necessary information about the design environment (Appendix A.1). There are different types or briefs serving different purposes. Business briefs usually give precise information about the product to be designed, the stakeholders, the market and the production capabilities. A second type of design brief is competition brief, where the designer is mostly less restricted as compared to the case of a business brief.

Considering the fact that proposing too many realistic restrictions on the design problem may prevent the designer acting in an open-minded manner. Use of 3D sketches will be a new issue to deal with. The design brief has to provide an encouraging environment to the designer. Therefore a less exacting and more creative design brief is prepared which is inspired by competition briefs.

The design product is the essential element of the brief. The form and structure of the product has to be appropriate for clay modeling. This is taken to be the reference point when developing the brief. A casing for digital equipment seems to be a reasonable choice.

Among the alternatives, a digital control 'interface' for the personal computers is chosen. Two major advantages come along with a digital control interface as long as the design of its casing is concerned. First one is that it requires little amount of technological expertise. The second advantage is related to the ergonomic aspects of the product. The product can be modeled in its original scale. This gives the opportunity of instantaneous visual and tactile examination of the ergonomic criteria throughout the design process.

Defining the product, it is necessary to build a scenario around this product idea. A company, a design task, definition of user needs and judgment criteria are to be resolved. Since this is a research and not a real competition, duration for the design process has to be added to the brief.

The imaginary company is chosen to be an Original Equipment Manufacturer (OEM) based in the Far East. The current product range consists of wireless interfaces, networking and communication equipment. The firm is ready to invest in new products for internet users.

In order to clarify the basic needs of the computer user, a concise list is provided within the brief, like moving the cursor on the screen, clicking, selecting, scrolling and using menus. Most important of all, the product has to deliver the capability of 'individualization'.

Finishing with the definition of the design task, the judgment criteria are to be settled. Novelty in design, use of technology in favor of the consumer, ergonomic and aesthetic aspects are basic criteria identified as the judgment criteria.

The presentation technique is left to the choice of the designer, because the presentation technique he/she uses will also shed light on the individual preferences. It is an area of discussion whether designers are capable of adopting 3D sketching as a method for reflecting their virtual imagery.

Lastly, the duration of the design session is declared as one hour. A shorter design session may not allow the designers to develop a design idea and observation of interactions between different sketching methods might not deliver considerable information. Conversely a longer design period is considered to be overexerted, since the essence of the research lies within the conceptual design phase. Remembering that, at the point where the designer finishes the development of the design idea and goes on working on the details, the process is gone beyond the interest of this study.

3.3.2 Selection of the Participants

It has to be taken into account that the participants should have comparable background. Although it is possible to have participants from different disciplines, even having a background other than a non-creative discipline, in this study the participants are chosen intentionally from the Industrial Design Department in order to reduce the diversity.

Another issue is the experience level of the participants. As mentioned before protocol analysis is difficult to apply to a large group of participants because of the time consuming encoding and transcription process. Considering this, limited

number of participants having similar levels of experience is chosen to take part in this study. Since they are students, they will be classified as novice designers. Consequent studies may be applied to expert and novice designers in order to clarify the affects of experience on using '3 dimensional sketching' in interaction with the conventional sketching as a design tool.

There were two participants in this research. Both of them were male undergraduate students. Both students have undertaken the preliminary design education. One of the students was studying third grade and the other one was studying fourth grade. They were competent students, skilled sketchers in their classes. They have got the highest marks in their classes for their latest term projects and therefore it is also taken into account that both of them have done their practical training as a trainee in a leading design firm.

3.3.3 Apparatus

The workplace is consisted of a large table and a chair. There are two cameras for recording the design session. A4 papers and modeling clays are arranged on the table. A set of markers are also provided for presentation purposes.

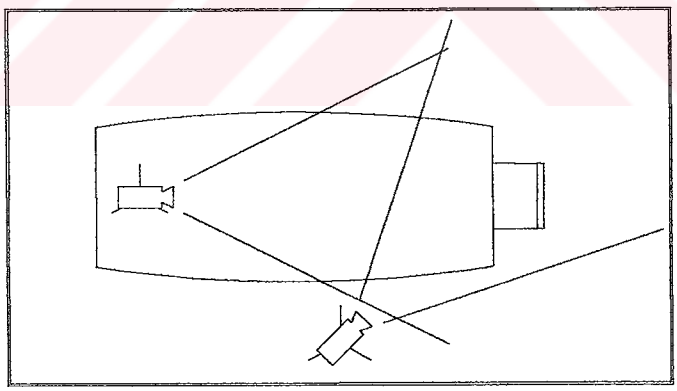


Figure 3.1. Layout of the workplace

Throughout the design session, participants are recorded from different angles using two cameras. 'Camera I' is placed on the table opposite to the designer and is recording the participant's physical and facial expressions.

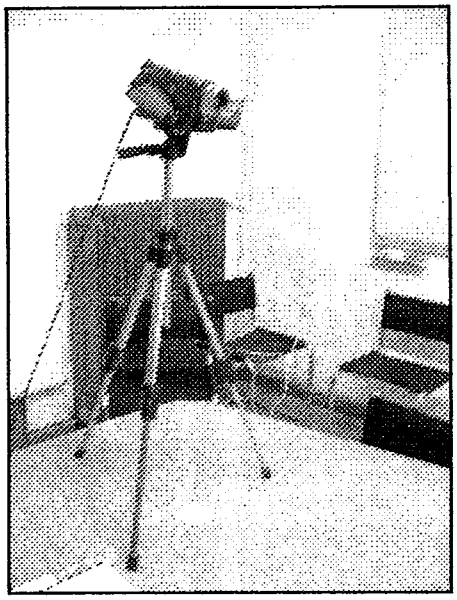


Figure 3.2. Camera I positioned opposite to the participant

The other camera is employed for capturing the sketching activity. Since both participants are right-handed, the camera recording their sketching activity (identified as Camera II), is placed to the left of the table, making an angle of 45° with participants facing direction. It is directed towards the working area so that the designers' hand, the papers and the clay models are within the vision of the camera throughout the study.

Figure 3.3. Camera II capturing the working area

The sound is also captured with both of the cameras. Considering the fact that the close-up camera (Camera II) is nearer to the participant, this recording will be utilized for the verbal transcription purposes later on.

3.3.4 Modeling Clay

In addition to pen and paper, modeling clay is made available as the 3D sketching tool. The selection of the clay material plays an important role considering the fact that it will be used for conceptual sketching purposes.

The clay should be easily sculpted. Usually professional modeling clays used for model making in industrial design discipline are extruded and slicked extremely accurate, their finish is glasslike, they do not crack under normal circumstances, hold fine detail, can be shellacked, painted, reused and molds can be taken from the surface. But they are stiff when it comes to deformation by hand. Considering the fact that the main aspect in this research is studying the participants interaction with the modeling clay, being a tool for sketching, the properties above, such as good finishing surface or holding fine details, become less important. Hence, more flexible modeling clay would be proper for 3D sketching, by means of simulating the main properties of sketching with pen and paper, such as incompleteness, ambiguity and roughness.

The clay also has to be easily split and joined. Different colors would also be advantageous, where the designer wants to represent functions or textures with color.

In order to assure that the participants save some of the sketch models they produced at some stage in the design process, they are supplied with sufficient amount of clay.

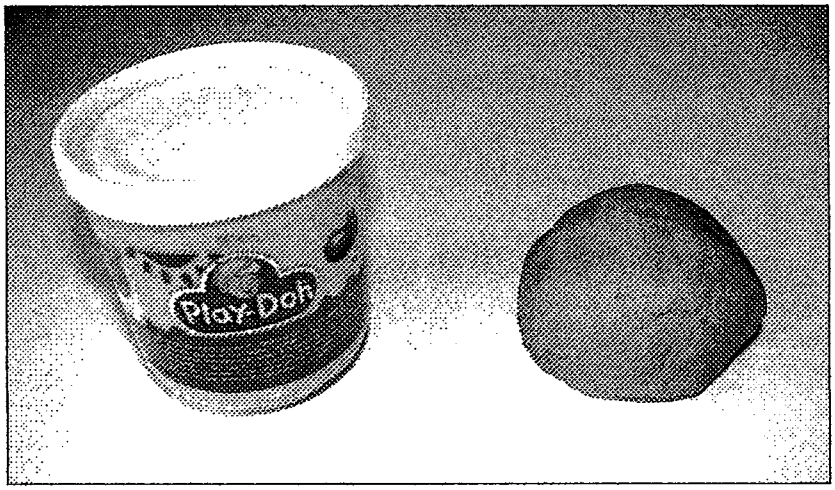


Figure 3.4. 'Play-Doh' modeling compound

"Play-doh" is chosen amongst suitable modeling clays to be used in this research, since its properties are agreeable with the ones stated above.

3.3.5 Procedure

The study begins with the instructor reading over an introduction sheet that explains and describes the nature of the study. Since the participants are not accustomed to the think-aloud process, they are informed about the significance and role of verbalization in this study. Detailed information of the introductory explanation and the subsequent stages are explicitly described in the following sections of this research paper.

In order to ensure that they keep up with an acceptable rate of verbalization, the main design session is preceded by two small warm-up exercises. The participants are encouraged to think-aloud while doing these exercises. First practice problem is a simple multiplication. The second one is a cryptarithmetic puzzle. This puzzle is selected in their native language. Three and five minutes are given to the participants to accomplish these tasks. It should be noted that the participants are not obliged to provide a correct answer but exercise think-aloud process.

Following the completion of these two exercises the design brief is handed to the participants and the instructor read it out loud once. The time limit set for this part of the study is one hour. Following this, the instructor switches the cameras on and starts recording the main design session. Having completed the design session the participants are asked to write down the design decisions they recall they have made through the design process.

The detailed description of the design process is given in the following sections.

3.3.5.1 Presentation

Before the participant started to work he is given introductory information about the study in order to help him feel relaxed and comfortable. Hence the participant may be isolated from the experimental apparatus and concentrate on the design situation. First the participant is enlightened about the aim of the study. Following statement is read to the participants.

> *"In this study we are interested in the creative design process and the potential role of 3d sketching when used in interaction with conventional sketching.*

Where and how designers can make use of 3d models in their preliminary design phases? How does practicing with 3 dimensional sketches affect design decisions?

As a design student you can give us an insight on these issues. Soon you will be presented a design task, which is similar to the projects you have dealt with in the past.

In this research we are interested in your way of thinking and handling a design problem throughout the design process. Therefore, we want you to speak continuously about what you are thinking, while working on the design problem. This way we will be able to capture your cognitive activities.

Since you are probably not familiar with talking while designing, we are going to give you two small problems for an exercise.

Whilst solving these problems you will get used to thinking-aloud. Now, I'm going to give you the first problem, you have three minutes for the first exercise and five minutes for the second one.

Remember that it is not important that you find a solution, but you have to keep talking throughout the solution process. If you stop talking you will be reminded to talk about what you are thinking."

3.3.5.2 The "Warm-up Exercise"

The design session is preceded by a warm-up exercise, where the participants get familiar with the think-aloud process.

The participants are asked to perform two short exercises. First one is a simple arithmetic exercise, where the participants are expected to multiply 24 x 36. While they are solving this problem, the instructor continuously encourages them to think aloud. This problem is used by many researchers as a warm-up exercise preceding protocol analysis sessions.

The second problem is a cryptarithmetic puzzle. A 'cryptarithm' is a genre of mathematical puzzle in which the digits are replaced by letters of the alphabet or other symbols. They are to determine the digit that corresponds to each letter.

Similar cryptarithmetic tasks such as DONALD + GERALD = ROBERT are extensively used by Newel and Simon (1972). The same puzzle is utilized by Dorst (1997) in his research where he has applied think-aloud method to nine experienced designers.

Since both participants' native language is Turkish in this study, it seems to be more appropriate to choose a cryptarithmetic example in Turkish. KUZU + KEÇİ = SÜRÜ example is the most suitable one of the three examples are found on the internet.

Three minutes are given for the first exercise and five minutes for the latter one. The participants are reminded that the essential part of these exercises is not finding a solution but getting used to think-aloud method. Hence they are asked to stop at the end of each interval.

3.3.5.3 Reading and Discussing the Brief

Following the warm-up exercises the participants are presented with the design brief. Having completed reading the brief they are given detailed instructions about the design brief. In order to clarify the design problem, the participants are encouraged to ask questions.

Before starting with the recording, they are informed, that 60 minutes are available for the design session and they will be reminded at the half-time and the last 15 and 5 minutes.

As a final remark, the participants are reminded to think aloud throughout the design session. Considering the fact that the research is based on the use of 3D models in interaction with conventional sketching, participants are notified that they are not entitled, but encouraged to make use of clay modeling in their design process. Moreover they are told that they can save some models and continue working with others, if they think they may need those 'representations' later in the design process. This allows them to use models as 'external memory aids', similar to sketches on paper.

3.3.5.4 Recording the Design Session

As stated before the main design session is recorded by two separate cameras. It is important to check whether they are recording or not. Since the design process can not be terminated for any reason, if anything goes wrong with one of the cameras,

solutions have to be found straight away. Substitute videotapes are present. Another important issue is not disturbing the participant, so that he/she retains his/her concentration. Questions regarding design process or the design task are answered by the instructor throughout the session. Last 30 minutes, 15 minutes and 5 minutes were prompted.

At the end of the given time specified on the brief, the participants are asked to complete the design process.

3.3.5.5 Retrospective Report on the Design Decisions

In this study, the design decisions and their evolution in design process are observed and their probable interactions with 3D sketches are examined.

It should also be taken into account that using 3D sketches as 'external memory aids' can contribute to a new understanding of conceptual design phase and creativity. Both in short and long terms, where they transport information including design decisions, 2D and 3Dsketches may be used as carriers from one stage of the design process to another one. Those instance, if there are any, where design decisions are revised or design ideas are developed by using 'external memory aids' are of particular interest in this study.

Considering these, a definition of design process is read to the participants and then they are asked to write down the design decision they remember after the design process. These retrospective reports are then compared with the design decisions that the encoder has located.

3.4 Analyzing the Protocol

Analysis of the protocol consists of several stages that are independent of each other. This makes protocol analysis a flexible research method. After recording design sessions, first stage is to transcribe them, where the videotapes are watched and verbal data is transcribed with the associated timestamps. This is not necessarily done by the researcher. It is also possible to utilize previously recorded videotapes that are ready to be transcribed, or even the transcription may have been delivered to the researcher.

Considering the fact that this research is a pilot study in its area, all of the stages stated above are carried out by the researcher.

The next step is to decide on a description method. Dorst (1997) defines a 'description method' as follows:

> *A description method is a part, a selection of a paradigm made with a specific goal in mind. So this 'translation' of the abstract paradigm into a more concrete description method, encoding system and data processing method is not unique.*
>
> *One and the same paradigm can be implemented in many different ways, which will limit the scope of the conclusions that can be drawn from the paradigm itself.*

Ericsson and Simon (1984), on the other hand, called this process 'Model-based Coding' in their well-known book 'Protocol Analysis'.

> *When prediction is guided by a model, the model identifies relevant information that will be heeded.*

The hypothesis of this research is based on the relation of design decisions and sketching, where using 3D modeling is recognized as a part of it. Therefore, the description method is derived from detecting the states of design decisions throughout the design process and relating these states with the use of sketching. The progress of design decisions will also give some insight into the cognitive activity of the designer. Hence the encoding process shall represent the cognitive implications as well as the states of design decisions. The description method and the encoding process will be handled in detail later in this section.

In this research both the transcription and the encoding processes are done by the researcher.

3.4.1 Transcription of the Protocol

The transcription process is a rather time consuming process. In order to perform it in a well organized way, it is divided into three stages. First the recordings are watched from the beginning to the end, while writing down the verbalization of the participant. Even the exclamations are written down as they are. Then these inscriptions are typed on the computer and sentences are determined and separated.

At the next stage, tapes are watched again, and timestamps for the beginning and ending of each sentence is identified and marked. Finally a chart is prepared, where the speech of the participant is matched with the timeline of the design process.

3.4.2 Design Decisions

After finishing with the transcription, it is time to start encoding the protocol. However, since the study is based on determining design decisions and their relation to 2D and 3D sketching, first the definition of a 'design decision' have to be made.

Akin and Lin (1995), in their study 'Data processing and novel design ideas', describes design decisions as "... any and all intentional declarations of information as valid for the design problem at hand". And furthermore they make the following classification:

"Some design decisions concern the design product while others the design process"

They claim that some of the design decisions, which he designates as 'novel design decisions', "... turn to be critical for the design progress of the entire design."

Since practically every statement of the designer is a decision, we also have to make a clear distinction between 'key decisions' and statements. The solution is discriminating decisions as major and minor decisions, similar to Akin's definition. Throughout the design progress, some 'idea's are stated by the designer, which have a strong influence on the product. First, these ideas are developed by minor decisions, where the designer stands within the context of the main 'idea'. Then this idea transforms itself into a 'decision'.

The minor decisions can be interpreted as the designer 'making a point about the design product', or at some instances 'developing the idea', whereas the major decisions directly can be interpreted as design decisions.

To clarify these distinctions, before going into the encoding procedure, a coding scheme has to be defined.

3.4.3 Coding Scheme

In a protocol analysis, the transcribed data is analyzed using a coding scheme. The key elements of a coding scheme consist of segmentation, activity categories and

observable cognitive or behavioral elements that will be encoded into pieces of information.

Among the elements stated above, the last one is the essential part. The setup of the coding scheme is dependant on the decision which phenomena will be taken as reference for the hypothesis. Design decisions are taken to be the key cognitive activity in this research and the contribution of using 3D sketches to decision making is going to be investigated.

At this point, two alternatives exist. Either the researcher decides to use an existing scheme, or he/she defines a new scheme, that he believes, represents the observed phenomena better than the existing ones.

Some of the models used in design research are too complicated for this research, such as the model derived by Suwa et al. (1998), where the cognitive, perceptual, physical and functional activities are covered as one. This model is claimed to be the most extensive approach for covering both process and content related issues. However because of its complex structure, it is not employed in this research. Moreover it has not separately defined codes for 3D sketching.

Another example is the protocol analysis by Dorst (1997), where he compares two design research paradigms. In his coding scheme acts, goals, context and topics are coded for each segment. Akin and Lin (1995) use another model, where they look for 'Novel Design Decisions'.

Summing up all these, it is essential to define a suitable coding scheme, when dealing with a 'novel design element', such as '3D sketching', since existing models are not readily capable of covering new phenomena.

Therefore, a set of codes are established in this research, which are believed to be representing the decision states throughout the design progress. The codes used are explicitly defined and supported with examples from the protocols as follows:

ST: Set Theme/Topic

At some instances the participant declares, what he/she is going to work on. These statements are considered to be markers for beginning of 'frame's. Frames refer to 'Framing' in the mechanism of 'reflection-in action' outlined by Schön (1983). The designer's design process is divided into segments or 'design episodes', where he/she

names, frames, makes moves and evaluates certain design intensions. The 'naming' step corresponds to the instances where the designer is selecting and naming the objects to be considered in the design situation. Subsequently in the 'framing' section these objects are put into a context. 'Set Theme' can be analogous to the 'naming' step defined by Schön.

Timestamp	Transcription (Translated into English)	Decision State
00:19:23 00:19:24 00:19:25 00:19:26 00:19:27 00:19:28	I... Let's think of alternative ways of 'clicking' other than the way we do it with a mouse... Let's think	ST

Figure 3.5. Example segment for 'ST'

The statement above is taken from the protocol of the participant X. In this statement, the designer declares clearly, in which topic he/she will approach the design problem. When these statements are made by the designer, which is uncommon, the period is marked with 'ST'. Though, in many instances the theme may be inferred from the designer's statements, such as declaration of a new idea or a question about the design problem. But these statements are encoded according to their higher order significance in the decision process. A new idea is more than just a declaration of a theme, or the role of a design question is not pointing out a new theme.

CT: Change/Close Theme/Topic

After setting a theme the participant can intentionally close this theme. At those instances where the end of a theme corresponds to the beginning of another one, he/she is considered to be changing the theme. Both of these occurrences are interpreted as 'CT'. Similar to 'ST', new ideas may be interpreted as changing a theme, but their role in decision cycles will be explained subsequently. So they should not be mixed up with simple declarations of changing or closing a theme.

Timestamp	Transcription (Translated into English)	Decision State
00:24:05 00:24:06 00:24:07	Now... What did I say? Scrolling the screen	CT

Figure 3.6. Example segment for 'CT'

NI: New Idea

When the participant comes up with a design idea for the first time in the protocol, those segments are marked with 'NI' meaning 'New Idea'. The following segment, taken from the protocol analysis of Participant Y, can be designated as an example of new design idea:

Timestamp	Transcription (Translated into English)	Decision State
00:12:26 00:12:27 00:12:28	Let's assume we could put it on our finger	NI

Figure 3.7. Example segment for 'NI'

RI: Review/Reconsider Idea

In every occurrence of an idea, special attention has to be paid to the possible occurrences of that idea in the design process. When the participant reviews or reconsiders a previously stated idea, these segments are designated as 'RI', which stands for 'Review/Reconsider Idea'. The following example is taken from the protocol analysis of Participant Y.

Timestamp	Transcription (Translated into English)	Decision State
00:15:28 00:15:29 00:15:30	I'm back to the user-defined area	RI

Figure 3.8. Example segment for 'RI'

DI: Develop Idea

If the participant is developing a previously stated idea, 'DI' is used meaning 'Developing Idea'. These occasions are comparable to 'lateral transformations' of Goel (1995) or 'seeing-as' of Goldschmidt (1991).

Timestamp	Transcription (Translated into English)	Decision State
00:16:26 00:16:27 00:16:28 00:16:29 00:16:30 00:16:31 00:16:32 00:16:33	Maybe we can encode some of the actions. One, two, three, four... One, for example, could open 'My Documents'	DI

Figure 3.9. Example segment for 'DI'

In the example above Participant Y is developing the idea of using voice recognition on the device and inquires the probability of assigning verbal codes to certain frequent actions.

Q: Question

When the participant puts a design question, 'Q' will be assign to that question. These questions are indications of periods where the participant will concentrate on a certain subject within a design topic or related to a design idea. Sometimes questions about the design process may arise. The question about design problem and design process will be handled separately according to their contexts.

Timestamp	Transcription (Translated into English)	Decision State
00:29:54 00:29:55	What are the additional functions of this device	Q

Figure 3.10. Example segment for 'Q'

TI: Test Idea

Following the statement of a new design idea, the participant usually develops that idea. At some instances he/she tests this idea in an imaginative environment. These are marked with 'TI'. When testing an idea the participant can make use of 3D sketches or may sketch on paper. It is certain that physical models give a more realistic understanding of the idea being tested. Therefore testing periods are of particular significance.

Timestamp	Transcription (Translated into English)	Decision State
00:19:12 00:19:13 00:19:14	I plugged it in, Started the computer. I double-click on My Computer	TI

Figure 3.11. Example segment for 'TI'

Participant Y is testing the idea of using the device on ones finger in an imaginary working environment, where he illustrates the moves one has to make in order to start-up a computer.

MP: Make Point

Making a point related to the design problem is considered to be an 'MP' period. These instances contribute to design decisions made later in the design process. They put constrains to design problems.

Timestamp	Transcription (Translated into English)	Decision State
00:23:07 00:23:08 00:23:09 00:23:10 00:23:11 00:23:12 00:23:13 00:23:14 00:23:15	It is not very comfortable with two fingers. When you move your fingers the ring-finger also moves. They are somehow connected with muscles I think.	MP

Figure 3.12. Example segment for 'MP'

The example illustrates Participant X handling the problem of clicking, where he explores the idea of using the first two fingers for the 'left click' function and the other two fingers for the 'right click' function, where two buttons on the device are next to each other. He suddenly realizes the fact that the third finger moves together with the first two fingers, which may cause the problem of accidental clicking. He changes his strategy after Realizing this fact and making this point. As explains before 'MP' is used for design problem-related statements. All statements related to the design process will be identified as simply 'making a statement'. This will be clarified in the 'MS: Make Statement' section.

MD: Make Decision

Making a decision, encoded by 'MD', is one of the easiest states observed in the protocol, because it depends to declarations of decision by the participants. The decisions might have a positive meaning as well as a negative one, such as giving up an idea.

Timestamp	Transcription (Translated into English)	Decision State
00:20:42 00:20:43 00:20:44 00:20:45 00:20:46 00:20:47 00:20:48 00:20:49 00:20:50 00:20:51	Let it be the conventional way. Four points. OK! He will define a plane with four points, anywhere in space. Interface, plane....	MD

Figure 3.13. Example segment for 'MD'

Making decisions can be compared to 'moves' of Schön (1983) or 'lateral transformations' of Goel (1995) where the design process is transformed into a higher level. These decisions are not necessarily shaping the final product. They may be revised or even discarded at the later stages of the design process, but since they

are the end-marks of local 'decision cycles', their contribution to the design progress is superior.

RD: Review/Revise Decision

When the participant reviews a decision that is previously stated, these instances are designated as 'RD'.

Timestamp	Transcription (Translated into English)	Decision State
00:26:19 00:26:20 00:26:21	Whatever... I know that I'm going to use it on my finger	RD

Figure 3.14. Example segment for 'RD'

Here participant Y reconsiders the decision of using a user defined area for the input device. This decision is revised or reviewed a few times before the final evaluation.

PP: Prepare Presentation

When the participant prepares a presentation drawing or model, it is specified as 'PP'. Considering the fact that the presentation method the participant prefers is of particular interest, occurrences of periods where the participant is working on a presentation are carefully examined.

Timestamp	Transcription (Translated into English)	Decision State
00:48:00 00:48:01 00:48:02 00:48:03	Right in the middle... Here... We have a voice recognition device	PP

Figure 3.15. Example segment for 'PP'

This example is taken from the protocol analysis of participant Y, where he prepares a drawing of the interface. In this section he is talking about where to put the voice recognition device. These presentation drawings or models are usually observed towards the end of the design process.

ER: External Reference

An external reference is a statement related to the designer own experience. As it can be seen from the following case, the designer may recall information from his past experiences and reflecs this information in his/her design.

Timestamp	Transcription (Translated into English)	Decision State
00:13:10 00:13:11 00:13:12 00:13:13 00:13:14	I remember seeing something like this on the movie 'Minority Report'	ER

Figure 3.16. Example segment for 'ER'

Here, participant Y is remembering seeing a device on a movie, similar to the one he is working on at that very moment.

MS: Make Statement

When the participant makes a statement about the design situation, 'MS' is marked for the episode. These statements are not directly related to design problems. Therefore, they are less important as compared to 'MP' episodes where statements related to design problems are made.

Timestamp	Transcription (Translated into English)	Decision State
00:48:00 00:48:01 00:48:02 00:48:03	Here... I should remember this. I liked this idea.	MS

Figure 3.17. Example segment for 'MS'

3.4.3.1 Segmentation

In many of the protocol analysis methods segmentation precedes the encoding process. The verbal protocol is divided into small units called segments. There are however different approaches for segmentation.

Ericsson and Simon (1984) divide the verbal protocol according to syntactic markers for sentences, pauses and intonations, where these events indicate the start and end of a new segment. Another approach will be a segmentation based on the designer's intentions, where a segment may contain many sentences.

Suwa et al.'s (1998) definition of a segment is as follows:

> *One segment consists of pieces of information which appear to have occurred simultaneously in the designer's mind. The pieces of information constituting one segment are embodied by a set of cognitive actions (i.e. including conception, perception, drawing and gestures). Observing the designer's different modes of cognitive actions in its entirety will enable you to interpret the way in which his/her design thoughts shifted.*

When successive sentences belong to the same design intention, they are identified as one segment. An alternative segmentation system is used by Dorst (1997), where the protocol is divided into equal time intervals of 15 seconds. Each segment is encoded by the dominant activity and intention.

Definition of segmentation and coding scheme are mutually related and an appropriate segmentation has to be chosen to ensure accuracy of encoding. In this research design decisions and their formations are to be observed. Hence the protocol is divided into segments based on the subject's intentions.

3.4.3.2 Activity Categories

The first part of the encoding process consists of determining the activity categories. In order to gather data about the cognitive activities and mental processes that handle visual and verbal information, it is essential to record and analyze activities of a designer throughout the design process.

Speech, reading, writing, drawing, thinking, asking questions and listening are the major activities that we are familiar with from earlier protocol analyses done about sketching in design. They are designated as S, R, W, D, T, A and L respectively on the analysis. Categories designated with M are modeling activities and will be explained eventually.

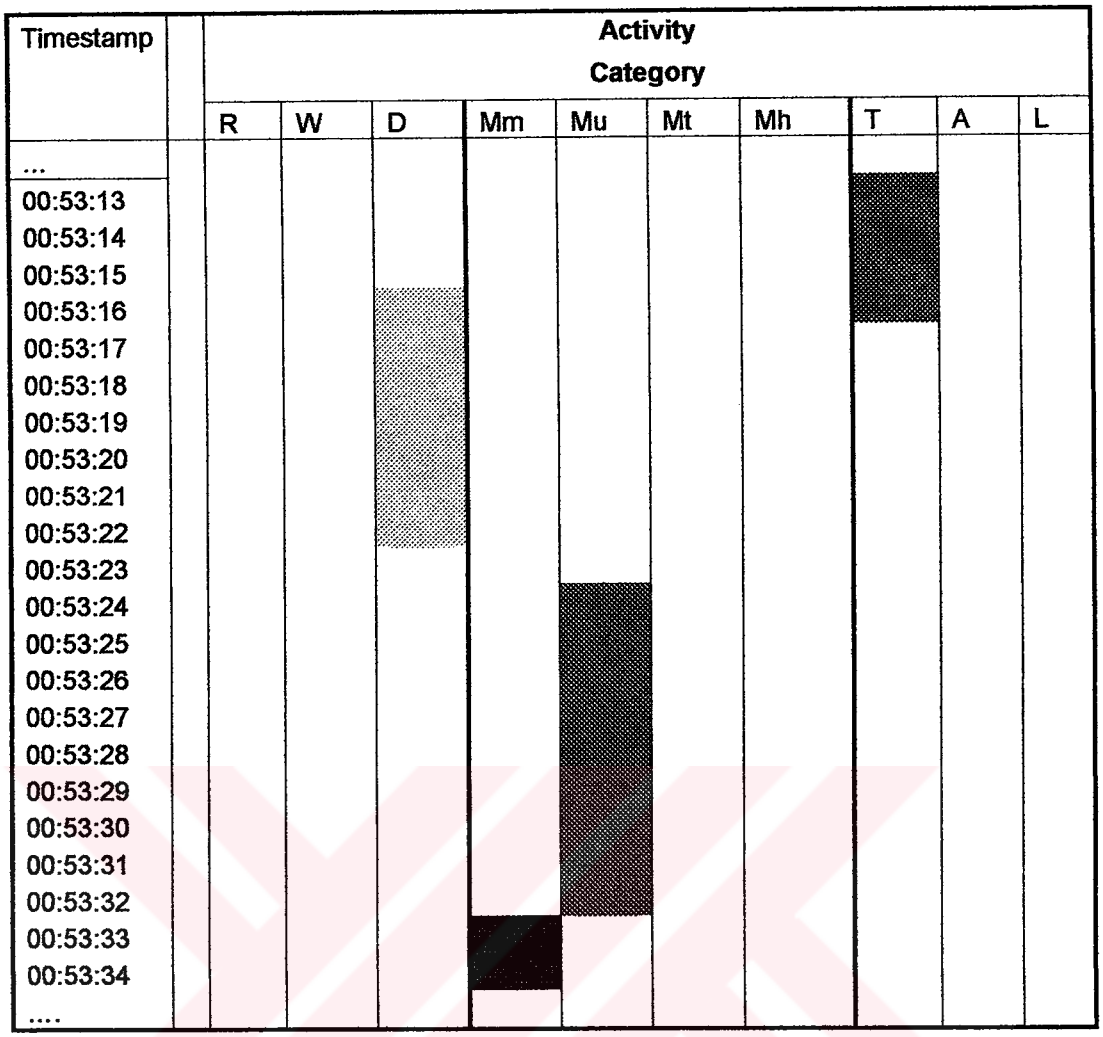


Figure 3.18. Illustration of a segment of data analysis showing activity categories

Speech is the most evident activity category. The transcription contains the necessary data for the speech activity. Since speech as being a verbal-conceptual activity, can coexist with visual-graphic activity, dual mode approach of Akin and Lin (1995) is considered as a reference. At the instances where this co-existence occurs, both activities are marked.

Writing ("W") and drawing ("D") are similar activities where the participant uses pen and paper, but they can be differentiated in the way that writing produces alphanumeric markings and drawing covers all graphic representations other than alphanumeric symbols. It is clear that drawing plays a key role in design process, especially when focused on the sketching activity in the conceptual design phase. Hence the relation of 2D and 3D sketching with the design decisions will be carefully analyzed in this research. And their apparent interactions will be presented.

Modeling activity is defined as the events where the participant is in interaction with the modeling clay. In order to refine the definition of modeling activity, it is possible to categorize it.

Four different states are observed in the video recordings. First two states are identified as 'Model Making' ("Mm") and 'Model Using' ("Mu") where the designer is concentrated on the modeling clay. Those instances where the designer was deforming the clay for the purpose of giving a specific shape are called 'Model Making' episodes.

The designer might have kept previously modeled clays for future reference. When these clays are used with the intention of developing or testing design concepts, it is classified as 'Model Using'.

Both of these states represent conscious activities. It became obvious that there are also unconscious interactions with the modeling clay. The next two states refer to these types of activity.

'Model Transforming' ("Mt") is assigned to episodes where the designer was deforming the clay unconsciously, while being concentrated on a major activity such as thinking, reading or speaking. These transformations may result with ambiguous shapes which resemble the ambiguity and incompleteness of idea sketches and may possibly lead to re-interpretations. Since occurrence of reinterpretation is seen as a major cognitive tool for creativity, special attention has to be given to 'model transformations'.

The last and most passive state is 'Model Holding' ("Mh"), where the designer holds the previously shaped model, but does not make use of it. It is not to deny that there is still an interaction with the clay, and this still may play a linking role in the creative process.

These four states basically cover all of the modeling activity in this research, but they are open to modification and refinement in the future.

The last three states are considered to be as fewer occurring activities. 'Asking' ("A") is assigned to the occasions where the participant is asking a question to the instructor. Since all of the information is assumed to be covered within the brief, few questions arise about the design problem in this research. The rest of the questions are related to the design situation and timing. 'Listening' ("L"), on the other hand,

corresponds to the periods where the participant is listening to the comments or answer of the instructor.

It is obvious that the designer is thinking throughout the entire design process. Moreover there are no observable behaviors pointing out thinking activity. Hence it is essential to define 'thinking in a way, that it represents intense thinking activity. Highly reduced or even interrupted verbalization accompanied by no supplementary physical activity, such as drawing, writing or model making, is considered to be a 'Thinking' ("T") period in this research. But if the participant remains silent for more than 20 seconds, he/she is reminded to keep thinking aloud for the validity of the study which is based on 'think-aloud' process. Thus thinking activities are not prolonged for more than 20 seconds.

3.4.4 An Example of the Encoded Transcription

In order to have a better understanding of the encoding process, it is essential to have a look at an example from the encoded transcription. The following table is taken from the transcription of Participant Y. The transcription of the speech is translated into English. The structure of this table is described in the preceding chapters.

In this example a continuous design decision process together with its subordinate evaluations will be handled. It consists of the time span between 00:20:00 and 00:20:51. Within this time span the designer deals with a design idea. The first segment corresponds to the statement of the 'new design idea' and the last segment is a decision statement. Since the development of the design decision is uninterrupted, the different stages and their roles within a complete design decision cycle is easily demonstrated in this example. Considering the difficulty of finding a single segment with all the decision codes within, the sample segment is selected by taking into account that it consists of only statement directly related to development of design ideas. Moreover, most of the decision cycles are interrupted by other novel ideas, and the amorphous structure of decision cycles are not as easily detectable as demonstrated in this example.

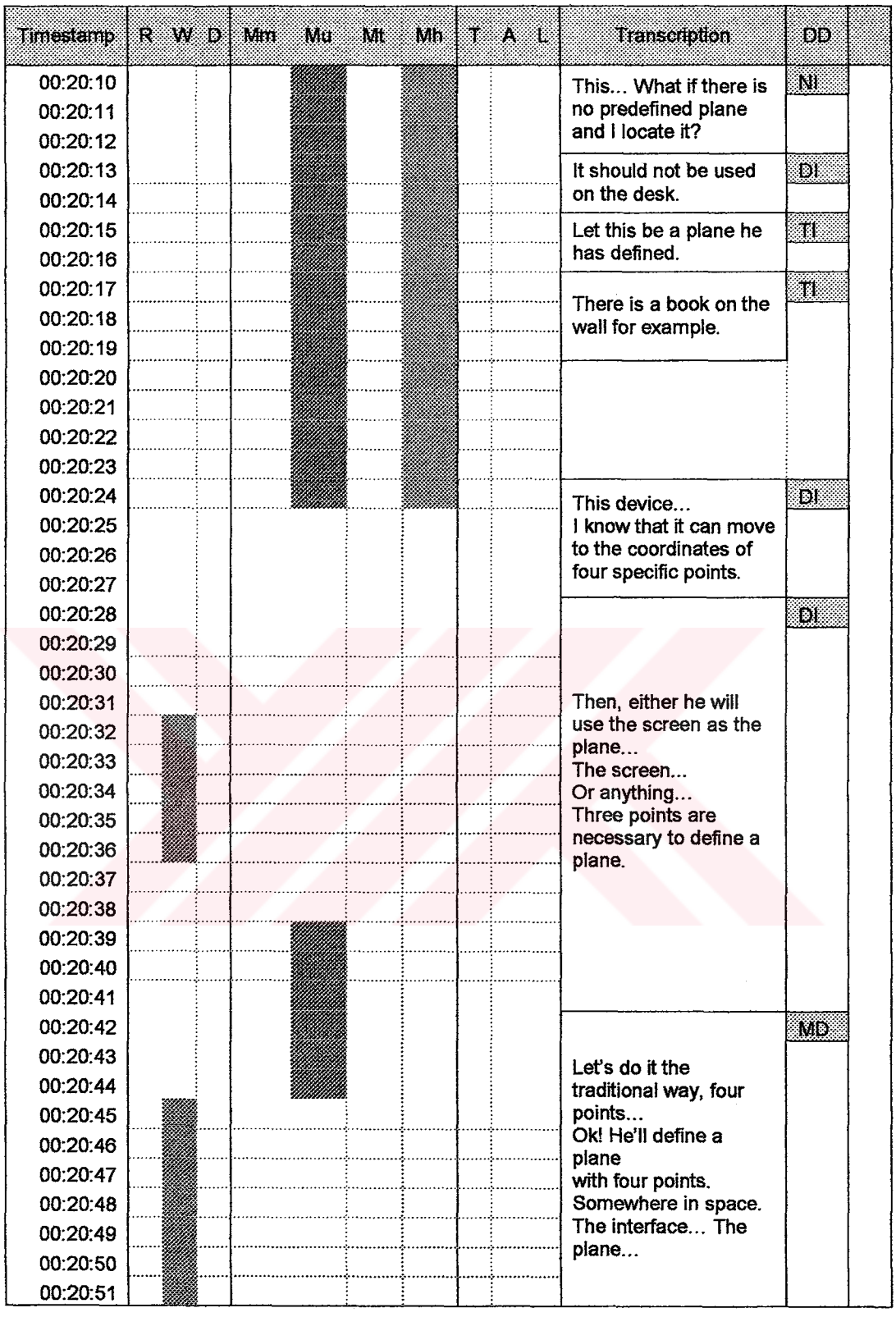


Figure 3.19. Illustration of a design decision segment taken from the protocol of participant Y

The first column shows the timestamp that corresponds to the time elapsed from the beginning of the recording. The next ten columns show the activity categories.

Taking a quick look we can distinguish three activities. The darker column shows that for the first 14 seconds the participant is using a previously made sketch model and at the same time he is holding another model on his other hand, which is inferred from the 'Mu' and 'Mh' columns respectively. It is seldom that the participant is in interaction with two models at the same time.

When we look at the transcription we can see that within these 14 seconds he comes up with an idea, encoded by 'NI' on the design decisions column designated by 'DD' on the right side of the table. He suggests that the device may be used on a user defined virtual plane. By doing this he plans to diminish the dependency on a desk or a similar surface. In his second statement, he mentions this. Since this declaration is part of the 'virtual plane' idea, it is encoded as 'DI', which means 'developing an idea'. Then he has put this idea into test, where he simulates the environment in which the device would be used. 'TI' is marked on the design decisions column for this testing period.

Then he puts the models away, and deals with the problem of defining a virtual plane, where he writes some remarks on the paper. This can be observed from the activities column with the heading 'W'.

At the next step, he utilizes the model again and decides that the most appropriate way of defining the plane is specifying four points in space. This he writes down as a decision.

After allocating the decision segments, it is straightforward to determine the role of modeling and sketching in this decision. For the example given above, the models are used for illustration purposes. Testing the ideas in its environment enables the designer to have a better understanding of the idea being reasonable and/or applicable.

Testing an idea is only one area of interest where models may be utilized. The relations between sketching activities and design decisions will be discussed in depth in the following chapters.

4. RESULTS AND DISCUSSION

4.1 The Raw Data of the Protocols

The raw data is collected in this experiment in 125 minutes of video recording, 25 pages of sketching (6+19) and 11 3D sketches (7+4). The output of the transcription and encoding process is 135 pages (69+66). The numbers given in parenthesis are corresponding to the data related to participant X and participant Y respectively.

4.2 Discussion on the Design of the Research

Being aware of the limitations of the methodology, the research provides valuable information about the potentials of 3D sketching. As far as the design of the research is concerned, it can be told that the research is quiet effective in capturing the evolution of design decisions.

The research can be handled in three steps. The first one is the preparation of the framework before the empirical study, and the second one is the empirical study itself. The third stage is the transcription and the encoding process following the empirical study.

Before going into the detailed discussion about the results, it is essential to evaluate the efficiency of the research in terms of its configurations and elements. It is not to deny that the first stage of the design has to be handled with special attention, namely the preparation of the brief, the duration of the design session and selection of the participants. Considering the fact that it is not possible to apply a protocol analysis to the same person twice, since he/she will be familiar with the process and may become biased on consecutive applications, the discussion about this stage may shed light on future researches on this area.

On the other hand an evaluation about the transcription and the encoding system will trail the discussion on the research setup. Here, activity categories and segmentation will be revised.

4.2.1 Discussion on the Brief

As mentioned before the brief was stimulated by competition briefs. The brief served its duty in the way that it supports and encourages the use of 3D sketches. The product was chosen carefully. From the protocols it can be observed that especially participant X made extensive use of the modeling clay. He was in interaction with the clay for 2492 seconds throughout his design process, the duration of which was 3758 seconds that corresponded to 66% of this total activity. On the contrary participant Y was in interaction with the clay for 400 seconds. His design session took 3621 seconds. Thus the percentage of modeling activity as compared to the total process is 11. As a result of this comparison we can say that the two participants have shown totally diverse approaches in their design process as far as the use of 3D sketches is concerned. The following table shows the comparison of the activities of the designers. The upper values in each row correspond to the activities of participant X and the lower ones correspond to the values related to participant Y's design session. The row headings are the abbreviations for speech, listening, asking, thinking, modeling, drawing and reading respectively.

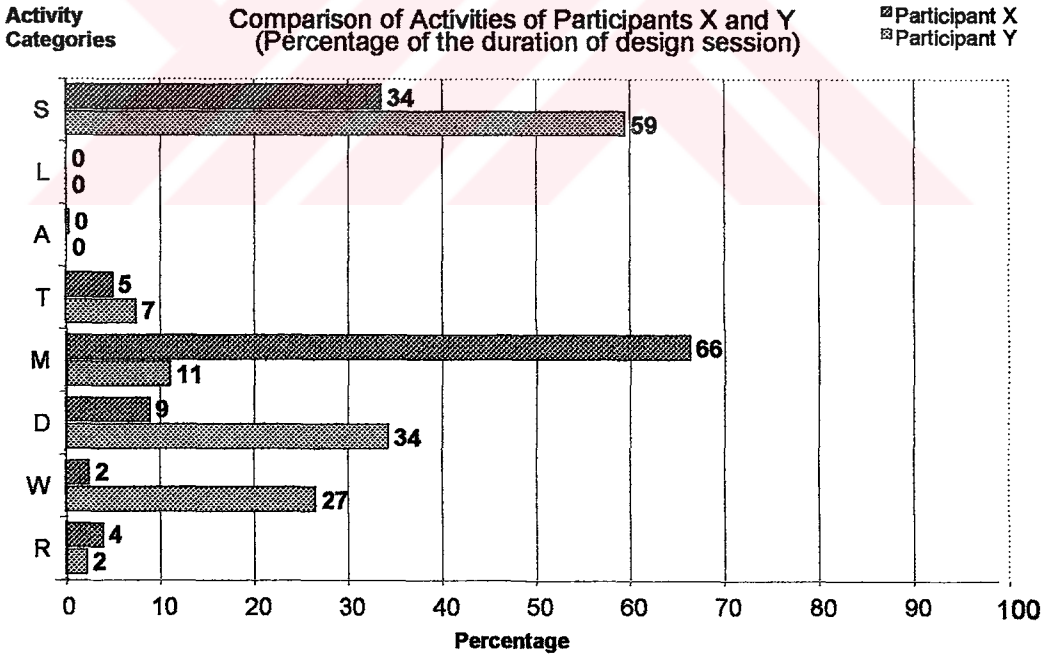


Figure 4.1. Comparison of activities

The difference in the modeling percentage can be better explained when modeling, drawing and writing are evaluated together. It is not to deny that writing as well as drawing is forms of designers' externalizations. Since the modeling activity in this

research also belongs to the same category, it can be told that these three activities serve as exploration tools for the designer. It may vary from designer to designer, but drawing and writing together with modeling correspond to those instances where he/she is in mental interaction with the design problem. Whichever method to be used depends on the designers preferences. It can be observed on the Figure 4.1 that participant X felt more comfortable with modeling whereas participant Y did not prefer to express himself by using 3D sketches. However, the sum of all three activities for both designers gives 77% and 72%, where it is obvious that modeling activity cannot be analyzed in a distinct manner. The role modeling activity and its interaction with drawing and writing should be handled with special care. Having observed these, it can be told that the brief was successful in the way that it supports diverse approaches.

Only one question related to the brief was directed to the instructor through the design sessions of the both participants. The role and the position of the designer was not clear for participant Y. He wanted to know whether the designer is working for company or is a freelance designer. Except this question no further information was demanded by the participants.

4.2.2 Discussion on the Duration

Akin and Lin (1995) divided the design protocol in their study in three major segments: problem understanding, design and retrospection. Additionally they defined three subdivisions in the design stage: conception, development and representation.

The same structure can be observed in the design protocols. Neither of the participants was unable to finish the design process. They both had time to prepare their presentations. Participant X was still developing the design when the remark for the last 5 minutes was made by the instructor. However he prepared a model and two drawings of the finished product. It was not a surprise that he choose the modeling method for the presentation since his design progress relied on the use of 3D sketches. Participant Y, on the other hand, made his presentation as drawings. His creative process is based on the drawings and writings. Taking a closer look at his design progress it can be observed that at the 45th minute he started with a drawing session which persisted till the end of his design session. This period may be

regarded as the representation stage mentioned in Akin and Lin's (1995) work. Hence looking at the protocols, we can see that both participants finished their presentation at the end of the time specified for the design session. Summing up all these one hour seems to be well chosen duration for such a study.

4.2.3 Discussion on the Validity of the Design Session

In this section the validity of the main design session in the research is discussed. The major criteria for the legitimacy of a 'think-aloud' process are the rate of verbalization. Ericcson and Simon (1984) stated in their book 'Protocol Analysis' that a normal relaxed continuous talking person roughly produces 150-200 words in a minute. Think-aloud protocols vary about 50-110 words/minute for 10 subjects in Ohlsson's and Biggs' studies. It is seldom that the verbalization rate reaches the upper limit of human vocalization limits (150 words/minute) during a protocol study. At those instances the participants are doing less creative work. They are just recalling information from the memory.

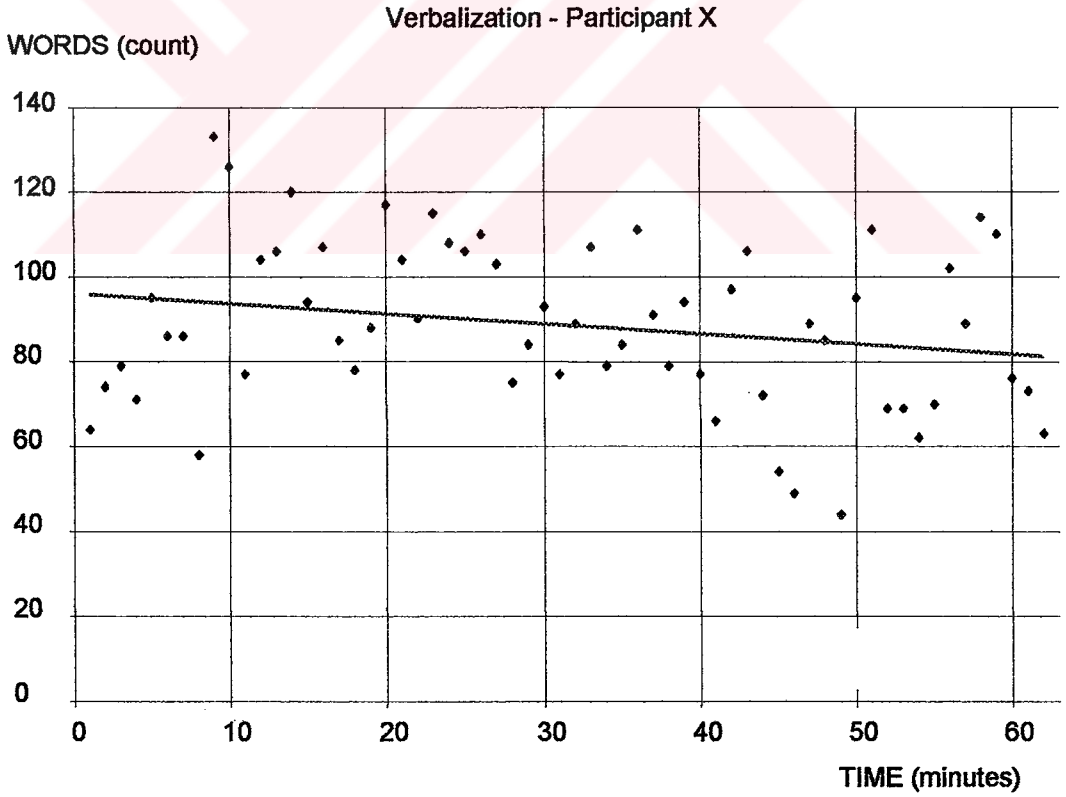


Figure 4.2. Verbalization rate of participant X

The figures show the verbalization performance of participant X and participant Y respectively. The points correspond to the count of spoken words at that moment. Average verbalization rate for the Participant X was 89 words/ minute in this research whereas average verbalization rate for the participant Y was 63 words/minute.

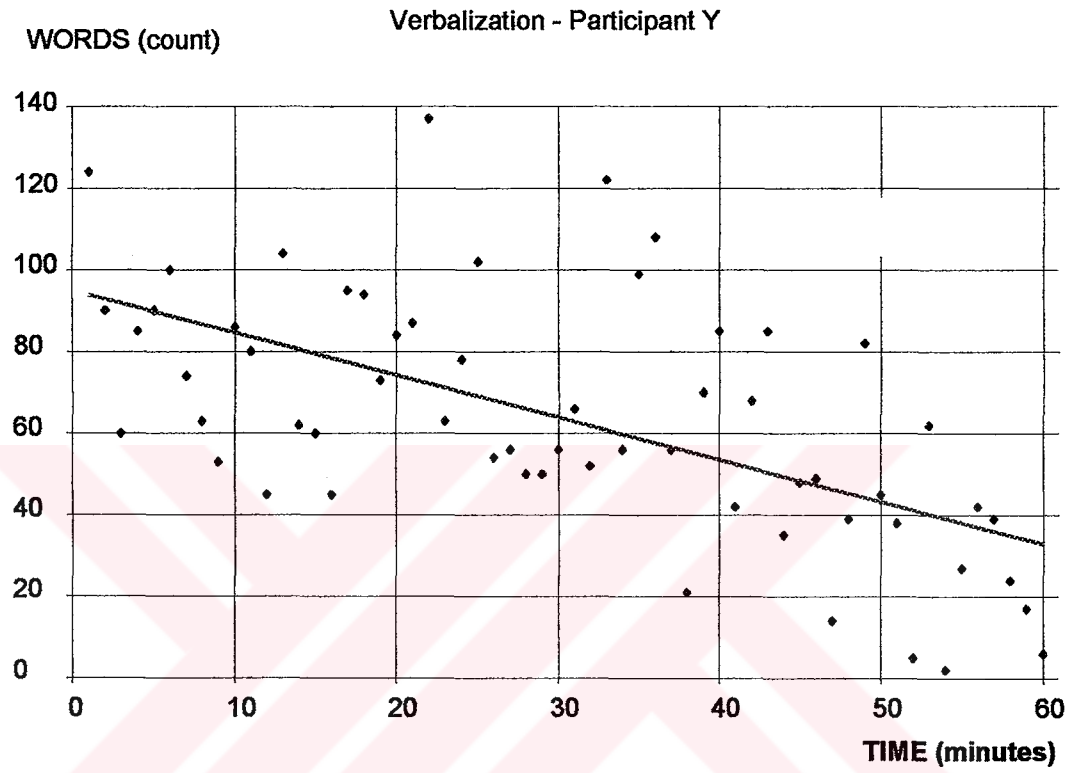


Figure 4.3. Verbalization rate of participant Y

Verbalization rate is crucial for a protocol analysis when think-aloud method is applied because it delivers valuable information about the efficiency of the study.

At the instances where verbalization is over average it is more likely that the designer is working on 'repetitive tasks'. These tasks do not require extensive use of memory, since they are not 'creative' tasks. Usually the designer is verbalizing what he is doing or repeating what he has thought before. Therefore these tasks are called 'repetitive'.

On the other hand when the verbalization rate drops below average, there are two possibilities. First one is that the designer fails to keep up 'thinking aloud' as it is required. At these instances he/she is reminded to resume 'thinking aloud' process. On the other hand, silence intervals shorter than 20 seconds are regarded as intensive

thinking periods. Thus the instances where verbalization drops below average are signs of creative mental processes.

The verbalization rate was highest at the 9th minute for participant X and 22nd minute for participant Y whereas it was lowest at the 49th minute for participant X where he was thinking and 54th minute for participant Y where he was preparing a presentation drawing.

The lines on the verbalization graphs are least R^2 functions for the data. They are calculated with Microsoft Excel Trend-line Function. They represent the overall trend of verbal activity throughout the design session. On both protocols, the rate decreases within the acceptable range. It is not a surprise that the rate is lower at the end of the design session for two reasons:

- The designer is exhausted towards the end of the process. This is because the think-aloud process requires extra effort in terms of mental activity.
- The designer passes from the 'development stage' to the 'representation stage' with Akin and Lin's (1995) notation. At the representation stage, the creative mental activity decreases and the designer usually starts to talk about the presentation.

High verbalization rates on the other hand may cause a phenomenon called 'overshadowing' as far as a 'think-aloud' session is concerned. When the designer is over-involved in verbalizing his/her thoughts, the risk of falling behind mental activity related to creative processes is present. However it is rarely that the limit of 150 words per minute is approximated.

Summarizing the facts stated above, it can be told that the verbal activity neither diminished nor exceeded the acceptable limits.

4.3 Comparison of Design Approaches

As mentioned before the participants in this research had different approaches. Detailed analysis of their design progress shows in which context they made use of 3D sketching and how did this affect the design decisions. In this section the design approaches of the participants will be handled separately and then they will be compared.

Participant X's design approach was considering all factors mentioned in the design brief one by one. The process can be studied in three major segments. These segments fit the design process schema of Akin and Lin (1995), where the design protocol is divided into 'Problem understanding', 'Design' and 'Retrospection' segments. The design segment is further divided into three parts: 'Conception', 'Development' and 'Representation'.

Within the first minute of the design session participant X read the brief to have a better understanding of the design task. Following this, he entered the design stage, where he spoke about the design problem until the 4th minute. Then he took a piece of clay and started with the actual design development. Within this speech period we can observe that 'MP' is marked 9 times. That illustrates, within this segment he makes statements about the design task. Going into detail we can see that he underlines basic constraints and redefines and refines the user needs. This conception stage generates a frame for the designer to work within throughout the design process. No design ideas are stated within this segment.

His first contact with the modeling clay can be considered as the initiation of the development stage. This stage is extends to the 59th minute, where he no more develops the design product and is engaged with preparing the final presentation.

Since the 'representation stage' covers only statements about the designers' actions related to the preparation of the presentation, no more cognitive activity associated with the design decisions is observed. Hence these segments are not encoded. In the protocol of participant X all design ideas and decisions are located within the 'development' stage.

Participant Y, on the other hand, has a completely different approach. He starts with a brainstorming session which he identifies as 'streams of consciousness'. This segment takes 8.5 minutes. Some of the ideas developed in this session considerably affected the final design. The next phase is the development stage which extends to the 45th minute. The rest of his process is directly related to the preparation of presentations. Unlike participant X, who presented both drawings and a model, participant Y preferred to use only presentation drawings. Since this section contains no conceptual activity, it is not included in the analysis.

The encoding of the protocol has also given valuable information about the general structure of the design progress and the personal approaches for attacking the design problem. The following table shows the percentage of occurrence of segments within the protocol with the codes defined in the coding scheme.

Table 4.1. Decision states of participant X and participant Y

	PARTICIPANT X		PARTICIPANT Y	
Design Decision State	Occurrence in the Protocol	Percentage	Occurrence in the Protocol	Percentage
ST	6	1%	0	0%
CT	11	3%	3	1%
NI	19	4%	26	5%
RI	27	6%	33	7%
Q	33	8%	31	6%
DI	39	9%	52	10%
MP	104	24%	45	9%
TI	26	6%	56	11%
MD	4	1%	15	3%
ER	24	6%	26	6%
RD	2	0%	14	3%
MS	138	32%	187	37%
PP	0	0%	9	2%
TOTAL	433	Segments	499	Segments

The dark-shaded cells correspond to codes directly related to the formation of a design decision. A formal decision segment starts with the declaration of the design idea. Then this idea is developed by asking questions and/or seeking answers to these questions. It is obvious that 'MP' segments strengthen design ideas, where they provide a more abstract definition of that idea. At some instances the designer tests the rationality of these ideas. Sometimes they develop the ideas with their own experience. This process mostly ends with the declaration of the decisions. Usually these decisions are revised several times throughout the design session.

'ST' and 'CT' are indications of a planned design process. They reflect the designers' orderliness. They are like checkpoints of the design progress.

Lastly 'MS' stands for statements unrelated to the design problem and 'PP' stands for preparation of a presentation. However, since the presentation stage is excluded for reasons explained, it is rarely possible to detect a presentation segment.

Looking at the percentages of participant X, it can be revealed that 'MP' segments play an important role in his approach. This indicates that the designer is considering design situations or problems with every aspect related to it.

Table 4.1., on the other hand, reflects the states of participant Y within the encoded part of the design session. When compared to participant X, the frequency of 'MP' segments are relatively low with the value of 9%. This may be evidence for a less 'in depth' inquiry for design ideas.

Conversely it is also obvious that participant Y came up with 26 design ideas. This is a superior value as compared to the 19 ideas of participant X. When the 'ST' and 'CT' vales are compared, remembering that they are indications of a more orderly design process, there is a great difference in favor of Participant X.

Summing up all the observations mentioned above, the following deductions can be made:

- Participant X produced relatively fewer design ideas, but he examined and developed them in a more precise and profound way. Moreover, he has a rather orderly design process.
- Participant Y preferred to swing between design ideas where he is more productive in terms of the quantity of design ideas. However, as far as their rationality is concerned, he has not abstracted these ideas as detailed as participant X.

4.4 The Use of 3D Sketching

In this section the use of 3D sketching is compared for participant X and Y. Two criteria are taken into account by making this comparison. The first one is the rate of the total of instances in terms of seconds where the designer is in interaction with the modeling clay to the duration of the design session. Participant X was noticeably

adopted to 3D sketching. His 66% is considerably higher than the rate of participant Y having 11%. However the second criterion becomes more crucial as far as the role of modeling within the design process is concerned. This is the rate of the four different modeling activities defined in this research to the overall modeling activity.

Participant X, on one end of the balance, built his process as well as his presentation on 3D sketching. The instances, at which he was model-making, match 9% of the total design process and 14% of the modeling activities. Moreover he was using these models for illustration or testing purposes on 30% of the total design process and %44 of the modeling activities. 'Model-using' appears to be his most frequent activity followed by 'Model-holding' within all modeling activities. Additionally when compared to all activities, 'Model-using' trails speech having 34%. 'Model-holding' corresponds to 23% of the total design process and 34% of the modeling activities. 'Model-transforming' being the least occurring activity for participant X matches 5% of the total design process and 8% of the modeling activities.

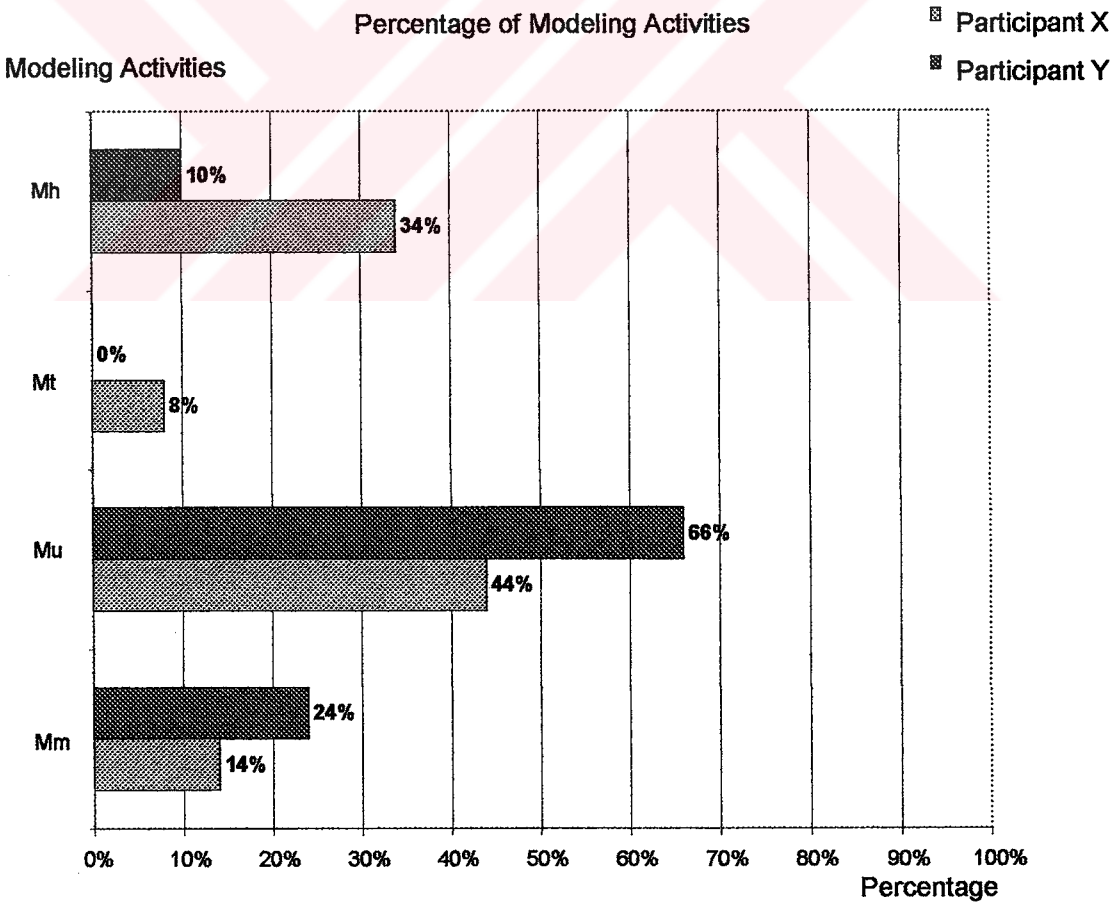


Figure 4.4. Modeling activities of participant X and participant Y

Participant Y, on the other hand of the scale, did not introduce 3D sketches into his design process as easily as participant X. He behaved in a rather conservative way.

The instances, at which he was involved with a modeling activity, match 11% of his total design activity. Again this is a very minute utilization of 3D sketching as compared to participant X, where 66% of whose activity was supported by 3D sketches.

'Model- making' corresponds to 3% of his design process and 24% of the modeling activities. He was using these models for illustration or testing purposes on 7% of the total design process and 66% of the modeling activities. 'Model-using' appears to be also participant Y's most frequent activity. It is followed by 'Model-making' within all modeling activities. Additionally, 'Model-holding' corresponds to 1% of the total design process and 10% of the modeling activities. 'Model-transforming' did not occur throughout his design process.

Both the quantity and the quality of the modeling activities clearly indicate that participant X was more successful in incorporating 3D sketching in his design process. Seeing that the unconscious modeling activities ('Mh', 'Mt') frequently occurred, it is obvious that these instances are candidates for reinterpretations to occur. Remembering that the reinterpretations are one of the most important cognitive implications of sketching, these instances are of primary concern.

4.5 The Relation of Design Decisions and Sketching

In order to relate the design decisions to sketching activity it is essential to identify the evolution of the design decisions. Each decision process starts with a design idea. This idea may be the successor of a previous idea or decision. Then this idea goes through the different stages as explained above before it develops into a decision. Within this process, sketching is considered to be a supportive tool for creative mental activities. Sketches with their ambiguous and incomplete form or structure may lead to reinterpretations and thus new design ideas. Moreover they serve as 'external memory aids'. The creative mental activity is mainly related with the short term memory. Sketches embody the information which is produced by the mental activity of the designer. Drawing, modeling or even writing can be seen as forms of externalizations. Which one or ones is utilized by the designer is of primary concern.

Through the analysis of the transcription it may be observed that at certain parts of the process, a sketching activity dominates the others and becomes the major sketching tool for that period. On the contrary, there are episodes where all of these activities are used in interaction. These will be called as 'dominant activity episodes' and 'interactive activity episodes' respectively.

In order to have an understanding of the relations between sketching activity and decision mechanism, the role of these activity episodes within the decision formation is going to be explored.

Table 4.3 illustrates the design ideas and decisions observed in the protocol of participant Y. The first column of this table corresponds to the identification number of the design ideas, enumerated in order of appearance. The next column has the brief explanation of the design idea. Third column, designated with 'IL' as column heading, shows if the decision had an influence on the final product. Three levels are marked in this column which are:

1. Highly effective on the final product,
2. Minor contributions to the final product,
3. No effect on the final product.

The next column, named 'REL', shows the relations of the design ideas with previous ones. Some ideas may be inspired by previous ideas, although they are original in their own context.

The following two columns show the first occurrence of a design idea and the related decision, if one exists. The second column from right lists how many time that design idea is revised and the last column designates the 'novel design decisions' with the terminology of Akin and Lin (1995).

Table 4.2. List of design ideas for participant Y

ID	DESIGN IDEA	IL	REL	FIRST IDEA	DECISION	REVISED	NDD
000	REMOTE CONTROL	1		00:02:28		2	
001	MOUSE IS EVERYWHERE	1		00:03:49		2	
002	SPATIAL	1		00:04:02		7	NDD
003	VOICE CONTROLLED	1		00:04:33	00:05:12	10	NDD
004	INTERFACE CLEANS THE SURFACE	3		00:05:48	00:05:52	0	
005	VARIANT FORM	3		00:06:05	00:29:08	5	
006	EYEWEAR	3		00:10:00		1	
007	OMITING THE KEYBOARD	3		00:11:46	00:11:57	2	
008	USED ON THE FINGER	1		00:12:26	00:17:15	5	NDD
009	PROGRAMMABLE	1		00:16:42	00:34:10	0	
010	WORKS BOTH ON THE SCREEN AND WITH THE DEVICE	2		00:19:33		0	
011	CAN BE USED IN THE PALM	3		00:19:44		0	
012	USER DEFINES THE PLANE	1	002	00:20:10	00:20:42	0	NDD
013	RING-LIKE	1		00:22:39		2	
014	SOMETHING COMPLETELY DIFFERENT	2			00:24:39	0	
015	SHOULD HAVE A POINTER	1		00:24:56		0	
016	TWO RING WITH DIFFERENT LEVELS OF HIERARCHY	2		00:27:45		2	
017	WEARABLE LIKE JEWELLERY	1		00:30:22		0	
018	PRESET FUNCTIONS	1		00:32:36	00:34:07	1	
019	COMMANDS ACTIVATED WITH SPECIAL MOTIONS	1		00:34:55	00:35:21	1	NDD
020	TWO VERSIONS (VOICE, POINTER)	1		00:35:40	00:36:07	3	
021	USED ON THE TIP OF THE FINGER	1		00:36:54		0	
022	BOTH DEVICES ARE CONNECTED	3		00:38:41	00:38:52	0	
023	FITS ALL FINGERS	1	008	00:39:35	00:40:05	2	
024	GIVES FEEDBACK TO THE USER VIA LIGHT SIGNAL	1		00:41:10		0	
025	HAS THE FORM OF A POINTER	1	015	00:41:32		2	
026	DIFFERENT VERSIONS WITH DIFFERENT MATERIALS	2		00:42:01		1	

After the design session the participants are asked to write down the design decisions they recall on a paper. This retrospective report is also evaluated and these decisions are marked with a shaded background on the table. It is not to deny that these decisions are of higher importance in the way that they are recalled from the long term memory of the designer.

The activity episodes, on the other hand, are determined from the activity diagram. The dominant or interactive activities are listed in the following table and the design ideas and decisions are matched to the periods they occurred within.

First column shows the identification number of each period. The second column defines the starting and ending timestamps for the period. The third column designates the dominant activity or activities of that period. Next two columns are assigned to design ideas and decisions stated within that period. Reviews of design ideas and decisions are also included in this list, because they are as well indications of problem solving sessions. Bold characters reveal the novel ideas and decisions.

The second column from right shows the length of the period in seconds. The last column in the table corresponds to the density of design ideas and decisions in the related period. Density is calculated as the number of decision per minute. Higher densities represent a higher level of mental activity.

The highest decision density is found on the 8^{th} period where participant Y was writing and drawing. This interactive session produced a new design idea and three design decisions were made two of which are designated to be novel in the analysis. From the whole transcription it may be observed that participant Y utilized writing as a very powerful tool for supporting his brainstorming session. Remembering that drawing was his favorite sketching tool with 34% of his total activity, it is not a surprise that the combination of these techniques produced a constructive period like this.

Table 4.3. Design activity periods and design decisions for participant Y

ID	Time span	Dominant Activities	Design Ideas	Design Decisions	Duration (Seconds)	Decision and Idea Density (D/ min)
1	00:00:00 - 00:09:45	W	000, 001, *002*, *003*, 004, 005, 006	*003*, 004	585	0,92
2	00:09:45 - 00:15:45	M, D, W	006, 007, *008*	007, 007, 007, *003*, 007	360	*1,33*
3	00:15:45 - 00:17:45	W	009	*008*	120	1,00
4	00:17:45 - 00:21:45	M	010, 011, *012*	*012*	240	1,00
5	00:21:45 - 00:25:05	D	013	*008*, *003*, *008*, 014	200	*1,50*
6	00:25:05 - 00:26:20	M		*008*	75	0,80
7	00:26:20 - 00:29:00	D	016		160	0,38
8	00:29:00 - 00:30:05	W, D	017	*002*, *003*, 005	65	*3,69*
9	00:30:05 - 00:32:00	M		*003*	115	0,52
10	00:32:00 - 00:37:00	W, M	018, *019*, 020, 021	018, 009, *019*, 020, *019*, *008*	300	*2,00*
11	00:37:00 - 00:40:10	D	022, 023	022, *008*, 023	190	*1,58*
12	00:40:10 - 00:41:10	M	024		60	1,00
13	00:41:10 - 00:43:00	W, D	025, 026	023	170	1,06
14	00:43:00 - 00:45:00	D		023	120	0,50

The second period in term of density is a 'writing' and 'modeling' period. Within five minutes four new ideas are stated one of which is a novel idea. Moreover six

decisions are declared in the same period. Three of the decisions are novel decisions. It is not to deny that this period has a high level contribution to the final product.

The 11 and 5 are third and fourth periods respectively on the scale of density. Both of them are dominant drawing sessions.

The same analysis is performed for the protocol of participant X. As mentioned before the design strategy of participant X was based on investigating design ideas in all aspects. This approach produces a structured protocol and 'decision cycles' are less interrupted. As a result of this, however, the number of design ideas and their revisions decreases drastically.

Table 4.4. List of design ideas for participant X

ID	DESIGN IDEA	IL	REL	FIRST IDEA	DECISION	REVISED	NDD
000	VERTICAL DEVICE	1		00:04:48		6	NDD
001	MOTION ON THE SCREEN IS PARALLEL TO THE HAND	1		00:05:17		4	NDD
002	HANDSHAKING POSITION	1	000	00:17:01		2	NDD
003	VERTICAL SCROLL BUTTON	1	001	00:17:49		2	NDD
004	CLICKING WITH THE WRIST	3		00:20:29		0	
005	MULTI-FINGER CLICKING	1		00:21:10		1	
006	LONG BUTTON	1	005	00:21:25		0	
007	TWO LONG BUTTONS	2	006	00:22:20	00:23:24	1	
008	TOUCH-PAD LIKE	3		00:25:41		0	
009	SCROLLING ASSIGNED TO THE THUMB	1		00:26:16	00:54:54	4	NDD
010	ANGLED STRUCTURE	2	000	00:27:35		0	
011	SMALL DEVICE	3		00:28:38		0	
012	TRANSPARENT DEVICE	3	002	00:28:24		0	
013	SINGLE CLICK INSTEAD OF DOUBLE CLICK	2		00:32:03		1	
014	EYE CONTROL	3		00:34:06	00:34:19	2	
015	CONTRAIN WRIST MOTION	1		00:39:01		2	NDD
016	SENSITIVE SCREEN	3		00:41:30		0	
017	WRIST-PAD	1		00:49:39		2	
018	ADJUSTABLE STRUCTURE	1	017	00:58:11		0	NDD

The number of 'novel design decision' on the other hand is superior to the protocol of participant Y. In addition to that, the retrospective analysis have shown that the decision he stated as 'novel' perfectly fits with the decision list established through the analysis of his protocol.

Table 4.5. Design activity periods and design decisions for participant X

ID	Time span	Dominant Activities	Design Ideas	Design Decisions	Duration (Seconds)	Decision and Idea Density (D/ min)
1	00:00:00 - 00:04:15	0			255	0
2	00:04:15 - 00:10:00	M	*000, 000, 001*		345	0,52
3	00:10:00 - 00:11:30	W			90	0
4	00:11:30 - 00:16:45	M	*000*		315	0,19
5	00:16:45 - 00:18:30	W	*002, 002, 003, 001*		105	*2,29*
6	00:18:30 - 00:46:30	M	000, 004, 005, 006, 007, 005, 003, 008, 009, 000, 010, 009, 011, 012, 009, 013, 014, 014, 013, 015, 016, 000, 001, 001, 001	007, 014	1680	*0,96*
7	00:46:30 - 00:49:00	0	001, 000		150	0,80
8	00:49:00 - 00:54:00	D, W	003, 009, 017, 017		300	*0,80*
9	00:54:00 - 00:59:00	M	015, 015, 018	009	300	*0,80*

When these decisions are matched to the activity periods, the relation between sketching activities and creative mental activities becomes more obvious. As

mentioned before, the density of design decisions within a period, in terms of decisions and/or ides per minute, will serve the evaluation of this relation.

The 1st and 7th periods are surprisingly prolonged periods of total inactivity in terms of representations. No drawing, modeling or writing activity is observed in these intervals. Within these intervals, the designer talks about the design situation.

Another important observation would be the 6th period, where the designer goes through a modeling session uninterrupted. In terms of the density of design decisions, it is obvious that the rates are much lower as compared to participant Y. This is not a surprise since it is designated that their strategies differ in the sense that participant X develops ideas in a profound way whereas participant Y comes up with as many design ideas as he can.

Looking at the most productive periods of participant X, another interesting period is at the top of the list. Within the fifth period the designer comes up with two new ideas and revises two former ones. This session serves as an externalization period for the ideas he has developed until that instance. The statement he makes at the end of the 16th minute clearly proves this:

> *Until now I have spoken a lot... Now I'm going to write down the major properties of my device.*

The next period to be examined is the 6th period. The length of this period is extraordinary as compared to the others within the results of this research. However this period has inner dynamics as far as the different modes of modeling activity is concerned. Seeing that participant X has fluctuating states of conscious ('Mm' and 'Mu') and unconscious ('Mt' and 'Mh') modeling activity within this period, it can be concluded that the density of inner dynamics of a certain modeling activity also affects the quality of itself.

Additionally, the 8th period, which is third on the scale of decision density, is the only occurrence of interactive use of different sketching activities. It is evident that participant X has built his strategy on modeling; however, his strategy lacks interactive use of sketching.

Summing up all the results, participant Y performed a perfectly dynamic and interactive process, however he could not integrate modeling activity into his process efficiently. On the other hand, participant X made excellent use of modeling,

demonstrating all the potentials of 3D sketching, however he was not able to implement modeling into the classical sketching methods. These results underline the fact that a productive and efficient design process relies on using different design tools in interaction and keeping the balance in between.

5. CONCLUSION

5.1 Conclusions on the Research

Primary concern of this research was exploring new dimensions for sketching activity in the preliminary design phase. Modeling, already being an element of the design progress, but being utilized at a latter stage, seems to be a candidate for a new conceptual design tool. By exploring the capabilities of using modeling as a sketch tool, it is intended to make the designers experience the three dimensional essence of the design at an earlier stage, preferably at the conceptual one.

In this research it was observed that 3D sketching may have considerable contributions to the design process, when used in the early stages of the design process. It was revealed that sketching should not only be defined and explored on designers' drawings. The mutual interaction of drawings and modeling produced promising results as far as the role of 'sketching' in creativity is concerned.

The coding scheme proposed here is based on the relation between states of design decisions and sketching activities. As a consequence, it is observed that 3D sketching emerged in different forms, namely 'model making', 'using', 'transforming' and 'holding', where each form served distinct purposes during the design process. Since modeling activity is not represented in existing coding schemes, this research may also provide a theoretical background for more comprehensive description methods in the future.

5.2 Recommendations for Further Research

As mentioned before in this report, analysis of protocols is a time consuming process. Moreover, quality of the encoding process and the procedure of the experiment are more significant than the quantity of the participants, when doing a 'pilot study' in a new area of interest. Since the way of introducing 3D sketching into the design process, exploring its interactions and generating a description method for

future research was the aim of this study, two students with contrary approaches were considered to be adequate.

However increasing the number of the participants may be reasonable after settling with the encoding process, when a statistical comparison is intended.

Another approach would be repeating the experiment with different design tasks. By changing the brief, criteria for suitability of clay modeling for different types of products can be settled. Some products are not likely to be modeled by clay, because of their structure. A bicycle, for example, has a wire frame structure and is difficult to model with clay. Alternative method may be investigated to enhance capabilities of 3D sketching.

In this research participants were allowed to choose which sketching method to utilize. They were told that they were expected to use 3D sketching in their design process. As a result of this two completely diverse approaches were observed. One of the designers made use of 3D sketching quiet often. It can be inferred from the results that he felt more comfortable representing mental images with 3D objects. On the other hand, the other designer appeared to be more conservative and made his sketches on the paper. The only purpose he could assign to 3D sketching was testing some design ideas. This in turn, was a data in itself. After establishing the conceptual framework for the role of 3D sketching, it is also possible to concentrate on the modeling only. Designers may be encouraged to use only clay for creative process by restricting sketching on paper. This enables the researcher to derive conclusions about the ways of enhancing the capabilities of 3D sketching and making it a promising tool for design process.

Both of the participants of this research were industrial design students. However, other design disciplines, such as architecture or interior design, are candidates for 3D sketching practice. Participants may be chosen accordingly. Even participants, having an educational background other than design, could be selected. This will give an insight in the relation between creativity and design tools that support it. There has been considerable amount of research conducted to understand the essentials of sketching, being the most effective creative tool for many designers. However alternative methods are not questioned in detail. Different disciplines would have to understand the role of education on creativity. How do people express their ideas? Which tools do they utilize? Is sketching a supportive tool or is its

representative quality mostly dependant on individual talent and does it become an exertion in some cases to express ideas by sketching? Answering these questions will give some insight about the nature of 3D sketching.

Not only different disciplines, but also different levels of expertise are to be concerned. Many studies have been made for comparison of expert and novice designers as long as the conventional way of sketching is concerned. The acceptance level of experts and novices may vary, when they are entitled to use 3D sketching. This is also an interesting comparison, which will probably deliver valuable information about how and to what extend novice and expert designers are likely to introduce 3D sketching into their own design approach. This, in turn, may also contribute to design education.

Although it is known, that professionals make use of 3D sketching in their design processes, no research has been found on this area. It is possible to determine from analysis of design protocols or observations of professionals, on which occasions they favor 3D sketching as a design tool.

There is also a further aspect to the area under discussion which concerns design education. If 3D sketching in interaction with conventional 2D sketching is recognized as a favorable tool for the early stages of the design process, how to introducing it into the design education becomes a subject matter. Through observation of students in their project environment, where they are entitled to utilize 3D sketching, valuable information about educational issues might be gathered.

It is also apparent that this discussion raises some questions in relation to the cognitive issues. Design imagery is held to be the most important mental activity related to creativity. Psychological experiments may help understanding properties of 3D figures. Studies on sketches have shown that properties like ambiguity and incompleteness in figures on paper (sketches in the case of design) lead to reinterpretations in the mind. This is considered to be the most important means of creativity. However we know very little about the properties of 3D figures. To what extend are they ambiguous? Do they allow reinterpretations in mental imagery? To what extend do they contribute to creativity? These questions are to be inquired. Since these issues are highly related to psychology, it may be adequate to conduct psychological experiments.

REFERENCES

Akin, Ö. and Lin, C., 1995. Design protocol data and novel design decisions, *Design Studies*, **Vol. 16**, 211-236.

Dorst, K., 1997. Describing design, a comparison of paradigms, *Ph.D. Thesis*, Delft University of Technology.

Dorst, K. and Dijkhuis, J., 1995. Comparing paradigms for describing design activity, *Design Studies*, **Vol. 16**, 261-274.

Eastman, C.M., 1970. On the analysis of intuitive design process, *Emerging Methods in Environmental Design and Planning*, MIT Press, Cambridge, MA

Ericsson, K.A. and Simon, H.A., 1984. Protocol Analysis: Verbal Reports as Data, MIT Press, Cambridge, MA.

Goel, V., 1995. Sketches of thought, MIT Press, Cambridge, MA, *quoted in Purcell*, 1998.

Goldschmidt, G., 1991. The dialectic of sketching, *Creativity Research Journal*, **Vol. 4**, No. 2, 135-164, *quoted in Purcell*, 1998.

Milanski, J., 1997. Usability test results: Parkbench (social furniture), www.id.iit.edu/~milanski/design/ParkBench.pdf, Institute of Design / IIT, Chicago.

Milanski, J. and Wang H., 1996. Behavioral Prototype: redesign of an in-store bottling machine, www.id.iit.edu/~milanski/design/ParkBench.pdf, Institute of Design / IIT, Chicago.

Newell, A. and Simon, H.A., 1972. Human problem solving, Prentice-Hall, EnglewoodCliffs, N.J.

Purcell, A.T. and Gero, J., 1998. Drawing and design process, *Design Studies*, **Vol. 19**, 389-430.

Schön, D.A., 1983. The Reflective Practitioner, Basic Books, New York.

Schön, D.A., Wiggins, G., 1992. Kinds of seeing and their function in designing', *Design Studies*, **Vol. 13**, 135-156.

Suwa, M., Purcell, A.T. and Gero, J., 1998. Macroscopic analysis of design process based on a scheme for coding designers' cognitive actions, *Design Studies*, **Vol. 19**, 455-483.

Kavakli, M. and Gero, J. S., 2001. Sketching as mental imagery processing, *Design Studies*, **Vol. 22**, 347-364.

Kavakli, M., Scrivener, S.A.R. and Ball, L.J., 1998. Structure in idea sketcing behaviour, *Design Studies*, **Vol. 19**, 485-517.

Oxman, R., 1997. Design by re-representation: a model of visual reasoning in design, *Design Studies*, **Vol. 18**, 329-347.

Oxman, R., 2002. The thinking eye, *Design Studies*, **Vol. 23**, 135-164.

Verstijnen, I.M., Hennessey, J.M., Leeuwen, C., Hamel, R., Goldschmidt, G., 1998. Sketching and creative discovery, *Design Studies*, **Vol. 19**, 485-517.

APPENDICES

Appendix A.1.

The design brief

Firma:

Uzakdoğu merkezli, Avrupa ve Amerika'da şubeleri bulunan firma, OEM (Original Equipment Manufacturer) ürün pazarında geniş ürün yelpazesiyle dikkat çekmektedir. Kablosuz arabirimler, ağ bağlantı birimleri, haberleşme cihazları konusunda kaliteli ürünler sunan firmanın hedefi İnternet kullanıcına yönelmek, yenilikçi ürün fikirleri ortaya çıkarmaktır. Günümüzde hızla değişmekte ve gelişmekte olan bilgi teknolojileri sektöründe yenilikçi yaklaşımların ancak araştırma-geliştirme yatırımları ile mümkün olacağının bilincinde olan firma yetkilileri, 'e-letişim' konulu bir proje başlatmışlardır.

Amaç:

Gün geçtikçe gelişen ve karmaşıklaşan dijital teknolojilerde insan-bilgisayar iletişimi en önemli konulardan biri halini almıştır. Teknoloji anlaşılırlık, kolaylık gibi temel kavramlardan uzaklaşmış, hayatı kolaylaştırmak yerine zorlaştırmaya başlamıştır. Arayüz ve arabirim tasarımı bu sorunun en önemli kaynaklarından biridir. İyi tasarlanmamış bir iletişim arabirimi gerek psikolojik, gerekse fiziksel sorunlara yol açmaktadır.

Tasarımcılardan, bilgisayar kullanıcısının temel iletişim ihtiyaçlarını (İnternet, sunum, e-mail vb..) göz önünde bulundurarak yenilikçi bir 'iletişim arabirimi' tasarlamaları beklenmektedir. Bu arabirimin tasarımcıya sağlıklı, anlaşılır ve verimli bir çalışma ortamı sağlaması amaçlanmaktadır.

Değerlendirme kriterleri:

Tasarımda yenilikçilik
Tasarımda teknolojinin kullanıcıya faydalı kullanımı
Tasarımın ergonomik özellikleri
Tasarımda ürün estetiği

Temel iletişim ihtiyaçlarından bazıları:

Ekranda imleci gezdirme
İşaretleme
Seçme
Ekran kaydırma (scroll)
Menü açma
Kişiselleştirilebilme

Sunum:

Ürün fikrinin serbest sunum tekniğiyle hazırlanmış anlatımı.

Süre:

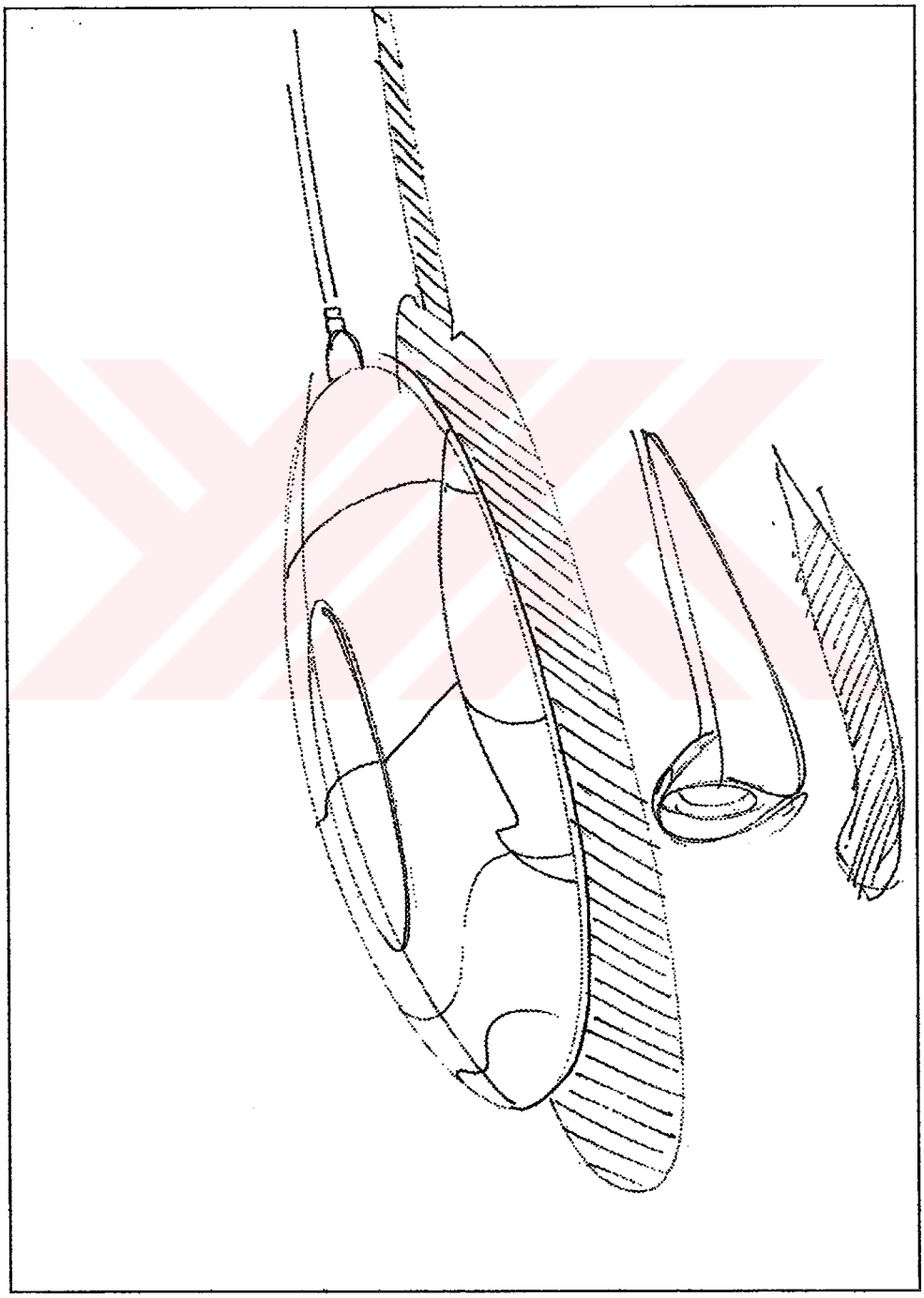
1 saat

Appendix B.1.

The presentation drawing of participant X

Appendix B.2.

The presentation drawing of participant Y



Appendix C.1.

The clay models of participant X

Appendix C.2.

The clay models of participant Y

Appendix D.1.

Transcription of the protocol of participant X

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:00:00												
00:00:01												
00:00:02												
00:00:03												
00:00:04												
00:00:05												
00:00:06												
00:00:07												
00:00:08												
00:00:09												
00:00:10												
00:00:11												
00:00:12												
00:00:13												
00:00:14											Benden şu anda istenen ürün, bilgisayar	MS
00:00:15											kullanıcısının temel iletişim ihtiyaçlarını göz	
00:00:16											önünde bulundura... bulundurarak yenilikçi	
00:00:17											bir iletişim arabirimi tasarlamak	
00:00:18												
00:00:19												
00:00:20												
00:00:21												
00:00:22												
00:00:23												
00:00:24												
00:00:25											İletişim ih... tiyacını karşılayan yeniliçi bir	MS
00:00:26											iletişim ara-birimi.	
00:00:27												
00:00:28												
00:00:29												
00:00:30												
00:00:31												
00:00:32											Arabirim,	MS
00:00:33											yani bilgisayarda bugün kullanmış	
00:00:34											olduğumuz klavye mouse gibi cihazlardan	
00:00:35											bahsediyoruz	
00:00:36												
00:00:37												
00:00:38												
00:00:39												
00:00:40											Bunların yenilikçi...	MS
00:00:41											teknolojinin kullanıcıya faydalı	
00:00:42											Ergonomik özellikleri ve ürün estetiği	
00:00:43											Gibi kriterlerde.. önemi var	
00:00:44											Bu konular da... değerlendirme kriterlerimiz	
00:00:45											yani	
00:00:46												
00:00:47												
00:00:48												
00:00:49												
00:00:50												
00:00:51												
00:00:52												
00:00:53												
00:00:54												
00:00:55												
00:00:56												
00:00:57											Hmm...	MS
00:00:58											Evet şimdi...	
00:00:59											bir arabirimden bahsediyoruz	

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:01:00												
00:01:01												
00:01:02												
00:01:03												
00:01:04											İntenet'te neler yapıyoruz	MP
00:01:05											Ekranda imleci gezdiriyoruz,	
00:01:06											İşaretliyoruz,	
00:01:07											Seçiyoruz,	
00:01:08											Ekranı aşağı yukarı hareket ettiriyoruz	
00:01:09											Bir menüyü açıyoruz, kapatıryoruz..	
00:01:10												
00:01:11												
00:01:12												
00:01:13												
00:01:14												
00:01:15												
00:01:16												
00:01:17												
00:01:18											Hmm...	MS
00:01:19											Bunlar için yaptığımız işlemler	
00:01:20											Bunları yaparken	
00:01:21												
00:01:22											Bişeyi	MP
00:01:23											Mesela ekranı kaydırırken birşeyi	
00:01:24											yuvarlıyoruz.	
00:01:25												
00:01:26											Birşeyi işaretlemek istediğimizde, seçmek	
00:01:27											istediğimizde	
00:01:28											Tıklıyoruz, parmağımızla birşeye	
00:01:29											bastırıyoruz.	
00:01:30												
00:01:31											Yada oraya giderken elimizi kolumuzu	
00:01:32											hareket ettiriyoruz.	
00:01:33												
00:01:34												
00:01:35												
00:01:36												
00:01:37												
00:01:38												
00:01:39												
00:01:40												
00:01:41												
00:01:42											Görsel anlamda bir noktaya giderken elimizi	MP
00:01:43											kolumuzu kaydırdırdığımız için	
00:01:44											bunun dolayısıyla	
00:01:45											eee...	
00:01:46											bildirişim açısından aynı yönde olması	
00:01:47											kullanıcı için...	
00:01:48											daha...	
00:01:49											kolay değil de	
00:01:50											iletişim açısından daha sağlıklı olur	
00:01:51												
00:01:52												
00:01:53												
00:01:54												
00:01:55												
00:01:56												
00:01:57												
00:01:58												
00:01:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:02:00												
00:02:01												
00:02:02												
00:02:03												
00:02:04											bir insan elini sağa doğru hareket	MP
00:02:05											ettirdiğinde imlecin de sağa doğru hareket	
00:02:06											etmesi çok daha mantıklıdır..	
00:02:07												
00:02:08												
00:02:09												
00:02:10												
00:02:11												
00:02:12												
00:02:13												
00:02:14											O yüzden elimizin	MP
00:02:15											Yani cihazı kullanırken belli bir rotasyon,	
00:02:16											belli bir ilerleme, sağa sola kayma mevcut	
00:02:17											olacak tabi ki..	
00:02:18												
00:02:19												
00:02:20												
00:02:21												
00:02:22												
00:02:23												
00:02:24												
00:02:25											Çok komplex birşeyden bahsetmiyorsak	MP
00:02:26											eğer	
00:02:27											Hmm...	
00:02:28												
00:02:29												
00:02:30												
00:02:31												
00:02:32												
00:02:33												
00:02:34												
00:02:35											İhtiyaçlarımızı belirleyelim önce	MP
00:02:36											Ne dedik..	
00:02:37											Tıklama dedik	
00:02:38											Bi kak	
00:02:39											sağa sola kaydırma	
00:02:40											ileri geri gitme	
00:02:41											ekranı kaydırmak için yine	
00:02:42											yuvarlama olabilir	
00:02:43												
00:02:44												
00:02:45												
00:02:46												
00:02:47												
00:02:48											menü açmaktan bahsettik.	MP
00:02:49											Menü açmak için başka tuşlara basıp	
00:02:50											Seçiyoruz falan..	
00:02:51												
00:02:52												
00:02:53												
00:02:54												
00:02:55											Temel iletişim ihtiyaçlarından bazıları	MS
00:02:56											İletişim arabirimi	
00:02:57											Konumuz	
00:02:58											Tekrar başa döndük.	
00:02:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:03:00												
00:03:01												
00:03:02												
00:03:03												
00:03:04												
00:03:05												
00:03:06												
00:03:07												
00:03:08												
00:03:09												
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00:03:11												
00:03:12												
00:03:13												
00:03:14											böyle bir ürün tasarlarken	MS
00:03:15											şu an..	
00:03:16											günümüz teknolojileri dışında da kalabiliriz	
00:03:17											daha ileriki bir teknolojiye sahip bir ürün de	
00:03:18											tasarlayabilirim	
00:03:19											böyle birşey	
00:03:20											böyle bir konuda kısıtlanmadım.	
00:03:21												
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00:03:33												
00:03:34												
00:03:35											Evet ne olabilir.	MS
00:03:36											Öncelikle şeyden olaya girelim	
00:03:37											Bir mouse'un...	
00:03:38											Bugünkü bir mouse'un sorunlarından	
00:03:39											bahsedelim mesela	
00:03:40											Gerçi yapacağım şey bir mouse değil	
00:03:41											Ama mouse'u kullanırken insanların	
00:03:42											bileklerinde, kollarında bazı rahatsızlıklar	
00:03:43											oluşmakta	
00:03:44											Bunun neden	
00:03:45												
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00:04:02													
00:04:03											Ya da ilişkili olsa da, yanlış bir kullanım söz		MP
00:04:04											konusu olduğu için böyle rahatsızlıklar		
00:04:05											ortaya çıkmakta.		
00:04:06													
00:04:07													
00:04:08													
00:04:09											İnsanın kolu...		MP
00:04:10											daha doğrusu eli		
00:04:11											şu şekilde durması gerekirken		
00:04:12											Bim..		
00:04:13											mesela şunu mouse olarak		
00:04:14											düşündüğümüzde		
00:04:15											mouse'u şu şekilde kullanırız ve şu şekilde		
00:04:16											basarız		
00:04:17											ama insan		
00:04:18											normal duruş şekli		
00:04:19											elinin pozisyonu şu şekilde yatay		
00:04:20											yani el sıkışma pozisyonu		
00:04:21													
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00:04:30											ve bu şekilde duran bir cismi kullanmak		TI
00:04:31											kulanıcı a... için daha sağlıklı bir		
00:04:32											ortam oluşturacaktır.		
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00:04:41											Kullanıcı makina ara-kesidi açısından.		MS
00:04:42													
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00:04:48											Şöyle dikey bir cihaz olursa elimizdeki		NI
00:04:49											Şu şekilde.		
00:04:50											Geçmişte böyle joystick'ler vardı gerçi		
00:04:51											Onları yönlendirmek için şu şekilde sağa		
00:04:52											sola ileri geri iterdik		
00:04:53											Ama.. bu da.. birşey..		
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	Category												Decision
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00:05:01											Ama.. bu da.. birşey..		Q
00:05:02											bir rahatsızlığa neden olabilir mi?		
00:05:03											O açıdan şu anda çok birşey		
00:05:04											söyleyemiyorum.		
00:05:05													
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00:05:10											Ama dedik ki imleci sağa sola kaydırmak		MS
00:05:11											açısından..		
00:05:12													
00:05:13													
00:05:14													
00:05:15													
00:05:16													
00:05:17											Eee...		NI
00:05:18											Kullanıcının yapacağı hareketi aynı şekilde		
00:05:19											ekranda görmesi için kolunu da şu şekilde		
00:05:20											sağa sola hareket ettirirse imleci de...		
00:05:21											o yönde hareket edeceği konusunda daha		
00:05:22											önceden bilgilendirmiş oluruz.		
00:05:23													MP
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00:05:35											Aslında bu konu zor bir konu aslında biraz		MS
00:05:36											Tamamen görsel iletişim		
00:05:37											Yani, görsel iletişim değil de		
00:05:38											cihazın kullanıcıyla iletişim kurması çok		
00:05:39											önemli		MP
00:05:40											ve ..		
00:05:41											sağlık sorunu yaşatmadan.		
00:05:42													
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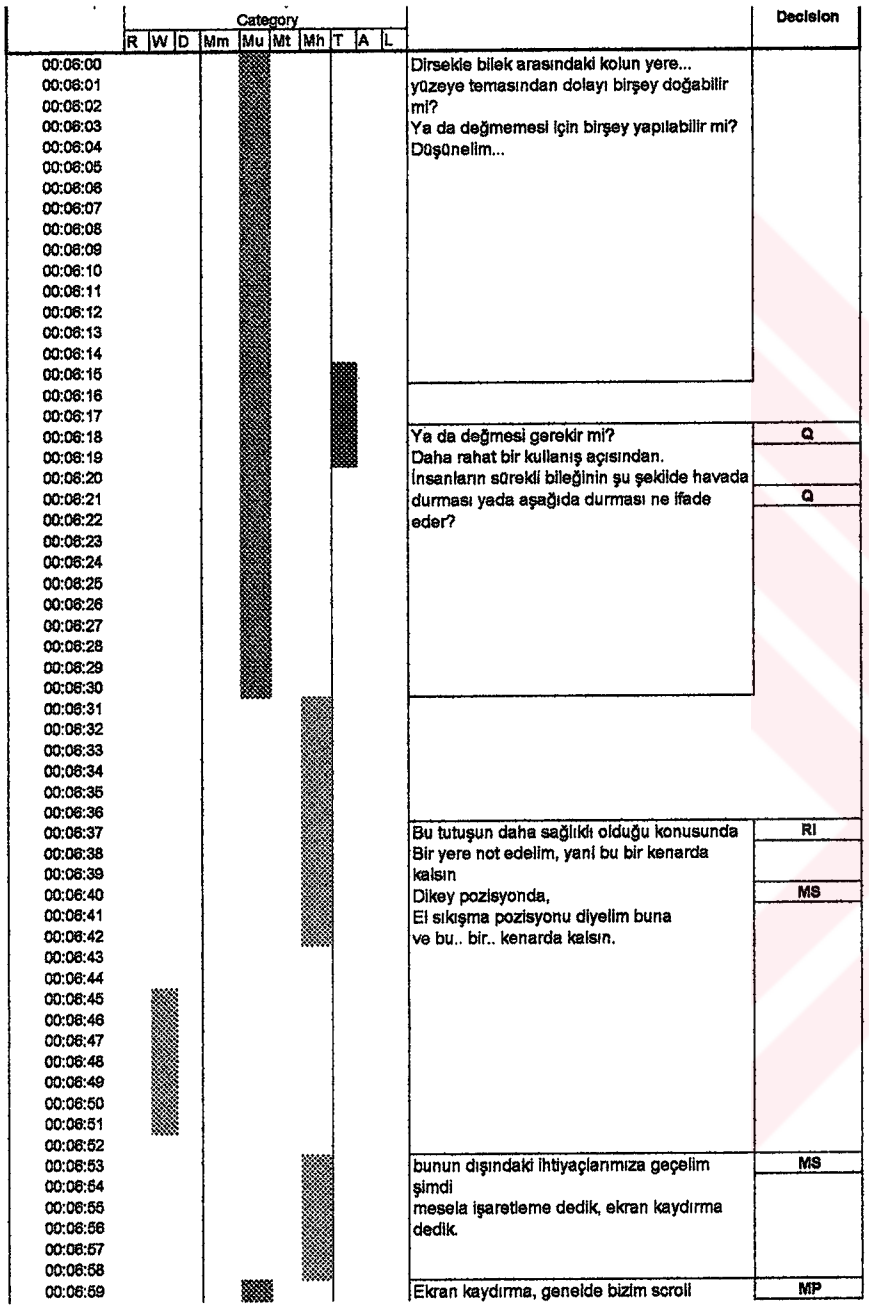
00:05:58											Elimizi bu dik şekilde tuttuğumuz zaman da,		DI
00:05:59											bu sefer dirsekte ve kolun...		


Category
R W D Mm Mu Mt Mh T A L
Decision
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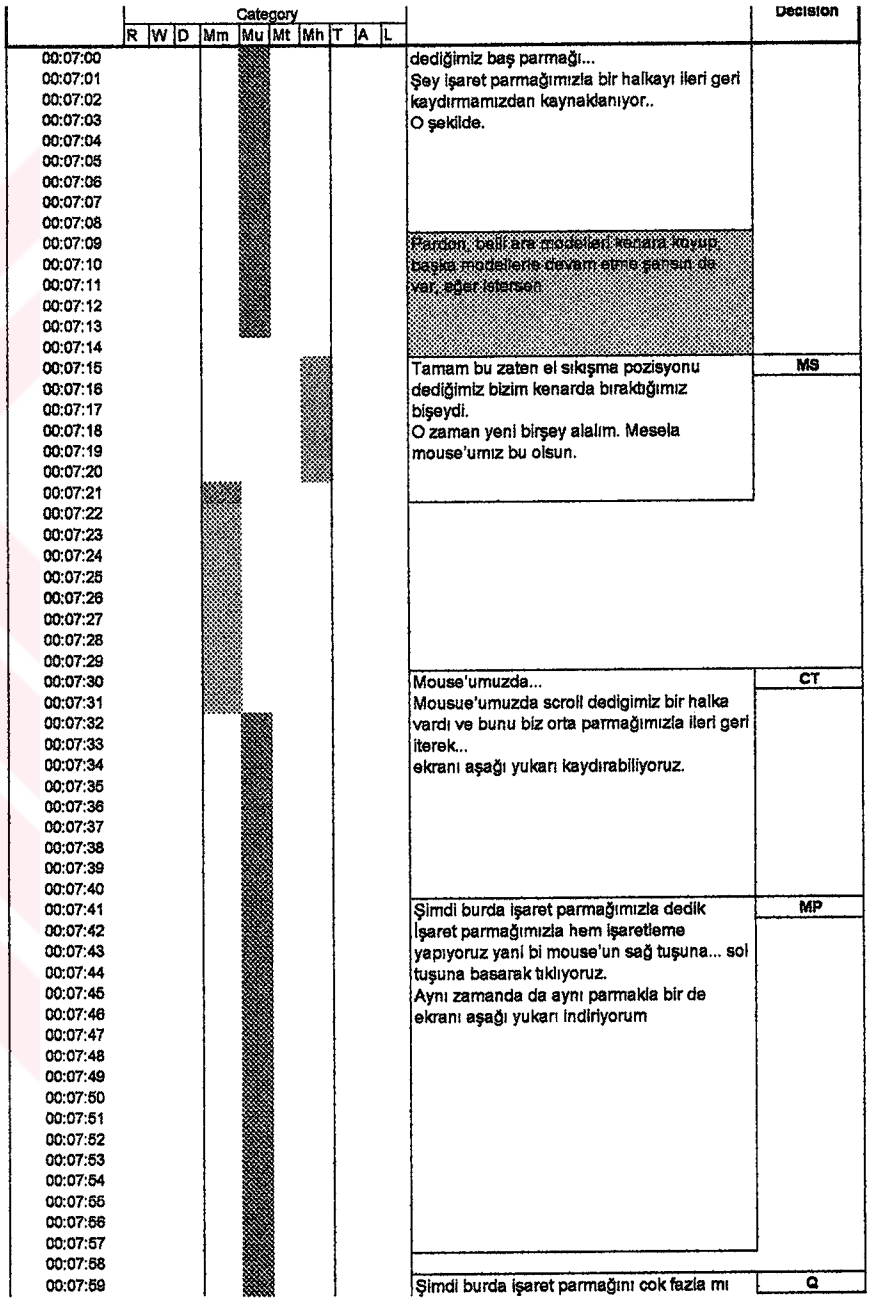
Dirsekle bilek arasındaki kolun yere... yüzeye temasından dolayı birşey doğabilir mi?
Ya da değmemesi için birşey yapılabilir mi?
Düşünelim...
Ya da değmesi gerekir mi?
Q
Daha rahat bir kullanış açısından.
İnsanların sürekli bileğinin şu şekilde havada durması yada aşağıda durması ne ifade eder?
Q
Bu tutuşun daha sağlıklı olduğu konusunda
RI
Bir yere not edelim, yani bu bir kenarda kalsın
Dikey pozisyonda,
MS
El sıkışma pozisyonu diyelim buna
ve bu.. bir.. kenarda kalsın.
bunun dışındaki ihtiyaçlarımıza geçelim şimdi
MS
mesela işaretleme dedik, ekran kaydırma dedik.
Ekran kaydırma, genelde bizim scroll
MP


Category
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dediğimiz baş parmağı...
Şey işaret parmağımızla bir halkayı ileri geri kaydırmamızdan kaynaklanıyor..
O şekilde.
Pardon, belli ara modelleri kenara koyup, başka modellerle devam etmiş şansın da var, eğer istersen
Tamam bu zaten el sıkışma pozisyonu
MS
dediğimiz bizim kenarda bıraktığımız bişeydi.
O zaman yeni birşey alalım. Mesela mouse'umuz bu olsun.
Mouse'umuzda...
CT
Mousue'umuzda scroll dediğimiz bir halka vardı ve bunu biz orta parmağımızla ileri geri iterek...
ekranı aşağı yukarı kaydırabiliyoruz.
Şimdi burda işaret parmağımızla dedik
MP
İşaret parmağımızla hem işaretleme yapıyoruz yani bi mouse'un sağ tuşuna... sol tuşuna basarak tıklıyoruz.
Aynı zamanda da aynı parmakla bir de ekranı aşağı yukarı indiriyorum
Şimdi burda işaret parmağını çok fazla mı
Q

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:08:00											kullanıyoruz	
00:08:01											Yani bu parmağı fazlası.. fazlasından... yani fazla mı yoruyoruz?	
00:08:02											Olması gerekenden fazla bir iş mi yüklüyoruz?	
00:08:03											Yoksa iki işin de aynı parmak tarafından yapılması, aynı o... aynı organ tarafından yapı	
00:08:04												
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00:08:26												
00:08:27											Yani... ikisini da aynı parmakla yapmak yerine diğerini...	Q
00:08:28											Orta parmakla ya da serçe ya da yüzük parmağıyla yapmak kullanıcı için ne kadar rahat olabilir ya da diğer parmaklar arasında bu görev dağılımını ne kadar iyi algılayıp, uygulayabilir.	
00:08:29												
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00:08:34												
00:08:35											Bu da önem	
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00:08:52												
00:08:53											Bunun dışında...	Q
00:08:54											Tabi dedik	
00:08:55											Aynı parmak kullanması kullanıcı için bir kolaylık mı?	
00:08:56												
00:08:57												
00:08:58											Yani...	MP
00:08:59											Kendini... pa... organlarını uyarması	

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:09:00											konusunda harekete geçirmesi konusunda.	
00:09:01												
00:09:02												
00:09:03												
00:09:04											Bunu için de kullanıcının belli bir alışkanlık	MP
00:09:05											düzeyinin olması gerekir.	
00:09:06												
00:09:07												
00:09:08												
00:09:09											Mesela bu bilgisayar oyunları, joystick'ler	ER
00:09:10											falan, daha doğrusu gamepad'lerden	
00:09:11											bahsedelim. Onlar iki ellidir falan böyle...	
00:09:12												
00:09:13												
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00:09:18											Ve..	ER
00:09:19											Ben kendi adıma konuşayım	
00:09:20											Ben onlarla çok geç tanıştığım için	
00:09:21											Ve... Geç tanıştığım için hala da	
00:09:22											oynayamam	
00:09:23												
00:09:24												
00:09:25												
00:09:26												
00:09:27											Boyle bir alışkanlığım yok.	MP
00:09:28											Ama küçüklüğünden beri oynayan çocuklar	
00:09:29											onlara çok iyi bir şekilde hükmedebilir,	
00:09:30											Yani göz el kombinasyonu çok iyi derecede	
00:09:31											gelişmiştir.	
00:09:32												
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00:09:35												
00:09:36												
00:09:37												
00:09:38											Bu el..	MP
00:09:39											Göz el kombinasyonu gelişmemiş insanlar	
00:09:40											için aynı parmağın kullanılması	
00:09:41											Onlar için bir avantaj,	
00:09:42											Onlar için bir kolaylık olacaktır.	
00:09:43											O yüzden bu nokta da ...	
00:09:44											Bu nokta da önemli bir nokta aslında	
00:09:45												
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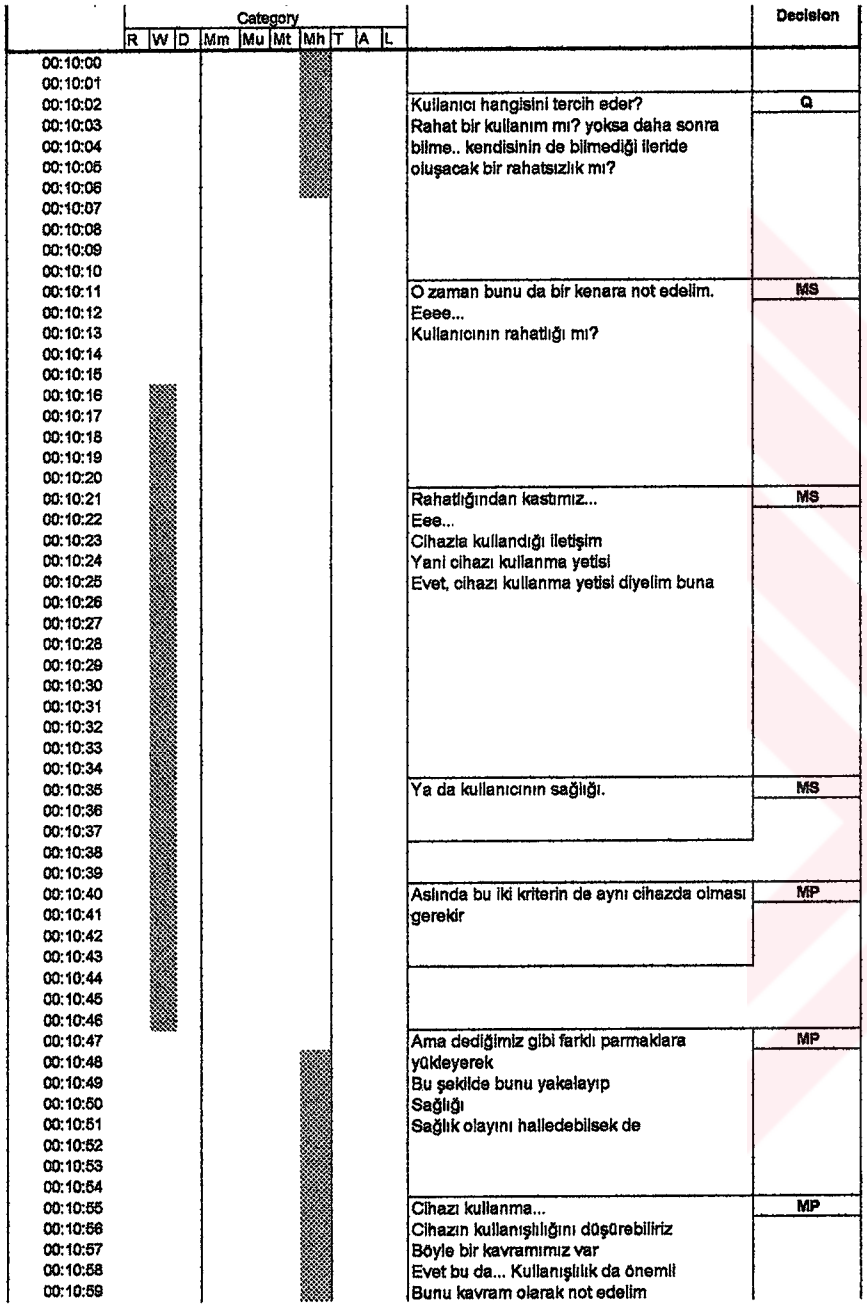
00:09:53											Burada kullanıcının	Q
00:09:54											Eee...	
00:09:55											rahatlığını mı?	
00:09:56											Cihazı kullanımındaki rahatlığını mı	
00:09:57											öne çıkarıcaz, yoksa kullanıcının sağlığını	
00:09:58											mı?	
00:09:59												


Category
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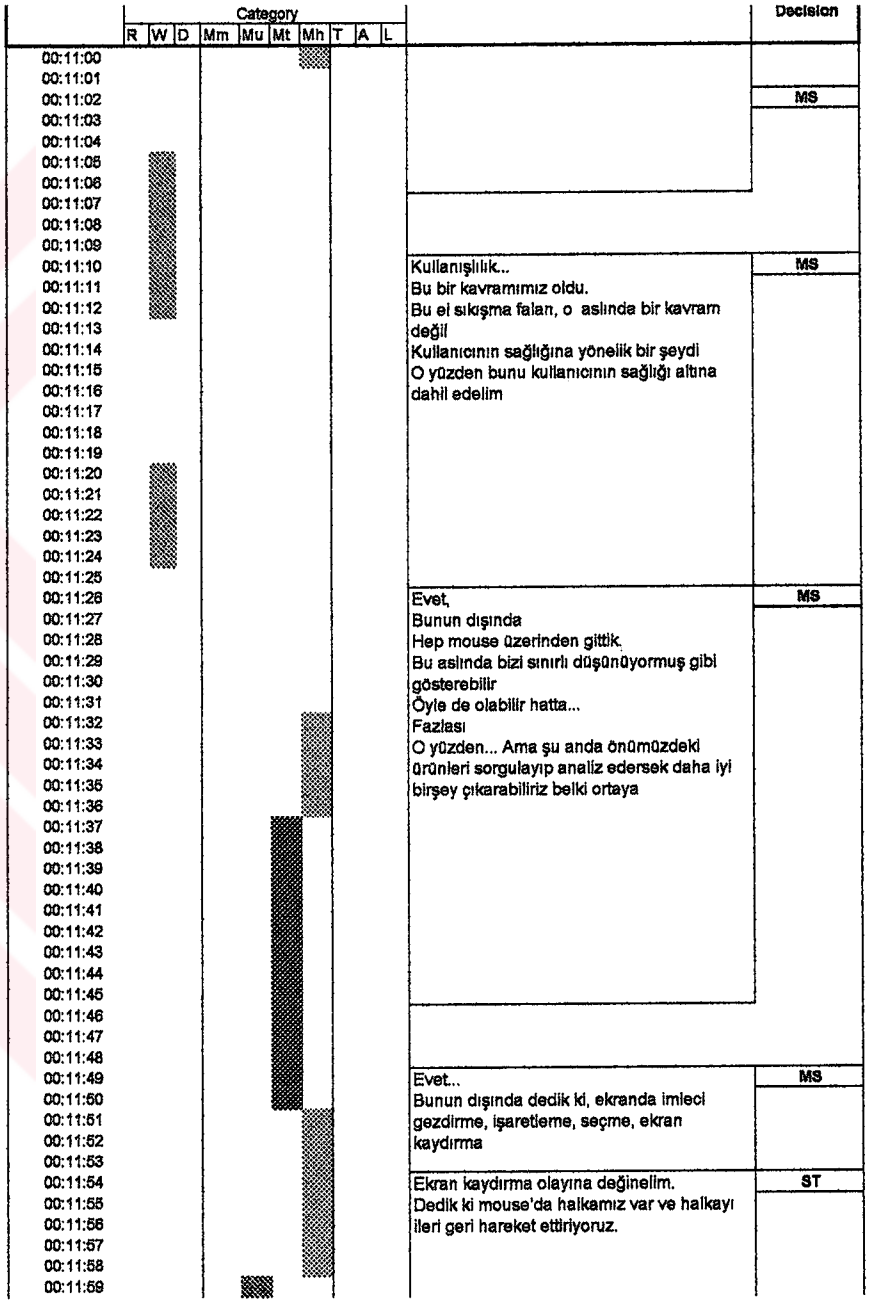
Kullanıcı hangisini tercih eder?
Rahat bir kullanım mı? yoksa daha sonra bilme.. kendisinin de bilmediği ileride oluşacak bir rahatsızlık mı?
Q
O zaman bunu da bir kenara not edelim.
Eeee...
Kullanıcının rahatlığı mı?
MS
Rahatlığından kastımız...
Eee...
Cihazla kullandığı iletişim
Yani cihazı kullanma yetisi
Evet, cihazı kullanma yetisi diyelim buna
MS
Ya da kullanıcının sağlığı.
MS
Aslında bu iki kriterin de aynı cihazda olması gerekir
MP
Ama dediğimiz gibi farklı parmaklara yükleyerek
Bu şekilde bunu yakalayıp
Sağlığı
Sağlık olayını halledebilsek de
MP
Cihazı kullanma...
Cihazın kullanışlılığını düşürebiliriz
Böyle bir kavramımız var
Evet bu da... Kullanışlılık da önemli
Bunu kavram olarak not edelim
MP


Category
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MS
Kullanışlılık...
Bu bir kavramımız oldu.
Bu el sıkışma falan, o aslında bir kavram değil
Kullanıcının sağlığına yönelik bir şeydi
O yüzden bunu kullanıcının sağlığı altına dahil edelim
MS
Evet,
Bunun dışında
Hep mouse üzerinden gittik.
Bu aslında bizi sınırlı düşünüyormuş gibi gösterebilir
Öyle de olabilir hatta...
Fazlası
O yüzden... Ama şu anda önümüzdeki ürünleri sorgulayıp analiz edersek daha iyi birşey çıkarabiliriz belki ortaya
MS
Evet...
Bunun dışında dedik ki, ekranda imleci gezdirme, işaretleme, seçme, ekran kaydırma
MS
Ekran kaydırma olayına değinelim.
Dedik ki mouse'da halkamız var ve halkayı ileri geri hareket ettiriyoruz.
ST

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:12:00												
00:12:01											Ve bunu da, menü açıp kapadığımız,	DI
00:12:02											seçtiğimiz, işaretleme yaptığımız	
00:12:03											Yine işaret parmağımızla yapıyoruz	
00:12:04												
00:12:05												
00:12:06												
00:12:07												
00:12:08												
00:12:09												
00:12:10												
00:12:11											Acaba bunu başka nasıl ifade edebiliriz	Q
00:12:12											insanlara?	
00:12:13												
00:12:14											Yani insana... bir halka yuvarlanır ve	Q
00:12:15											ekranda da bu şekilde aşağı yukarı kayma...	
00:12:16											Eee...	
00:12:17											Kayma...	
00:12:18											Ekranın aşağı yukarı kayma hissini bir	
00:12:19											scroll'a yüklemişler.	
00:12:20											Onu aşağı yukarı hareket ettirerek aynı	
00:12:21											şekilde de... ekranda görülür.	
00:12:22												
00:12:23												
00:12:24												
00:12:25												
00:12:26												
00:12:27												
00:12:28												
00:12:29												
00:12:30												
00:12:31												
00:12:32												
00:12:33											Ama bazı scrollar da mesela ters çalışır.	MP
00:12:34											İnsan onu tam olarak şey yapamaz	
00:12:35											Yani kişiden kişiye değişir en azından o	
00:12:36											Kişisel bir olaydır.	
00:12:37											Bazı insanlar scroll'u öne doğru ittiğinde	
00:12:38											menü yukarı çıkar, kendine doğru çektiğinde	
00:12:39											aşağı iner ya da bazı insanlar	
00:12:40												
00:12:41												
00:12:42												
00:12:43												ER
00:12:44												
00:12:45												
00:12:46												
00:12:47												
00:12:48												
00:12:49												
00:12:50												
00:12:51												
00:12:52												
00:12:53												
00:12:54												
00:12:55												
00:12:56												
00:12:57												
00:12:58											Orada bir karmaşa da yaşanmaktadır	ER
00:12:59											aslında.	

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:13:00											Mesela,benim mouse'um çift scroll'lu ve	
00:13:01											scroll'lardan biri	
00:13:02												
00:13:03												
00:13:04												
00:13:05											Eee..	ER
00:13:06											İkisi birbirine zıt olarak çalışır.	
00:13:07											Ve çoğunlukla da ben karıştırmaktayım,	
00:13:08											hangi scroll'du	
00:13:09											Aslında benim rahat ettiğim scroll aşağıya	
00:13:10											doğru...	
00:13:11												
00:13:12												
00:13:13											Pardon, ben scroll'u kendime doğru	ER
00:13:14											çektiğimde, yani mouse'un ön yüzeyi şu	
00:13:15											şekilde yere doğru yatık olduğunda,	
00:13:16											Yukarı kavramı bana doğru olduğu için ben	
00:13:17											scroll'u kendime doğru çektiğimde onu...	
00:13:18											Eee... Ekranın yukarı doğru kaydığını	
00:13:19											düşünürüm.	
00:13:20												
00:13:21												
00:13:22												
00:13:23												
00:13:24												
00:13:25												
00:13:26												
00:13:27												
00:13:28											Ama diğerini de kullanmaktayım, yani...	ER
00:13:29												
00:13:30												
00:13:31												
00:13:32												
00:13:33											İ...	MS
00:13:34											Şu anda hiçbirini...	
00:13:35											İkisinden birini kabullenip, diğerini dışlamış	
00:13:36											değilim.	
00:13:37												
00:13:38												
00:13:39											Böyle bir kavram da var.	MP
00:13:40											Eğer insanın işaret parmağıyla değil de kol	
00:13:41											hareketiyle ekranı kaydırmasını	
00:13:42											düşünürsek...	
00:13:43												
00:13:44												
00:13:45												
00:13:46												
00:13:47												
00:13:48												
00:13:49												
00:13:50											Bu sefer de şey var...	MP
00:13:51											Ekrana doğru bir hareketin menüyü... ekranı	
00:13:52											yukarıya ya da aşağıya doğru hareket	
00:13:53											ettirmesini nasıl algılatacağız yani...	
00:13:54												
00:13:55												
00:13:56												
00:13:57												
00:13:58											Sonuçta yaptığımız haraket yatay, ama	MP
00:13:59											ekranda oluşan hareket... Eee...	

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:14:00											Dikey yönde Aşağı ya da yukarı Bizimki ise yatay pozisyonda.	
00:14:01												
00:14:02												
00:14:03												
00:14:04												
00:14:05												
00:14:06												
00:14:07												
00:14:08												
00:14:09											Bu şekilde, ergonomi dersinden aklımda	MP
00:14:10											kaldığı şekilde	
00:14:11											O şekilde kullanılmış, ya da o şekilde	
00:14:12											tasarlanmış	
00:14:13											Cihazlar var	
00:14:14												
00:14:15												
00:14:16												
00:14:17												
00:14:18												
00:14:19												
00:14:20												
00:14:21												
00:14:22											Mesela bunlardan biri nedir	ER
00:14:23											Örnekleyelim mesela...	
00:14:24											Eee	
00:14:25												
00:14:26												
00:14:27												
00:14:28											Mesela viçlerin kolu diyebiliriz.	ER
00:14:29											Vinçlerde de kol vardır ve ileri geri hareket	
00:14:30											ettirdiğinizde	
00:14:31												
00:14:32											Vincin sarkacı yada zinciri aşağı yukarı	
00:14:33											hareket eder, bir yükü kaldırır, indirir.	
00:14:34											Ya da orada öyle bir ilişki vardır ama...	
00:14:35												
00:14:36												
00:14:37												
00:14:38												
00:14:39												
00:14:40												
00:14:41												
00:14:42												
00:14:43												
00:14:44											Bu da kullanıcının alışması...	MP
00:14:45											Kullanıcının bunu kabullenmesi...	
00:14:46											Gerekir böyle bir durumda	
00:14:47												
00:14:48												
00:14:49												
00:14:50												
00:14:51											Evet	MS
00:14:52											Şimdi, yani ne dedik	
00:14:53												
00:14:54												
00:14:55												
00:14:56												
00:14:57												
00:14:58											Menü	MP
00:14:59											Eee..	

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:15:00											Ekran kaydırma olayında kolumuzu sağa	
00:15:01											sola şey... ileri geri yatay pozisyonda hareket	
00:15:02											ettirmek onu algılatmayabilir dedik.	
00:15:03												
00:15:04												
00:15:05												
00:15:06												
00:15:07												
00:15:08												
00:15:09												
00:15:10												
00:15:11												
00:15:12											Ama scroll'da da dedik ki hangi tarafın... da	MS
00:15:13											iki.. Eee	
00:15:14											Scroll'da da kesin birşey yok dedik.	
00:15:15												
00:15:16												
00:15:17												
00:15:18												
00:15:19											İnsanlar tarafından tercih	MS
00:15:20											meselesi...Şeklinde	
00:15:21												
00:15:22												
00:15:23												
00:15:24												
00:15:25											O zaman ne yapabiliriz?	Q
00:15:26											Elimizi yukarı aşağıya mı kaldırırız?	
00:15:27											Ya da elimizi ileri geri bir joystick gibi ileri	
00:15:28											geri... Eee...	
00:15:29											Şey mi yap...	
00:15:30												
00:15:31												
00:15:32												
00:15:33												
00:15:34											Eee...	DI
00:15:35											Cihazı... tabanı yerde sabit kalmak üzere bir	
00:15:36											noktadan ileri geri...	
00:15:37											Rotate mi ederiz, yani	
00:15:38												
00:15:39												
00:15:40												
00:15:41												
00:15:42												
00:15:43											Ne derler ona...	DI
00:15:44											Bir menteşe gibi bir noktan ileri geri... iki...	
00:15:45											bir düzlemde ileri geri hareket mi ettiririz	
00:15:46											Şu şekilde	
00:15:47												
00:15:48												
00:15:49												
00:15:50												
00:15:51												
00:15:52											Şu şekilde	DI
00:15:53											Yoksa cihazın belli Eee... şeyi olur da, şöyle	
00:15:54											hafif beş milimlik	
00:15:55												
00:15:56												
00:15:57												
00:15:58												
00:15:59											Yani çok kısa bir mesafede insanın eline yük	DI

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:16:00							▒				vermeyecek şekilde	
00:16:01							▒					
00:16:02							▒					
00:16:03							▒					
00:16:04							▒					
00:16:05							▒					
00:16:06							▒				Şu şekilde bilek hareketiyle aşağı yukarı	DI
00:16:07					▒						Bi... oynayan bi bölüm, bi parçası mı olur	
00:16:08					▒							
00:16:09					▒							
00:16:10					▒							
00:16:11					▒							
00:16:12					▒						O şekilde ekranı yukarı aşağıya hareket	DI
00:16:13					▒						ettirebilir miyiz acaba	
00:16:14					▒						Öyle birşey de olabilir... Belki	
00:16:15					▒							
00:16:16					▒							
00:16:17												
00:16:18							▒					
00:16:19							▒				Sonuşta demin verdiğimiz örnekte dikey	RI
00:16:20							▒				pozisyonda, el sıkışma pozisyonundaydı	
00:16:21							▒					
00:16:22							▒					
00:16:23							▒					
00:16:24							▒					
00:16:25							▒				Ve bu menüyü aşağı yukarı kaydırma	MP
00:16:26							▒				işlemini de kullanıcının daha kolay	
00:16:27							▒				algılayabilmesi	
00:16:28							▒				için yine ekrandaki hareketle paralel bi	
00:16:29							▒				şekilde aşağı yukarı yapabiliriz belki.	
00:16:30							▒					
00:16:31							▒					
00:16:32							▒					
00:16:33							▒					
00:16:34							▒					
00:16:35							▒					
00:16:36							▒					
00:16:37							▒					
00:16:38							▒					
00:16:39							▒					
00:16:40							▒					
00:16:41							▒				Bu da bi... anlatım olabilir.	MS
00:16:42							▒					
00:16:43							▒					
00:16:44												
00:16:45												
00:16:46												
00:16:47												
00:16:48												
00:16:49												
00:16:50												
00:16:51												
00:16:52												
00:16:53												
00:16:54												
00:16:55											Şimdi...	MS
00:16:56											Buraya kadar birşeyler konuştuk	
00:16:57											Cihazımızda olmasını düşündüğüm	
00:16:58											özellikleri yazayım.	
00:16:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:17:00												
00:17:01											Dedim ki	RI
00:17:02											El sıkışma pozisyonunun insan için ideal	
00:17:03											olduğu	
00:17:04												
00:17:05												
00:17:06												
00:17:07												
00:17:08											Yani, bir joystick gibi Eee... silindirik bir	MP
00:17:09											şeklin	
00:17:10											Yuvarlak tabanının, yani şu şişe gibi silindirin	
00:17:11											tabanının...	
00:17:12											Yüzeye dik olduğu dikey bir cisimden	
00:17:13											bahsediyoruz.	
00:17:14												
00:17:15												
00:17:16												
00:17:17							▒					
00:17:18							▒					
00:17:19							▒					
00:17:20							▒					
00:17:21							▒					
00:17:22							▒					
00:17:23							▒					
00:17:24							▒					
00:17:25							▒				Gerçi hamurumuz var burada	MS
00:17:26							▒				Hamur... Hamurumuzu kullanmak daha	
00:17:27							▒				sağlıklı olur.	
00:17:28							▒					
00:17:29											Evet, böyle bir cisimden bahsediyoruz	RI
00:17:30			▒								Yani el sıkışma pozisyonuna sahip diyelim...	
00:17:31			▒									
00:17:32			▒									
00:17:33			▒									
00:17:34			▒								Daha sonra... dedik ki	RI
00:17:35			▒								İşaret parmağımızı kullandığımız... bir cihaz	
00:17:36			▒									
00:17:37			▒									
00:17:38							▒					
00:17:39							▒					
00:17:40							▒					
00:17:41							▒					
00:17:42							▒					
00:17:43							▒					
00:17:44							▒					
00:17:45							▒				Pardoon... Ne diyeyim... Şey	MS
00:17:46							▒					
00:17:47							▒					
00:17:48							▒					
00:17:49							▒				Ekran kaydırmayı da yine dikey cisimde	NI
00:17:50							▒				gerçekleştirebildiğim bir ürün.	
00:17:51							▒				Yani... ekran kaydırmayı...	
00:17:52							▒					
00:17:53							▒					
00:17:54							▒					
00:17:55			▒									
00:17:56			▒									
00:17:57			▒									
00:17:58			▒									
00:17:59			▒									

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:18:00												
00:18:01											kaydırmayı ekrandaki harekete paralel yapabildiğim bir ürün.	RI
00:18:02												
00:18:03												
00:18:04												
00:18:05												
00:18:06												
00:18:07												
00:18:08												
00:18:09												
00:18:10												
00:18:11												
00:18:12												
00:18:13												
00:18:14												
00:18:15												
00:18:16												
00:18:17											Aslında bu yenilikçi diye ortaya koyacağımız	MS
00:18:18											ürün etrafındaki	
00:18:19											Yani ilişkili olduğu ürünlerin şu anda	
00:18:20											bildiğimiz ürünler olduğundan dolayı	
00:18:21											Bizi biraz olsun kısıtlıyor	
00:18:22												
00:18:23												
00:18:24												
00:18:25												
00:18:26												
00:18:27												
00:18:28												
00:18:29											Yani şu anda ben bir ürün tasarlıyorum ve	MP
00:18:30											bu ürün bir ortama ait olacak ve ortamın da	
00:18:31											gerektirdiği bazı şartlar var	
00:18:32												
00:18:33												
00:18:34												
00:18:35												
00:18:36												
00:18:37												
00:18:38											Bu şartlara sahip olması gerekecek ve bu	MP
00:18:39											şartlar	
00:18:40											Bir anlamda sınırlandırma, bir anlamda da	
00:18:41											kısıtlama olacak benim için.	
00:18:42												
00:18:43												
00:18:44												
00:18:45												
00:18:46											O yüzden çok uçuk birşey çıkacağını	MS
00:18:47											düşünmüyorum.	
00:18:48											Düşünemiyorum. Aslında üstünde çok uzun	
00:18:49											çalışılabilecek bir konu ama benim sürem	
00:18:50											burada sınırlı.	
00:18:51												
00:18:52												
00:18:53												
00:18:54												
00:18:55												
00:18:56												
00:18:57												
00:18:58												
00:18:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:19:00											Şu anda dikey bir cihaz üzerinde ilerliyorum.	RI
00:19:01											Şu anki veriler beni ona götürüyor.	
00:19:02												
00:19:03												
00:19:04												
00:19:05												
00:19:06												
00:19:07												
00:19:08												
00:19:09											Şimdi... burada... demin... şeyi... mmm...	CT
00:19:10											İşaretleme ve seçme dedik.	
00:19:11											İşaretleme ve seçmeyi bu cihaz üzerine	
00:19:12											taşımadım	
00:19:13												
00:19:14												
00:19:15												
00:19:16												
00:19:17											Yani bu cihaz üzerine taşımak aslında beni,	MS
00:19:18											iyice bu ürün üzerine şartlandıracak, ama...	
00:19:19												
00:19:20												
00:19:21												
00:19:22												
00:19:23											Ben normal bir mouse'tan başka nasıl bir	MS
00:19:24											tıklama yapılabilir onu düşün... Düşünelim	
00:19:25												
00:19:26												
00:19:26												
00:19:27												
00:19:28												
00:19:29											En azından şöyle bir eee...bilgi oldu	MS
00:19:30												
00:19:31												
00:19:32											İnsanın bir saat boyunca sürekli işaret	ER
00:19:33											parmağıyla tık-tık yapması	
00:19:34											Ya da pardon... bir saat ya da başka bir	
00:19:35											kavram	
00:19:36											Daha az bir süre de olabilir, on dakika da	
00:19:37											olabilir, hatırlamıyorum.	
00:19:38												
00:19:39												
00:19:40												
00:19:41												
00:19:42												
00:19:43												
00:19:44												
00:19:45												
00:19:46												
00:19:47											On dakika ya da bir saat süresince sürekli tık-	ER
00:19:48											tık yapması o insanın 20 kilometrelik yolu	
00:19:49											yürümüş kadar bacak kaslarında bir	
00:19:50											gelişmeye neden olduğu gibi bir bilgim oldu.	
00:19:51												
00:19:52												
00:19:53												
00:19:54												
00:19:55												
00:19:56												
00:19:57												
00:19:58												
00:19:59												

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:20:00													
00:20:01													
00:20:02													
00:20:03											Yani bu işin sürekli işaret parmağıyla tık-tık		DI
00:20:04											yapılması insan için par...		
00:20:05											İnsanın sağlığı açısından çok... iyi birşey		
00:20:06											olmadığı... nı gösterir		
00:20:07											Ona işaret eder		
00:20:08													
00:20:09													
00:20:10													
00:20:11													
00:20:12													
00:20:13													
00:20:14													
00:20:15													
00:20:16													
00:20:17													
00:20:18													
00:20:19													
00:20:20													
00:20:21													
00:20:22											Yani acaba parmağımızı kullanmadan,		Q
00:20:23											başka bir şekilde imleci eee... tıklayabilir		
00:20:24											miyiz?		
00:20:25											Acaba böyle bir imkanımız var mı?		
00:20:26													
00:20:27													
00:20:28													
00:20:29											Parmak olmazsa ne olur?		NI
00:20:30											Bileğimiz olur... Şu şekilde...		
00:20:31											Bu mu olur		
00:20:32											Ya da kolumuzla olur		
00:20:33													
00:20:34													
00:20:35													
00:20:36													
00:20:37													
00:20:38													
00:20:39											Ama bu da çok yorucu... eğer bir siteye		MP
00:20:40											girdiğimizde		
00:20:41											Bir bölümü her...		
00:20:42											Bir siteye girdiğimizde çok kere tıklamamız		
00:20:43											gerekir.		
00:20:44													
00:20:45													
00:20:46											Ve bu da bir bilek için bir kol için aşırı		MP
00:20:47											yorgunluk olacaktır, ya da		
00:20:48											Daha fazla enerji tüketimi olacaktır		
00:20:49													
00:20:50													
00:20:51													
00:20:52													
00:20:53													
00:20:54													
00:20:55											O yüzden... böyle birşey, şu şekilde,		MP
00:20:56											herhalde pek uygun olmaz yani		
00:20:57											Ya da insanlara pek çekici gelmez		
00:20:58											Birşeyi eziyormuş gibi, şu şekilde, saçma		
00:20:59											olabilir.		

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:21:00													
00:21:01													
00:21:02													
00:21:03													
00:21:04													
00:21:05													
00:21:06													
00:21:07													
00:21:08													
00:21:09													
00:21:10											Bunun dışında ne olabilir?		NI
00:21:11											Acaba tek parmak yerine birsürü parmakla		
00:21:12											mı tıklarsak daha eee...		
00:21:13											Bir parmağa yüklenmemiş oluruz		
00:21:14											Ya da öyle de rahat olabilir mi		
00:21:15													
00:21:16													
00:21:17													
00:21:18													
00:21:19													
00:21:20													
00:21:21													
00:21:22													
00:21:23													
00:21:24													
00:21:25											Şu şekilde tık-tık yapsak		NI
00:21:26											Olabilir mi? Şu şekilde		
00:21:27											Cihazın boydan boya bir tuşu olsa mesela		
00:21:28													
00:21:29													
00:21:30													
00:21:31											Şu kırmızıdan alalım biraz		MS
00:21:32											Şu şekilde		
00:21:33											Şöyle boydan boya dört parmağımla		
00:21:34											basabileceğim bir tuş mu olmalı şurada		
00:21:35											acaba		
00:21:36													
00:21:37													
00:21:38													
00:21:39													
00:21:40											Tık tuşunu şu şekilde mi yapmalı tık diye		DI
00:21:41											mesela		
00:21:42											Böyle rahat olur mu acaba?		
00:21:43													
00:21:44													
00:21:45													
00:21:46													
00:21:47													
00:21:48													
00:21:49											Gibi...		TI
00:21:50													
00:21:51													
00:21:52													
00:21:53													
00:21:54											Şu şekilde tık di...		TI
00:21:55													
00:21:56													
00:21:57													
00:21:58													
00:21:59													

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:22:00					▒						Ama mouse'da bizim ihtiyacımızı karşılayan		ER
00:22:01							▒				bir özellik daha var		
00:22:02							▒				Mouse'larda en kötü, yani en basit mouse'da		
00:22:03							▒				bile iki tuş var		
00:22:04							▒				Birisi... sağ ve sol tuş olmak üzere		
00:22:05							▒				Sağ tuş		
00:22:06							▒				Menüleri açar, sol tuş ise tıklar		
00:22:07							▒						
00:22:08							▒						
00:22:09							▒						
00:22:10							▒						
00:22:11							▒						
00:22:12							▒						
00:22:13							▒						
00:22:14							▒						
00:22:15							▒						
00:22:16							▒						
00:22:17							▒						
00:22:18							▒				Burada da bizim iki tuşa ihtiyacımız var		MP
00:22:19							▒						
00:22:20							▒				Yani bu tuşu ikiye ayırarak şu şekilde		NI
00:22:21				▒							Acaba iki tuş görevini bu şekilde mi ...		
00:22:22				▒							karşılarız o... bir mousun		
00:22:23				▒									
00:22:24				▒									
00:22:25				▒									
00:22:26				▒									
00:22:27				▒									
00:22:28				▒									
00:22:29				▒									
00:22:30				▒									
00:22:31				▒							şu şekilde serçe ve yüzük parmağıyla		TI
00:22:32				▒							tıklayıp serçe ve...		
00:22:33				▒									
00:22:34				▒									
00:22:35					▒								
00:22:36					▒								
00:22:37					▒								
00:22:38					▒						Sağ tuş, mouse'larda sol tuşa göre çok daha		MP
00:22:39					▒						az kullanılır.		
00:22:40					▒								
00:22:41					▒								
00:22:42					▒								
00:22:43					▒								
00:22:44					▒						O yüzden yüzük parmağıyla ve serçe		DI
00:22:45					▒						parmağını daha az kullanacağımızı		
00:22:46					▒						düşünürsek		
00:22:47					▒						Daha iyi olacağını düşünürsek		
00:22:48					▒						Bunu sağ tuş, bunu da sol tuş diye		
00:22:49					▒						düşünebiliriz.		
00:22:50					▒								
00:22:51					▒								
00:22:52					▒								
00:22:53					▒								
00:22:54					▒								
00:22:55					▒								
00:22:56					▒						Ama bu sefer de dört parmakla hissettiğiniz		MP
00:22:57					▒						bir tuşu sadece iki parmakla hissetmek de		
00:22:58					▒						çok rahat olmayabilir.		
00:22:59					▒								

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:23:00					▒								
00:23:01					▒								
00:23:02					▒								
00:23:03					▒						Biraz itici geldi bana aslında		MS
00:23:04					▒								
00:23:05					▒								
00:23:06					▒								
00:23:07					▒						iki parmakla çok rahat değil aslında		MP
00:23:08					▒						iki parmak dururken, ister istemez yüzük		
00:23:09					▒						parmağı da hareket ediyor.		
00:23:10					▒						Bir şekilde kaslarla birbirine bağımlılar		
00:23:11					▒								
00:23:12					▒								
00:23:13					▒								
00:23:14					▒								
00:23:15					▒								
00:23:16					▒								
00:23:17					▒								
00:23:18					▒								
00:23:19					▒						Şu şekilde		DI
00:23:20					▒						Sadece ikisini hareket ettiremiyorum		
00:23:21					▒						Yani zorlanıyorum en azından		
00:23:22					▒								
00:23:23					▒								
00:23:24					▒						Bunu sıkmak zorunda kalıyorum		MD
00:23:25					▒						Bunu sıkmam demek de tuşa basmak zaten		
00:23:26					▒						O açıdan başka birşey bulmalıyız		
00:23:27					▒								
00:23:28					▒								
00:23:29					▒								
00:23:30					▒								
00:23:31				▒									
00:23:32				▒							Yani, demek ki...		RI
00:23:33				▒							dört parmakla basılabilir dedik		
00:23:34				▒									
00:23:35				▒									
00:23:36				▒									
00:23:37				▒									
00:23:38				▒							ama		RD
00:23:39				▒							Bu büyük tuşu ikiye ayırıp sağ ve sol tuş		
00:23:40				▒							görevi yüklemek yanlış olur		
00:23:41				▒									
00:23:42				▒									
00:23:43				▒									
00:23:44				▒									
00:23:45				▒									
00:23:46					▒								
00:23:47					▒						Evet şu şekilde biraz daha yol kaydetik		MS
00:23:48					▒						galiba		
00:23:49					▒								
00:23:50					▒								
00:23:51					▒								
00:23:52					▒								
00:23:53					▒								
00:23:54					▒								
00:23:55					▒								
00:23:56					▒								
00:23:57					▒						Bunun dışında neler olabilir?		Q
00:23:58					▒								
00:23:59					▒						Dedik ki tuş sorunumuz var sağ ve sol tıklar.		MP

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:24:00													
00:24:01													
00:24:02													
00:24:03													
00:24:04													
00:24:05											Şimdi bir de şey demiştim ben,	CT	
00:24:06											Ekran kaydırma olayı...		
00:24:07													
00:24:08													
00:24:09													
00:24:10											Ekran kaydırmayı aşağı yukarı yaparsam	Q	
00:24:11											insanlar daha rahat algılayabilir mi?		
00:24:12													
00:24:13													
00:24:14													
00:24:15													
00:24:16											Ya da şu şekilde ileri geri yaparsam daha	Q	
00:24:17											rahat algılayabilir mi?		
00:24:18													
00:24:19													
00:24:20													
00:24:21											Ya da onun öyle olacağını, ya da kullanırken	Q	
00:24:22											daha rahat edeceğini düşünebilir miyiz?		
00:24:23													
00:24:24													
00:24:25													
00:24:26											Bu da denemeler sonucunda belli olabilecek	MS	
00:24:27											birşey herhalde.		
00:24:28													
00:24:29													
00:24:30													
00:24:31											Yani bi... bi... eee...	MS	
00:24:32											birkaç kişilik focus grup'lara denettirilip onayı		
00:24:33											alınabilecek bir ürün olabilir herhalde		
00:24:34													
00:24:35													
00:24:36													
00:24:37													
00:24:38											Şimdi kalkıp da ben böyle insan daha rahat	MS	
00:24:39											eder dersem...		
00:24:40											Olmaz... tasarımcıya yakışmaz, herhalde		
00:24:41													
00:24:42													
00:24:43													
00:24:44													
00:24:45													
00:24:46													
00:24:47													
00:24:48													
00:24:49													
00:24:50											Eee... dedik ki ekran kaydırmayı şu şekilde	RI	
00:24:51											aşağı yukarı yapabilirim ben.		
00:24:52													
00:24:53													
00:24:54													
00:24:55													
00:24:56											Ya da bu cismi tamamen kavramak zorunda	Q	
00:24:57											mı bu insan?		
00:24:58													
00:24:59													

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:25:00													
00:25:01											Sadece... Eğer bu büyük bir kut...	DI	
00:25:02											Büyük kütleli ya da büyük hacimli bir cihaz		
00:25:03											olabilir.		
00:25:04													
00:25:05													
00:25:06													
00:25:07													
00:25:08											Sadece belli bir bölümünü şu şekilde	DI	
00:25:09											kavrayabilir...		
00:25:10													
00:25:11													
00:25:12											Ya da başka bir hamur üzerinde göstereyim.	MS	
00:25:13											Şu iki tane hamur bir arada olabilir mesela		
00:25:14											Daha büyük kütleli birşey olabilir.		
00:25:15													
00:25:16													
00:25:17													
00:25:18													
00:25:19													
00:25:20											Sadece bi... parmaklarını üstüne	Q	
00:25:21											dokundurarak şey yapabilir mi.		
00:25:22													
00:25:23													
00:25:24													
00:25:25													
00:25:26													
00:25:27													
00:25:28											Yönlendirebilir mi?	Q	
00:25:29											İhtiyaçlarını karşılayabilir mi?		
00:25:30													
00:25:31											Burada joystick'den bahsettik, joystick'i şu	MS	
00:25:32											şekilde gezdirmesinden bahsettik.		
00:25:33											Ya da tuşa şu şekilde basıp, şu şekilde		
00:25:34											ekranı kaydırmasından bahsettik.		
00:25:35													
00:25:36													
00:25:37													
00:25:38													
00:25:39													
00:25:40													
00:25:41											Acaba bu daha büyük kütleli birşey olsa ve	NI	
00:25:42											cihazı hareket ettirmek yerine parmaklarını		
00:25:43											üzerinde oynatsa mesela.		
00:25:44													
00:25:45													
00:25:46													
00:25:47													
00:25:48													
00:25:49											Mesela ekranı hareket ettirmek için	DI	
00:25:50											Sadece orta parmağıyla belli birşeyi ittirip		
00:25:51											şey yapsa		
00:25:52													
00:25:53													
00:25:54													
00:25:55													
00:25:56													
00:25:57													
00:25:58											Ama burada da mouse olayına geliyoruz	MP	
00:25:59											yine		

	Category											
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		Decision
00:26:00											Burada bir halkayı itiyormuşcasına şu şekilde bir hareket ett... bir hareket yapıyor.	
00:26:01												
00:26:02												
00:26:03												
00:26:04												
00:26:05											Ama baş parmağıyla mesela böyle birşey olabilir	DI
00:26:06												
00:26:07											Mesela şurada bir scroll olabilir mesela	
00:26:08											Scroll'a geldik yine	
00:26:09												
00:26:10												
00:26:11												
00:26:12											Aslında bu benim şu anda kısıtlı gös...	MS
00:26:13											Kısıtlı düşündüğümü gösterir ama	
00:26:14												
00:26:15												
00:26:16											Mesela şu şekilde ekrandaki harekete	NI
00:26:17											paralel bir hareketi baş parmağıyla yapabilir	
00:26:18											sadece	
00:26:19												
00:26:20												
00:26:21												
00:26:22												
00:26:23												
00:26:24												
00:26:25											Şu parmaklarla yapsa da yine zorluk çeker	DI
00:26:26											ama baş parmağıyla bu çok daha rahat olur.	
00:26:27												
00:26:28												
00:26:29												
00:26:30												
00:26:31											Bu şekilde bir ekranı kaydırma işlemini şu	DI
00:26:32											şekilde gerçekleştirebilir.	
00:26:33											İhtiyacı böyle karşılayabilir... kullanıcı.	
00:26:34												
00:26:35												
00:26:36												
00:26:37												
00:26:38												
00:26:39												
00:26:40											Evet...	MS
00:26:41												
00:26:42												
00:26:43											Peki ekranda imleci nasıl hareket ettirir	Q
00:26:44											böyle birşeyle?	
00:26:45												
00:26:46												
00:26:47												
00:26:48												
00:26:49											Ona karar verelim.	MS
00:26:50												
00:26:51												
00:26:52												
00:26:53												
00:26:54												
00:26:55											Mmm...	DI
00:26:56											Mesela bunun altında bir tablet olabilir. Bu	
00:26:57											tablet üzerinde çevirebilir mi?	
00:26:58											Çevirmesi de çok sağlıklı olmaz herhalde şu	
00:26:59											şekilde	

	Category											
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		Decision
00:27:00												
00:27:01												
00:27:02												
00:27:03												
00:27:04												
00:27:05												
00:27:06												
00:27:07												
00:27:08											Evet, başka ne vardır?	MS
00:27:09											Ya da bunu nasıl geliştirebilirim daha.	
00:27:10												
00:27:11												
00:27:12												
00:27:13												
00:27:14												
00:27:15												
00:27:16												
00:27:17											Şu şekilde dikey bir üründen bahsettik.	RI
00:27:18												
00:27:19												
00:27:20												
00:27:21												
00:27:22												
00:27:23												
00:27:24											Yani dikey bir ürün derken insanın elini	
00:27:25											bileğini yormayacak	
00:27:26											Mouseda şu şekilde olması yerine şu	
00:27:27											şekildeki bir üründen bahsettik.	
00:27:28												
00:27:29												
00:27:30												
00:27:31												
00:27:32												
00:27:33												
00:27:34												
00:27:35											Acaba onu tam şu şekilde değil de açılı	NI
00:27:36											şekilde kullandırabilir miyim?	
00:27:37												
00:27:38												
00:27:39											Cihazımı	DI
00:27:40											şu şekilde yatay olacak şekilde, belli bir açısı	
00:27:41											olan	
00:27:42											el tutma yeri, yani şu şekilde	
00:27:43												
00:27:44												
00:27:45												
00:27:46												
00:27:47												
00:27:48											yani...	MS
00:27:49												
00:27:50												
00:27:51												
00:27:52											Şurası şey olursa	MS
00:27:53												
00:27:54												
00:27:55												
00:27:56												
00:27:57												
00:27:58												
00:27:59											Şurada baş parmağıya bir menüyü kaydırma	RI

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:28:00											işlemini yapabileceği bir fonksyona sahip bir	
00:28:01											tuş, mekanizma ya da başka bir şey	
00:28:02												
00:28:03												
00:28:04												
00:28:05												
00:28:06												
00:28:07												
00:28:08												
00:28:09												
00:28:10												
00:28:11												
00:28:12												
00:28:13											Şuradan da işaretleyebileceği birtakım	DI
00:28:14											şuralarda tuşlar olabilir belki	
00:28:15											şu şekilde	
00:28:16												
00:28:17												
00:28:18												
00:28:19												
00:28:20												
00:28:21												
00:28:22												
00:28:23												
00:28:24												
00:28:25												
00:28:26											ama imleci gezdirmekten bahsediyoruz	MS
00:28:27												
00:28:28												
00:28:29												
00:28:30											bu ürün ne kadar büyük olursa	MP
00:28:31											kullanıcıda o kadar zor hareket ettirebilme	
00:28:32											güdüsünü, duygusunu uyandıracaktır	
00:28:33												
00:28:34												
00:28:35												
00:28:36												
00:28:37												
00:28:38											yani	NI
00:28:39											bu ürün ufak tefek birşey olsun ki kolay	
00:28:40											hareket ettirilebilir ifadesini taşısın	
00:28:41												
00:28:42												
00:28:43												
00:28:44											ya da görünümü şeffaf olmalı	NI
00:28:45											içinin de boş olduğu gösterilmeli ki insana,	
00:28:46											bir şekilde hafif olduğu duygusu anlatılmalı	
00:28:47											o şekilde bir iletişim kurulabilmeli.	
00:28:48												
00:28:49												
00:28:50												
00:28:51												
00:28:52												
00:28:53												
00:28:54												
00:28:55												
00:28:56												
00:28:57												
00:28:58												
00:28:59											Tabi böyle bir ürünü yaparken... ürünün ne	MP

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:29:00											işe yaradığına dair kavramsal iletişimi de	
00:29:01											unutmamak gerekir.	
00:29:02												
00:29:03												
00:29:04												
00:29:05												
00:29:06												
00:29:07												
00:29:08											Yani bu ürünün ne işe yaradığına	MP
00:29:09											İnsan karşısında gördüğünde ne işe	
00:29:10											yaradığını, nasıl tutacağını algılaması	
00:29:11											gerekir.	
00:29:12												
00:29:13												
00:29:14												
00:29:15												
00:29:16												
00:29:17												
00:29:18											Bu ürünün tasarımı ile alakadar birşey	MS
00:29:19											olduğu için tabiki	
00:29:20											Daha sonraki çizgileri ve formu belirlemede	
00:29:21											gözönünde bulun... bulundurmam gereken	
00:29:22											kriterler.	
00:29:23												
00:29:24												
00:29:25												
00:29:26												
00:29:27												
00:29:28												
00:29:29												
00:29:30												
00:29:31												
00:29:32												
00:29:33											*İnsanın eline...*	MS
00:29:34												
00:29:35											Şimdi insan bilgisayar başındayken	Q
00:29:36											Bilgisayar diyoruz hep	
00:29:37											Aslında ileride bilgisayar kalacak mı?	
00:29:38												
00:29:39												
00:29:40												
00:29:41											O da ayrı bir konu ama	Q
00:29:42											Ya da bilgisayarın ifadesi değişecek mi?	
00:29:43												
00:29:44												
00:29:45												
00:29:46												
00:29:47												
00:29:48											Bir monitörden, bir klavyeden, bir harddisk	MP
00:29:49											kasasından dışarıya çıkabilecek mi	
00:29:50											bilmiyoruz ama.	
00:29:51											Onu da düşünmek gerekebilir.	
00:29:52												
00:29:53												
00:29:54												
00:29:55												
00:29:56												
00:29:57												
00:29:58											Ya bugünkü şifrelerden... Şifre diye	Q
00:29:59											algıladığımız...	

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:30:00											Biçimsel formlardan uzakaşabilecek mi bilgisayar?	
00:30:01												
00:30:02												
00:30:03												
00:30:04												
00:30:05												
00:30:06												
00:30:07												
00:30:08												
00:30:09												
00:30:10												
00:30:11											Eveet...	MS
00:30:12												
00:30:13												
00:30:14												
00:30:15												
00:30:16											Bu şekilde bir ürün mesela...	MS
00:30:17												
00:30:18												
00:30:19												
00:30:20											Ürünü şu şekilde tuttuğum, kavradığım	MS
00:30:21												
00:30:22												
00:30:23												
00:30:24												
00:30:25											Ama mesela şurada başparmak yeri oldu ve ben bu başparmağımı artık hareket ettiremiyorum.	TI
00:30:26												
00:30:27												
00:30:28												
00:30:29												
00:30:30											Ben burada bir scroll olabilir diye düşünmüştüm mesela şu şekilde	TI
00:30:31												
00:30:32												
00:30:33												
00:30:34												
00:30:35											Aslında hala daha olabilir ama... çıkıntı olur. Bilmiyorum ne kadar kuvvetli olur	
00:30:36												
00:30:37												
00:30:38												
00:30:39												
00:30:40												
00:30:41												
00:30:42												
00:30:43											Bi şey vardı hatırladığım kadarıyla	MS
00:30:44												
00:30:45												
00:30:46												
00:30:47												
00:30:48												
00:30:49												
00:30:50											Parmak kasları birbirine bağlanıyordu ve bileğe ondan sonra gidiyordu ama Başparmak kasları direk bileğe bağlanıyor Yani buradaki kaslardan bağımsız çalışan bir parmağımız	ER
00:30:51												
00:30:52												
00:30:53												
00:30:54												
00:30:55												
00:30:56												
00:30:57												
00:30:58												
00:30:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:31:00												
00:31:01												
00:31:02												
00:31:03												
00:31:04											Acaba işaret parmağı yerine başparmağımızı kullanmak daha daha az sağlık sorununu... Yol açabilir mi?	RI
00:31:05												
00:31:06												
00:31:07												
00:31:08												
00:31:09												
00:31:10												
00:31:11												
00:31:12												
00:31:13												
00:31:14												
00:31:15												
00:31:16												
00:31:17											Ya da böyle bir iletişim sürecinde, bilgisel bir iletişim sürecinde başparmak ne kadar kullanışlı olur? Bunu da düşünmek gerekir	MP
00:31:18												
00:31:19												
00:31:20												
00:31:21												
00:31:22												
00:31:23												
00:31:24												
00:31:25												
00:31:26												
00:31:27												
00:31:28											Tıklayabiliriz Yönlendirebiliriz aşağı yukarı İleri geri biraz... sanki zor oluyor Ama aşağı yukarı rahat gözüküyor Basmak konusunda da... ne kadar... etkin olabiliyor...	TI
00:31:29												
00:31:30												
00:31:31												
00:31:32												
00:31:33												
00:31:34												
00:31:35												
00:31:36												
00:31:37												
00:31:38												
00:31:39												
00:31:40												
00:31:41												
00:31:42												
00:31:43												
00:31:44												
00:31:45												
00:31:46												
00:31:47												
00:31:48											Bir de şey de... Mesela... Ben burada yenilikçi bir üründen bahsediyorum ve şu ana kadar hep mouse'u örnek aldım.	CT
00:31:49												
00:31:50												
00:31:51												
00:31:52												
00:31:53												
00:31:54												
00:31:55											Mesela bir işaretleme sü... olayında çift tıklarız mesela Acaba çift tıklamak doğru birşey mi parmak açısından...	Q
00:31:56												
00:31:57												
00:31:58												
00:31:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:32:00												
00:32:01												
00:32:02												
00:32:03											Demek ki bunu çift tıklamaktan çıkarabiliriz.	NI
00:32:04											Bunu bir tuşa... bir tuşa bir fonsyon	
00:32:05											yükleyerek bir kere bastığında onu yine çift	
00:32:06											tıklamas... çift tıkla... dığını algılatarak	
00:32:07											ekrandaki bir işareti seçtirebiliriz	
00:32:08											Yani çift tıklama yerine tek tıklama olsun	
00:32:09												
00:32:10												
00:32:11												
00:32:12												
00:32:13												
00:32:14												
00:32:15												
00:32:16												
00:32:17												
00:32:18												
00:32:19												
00:32:20												
00:32:21												
00:32:22												
00:32:23												
00:32:24												
00:32:25												
00:32:26												
00:32:27											Demek	MP
00:32:28											Sağlık açısından, kullanıcının ergonomik...	
00:32:29											sağlığı açısından daha uygun birşey.	
00:32:30												
00:32:31												
00:32:32												
00:32:33												
00:32:34												
00:32:35											O yüzden mesela başparmakla tıkladığımda	MP
00:32:36											işaret parmağıyla kadar seri tıklaya...	
00:32:37											mıyorum sanki...	
00:32:38												
00:32:39												
00:32:40												
00:32:41												
00:32:42											Bi deneyelim ufak çapta	TI
00:32:43											şu şekilde, çok seri bir şekilde ama	
00:32:44											başparmağıyla da yapıyormuşuz demek ki	
00:32:45												
00:32:46												
00:32:47												
00:32:48												
00:32:49												
00:32:50											Gerçi o uzun zamanda kendini gösterecek	MS
00:32:51											birşey ama...	
00:32:52												
00:32:53												
00:32:54											Hangisi daha yorucu acaba	Q
00:32:55											Böyle birşey de var	
00:32:56											İşaret parmağıyla daha mı az yoruluyorum	
00:32:57											Baş parmağıyla daha az yoruluyorum, ya da	
00:32:58											daha çok mu yoruluyorum.	
00:32:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:33:00												
00:33:01												
00:33:02												
00:33:03												
00:33:04												
00:33:05												
00:33:06											Tamam, ortada pek birşey yok ama	MS
00:33:07												
00:33:08												
00:33:09												
00:33:10												
00:33:11												
00:33:12												
00:33:13												
00:33:14											Ya sonuçta ben bir cihazla...	MS
00:33:15												
00:33:16												
00:33:17												
00:33:18												
00:33:19												
00:33:20												
00:33:21												
00:33:22												
00:33:23											İletişim kuracam, ilişki kuracam ve bunu da	MP
00:33:24											elimle yapacağım.	
00:33:25											Diye düşünüyorum şu anda...	
00:33:26												
00:33:27												
00:33:28												
00:33:29												
00:33:30												
00:33:31												
00:33:32												
00:33:33												
00:33:34												
00:33:35												
00:33:36											Şu anda x zamanına ait bir teknoloji olabilir	Q
00:33:37											ve ben herşeyi gözümle de yapıyor olabilirim	
00:33:38											yani	
00:33:39											O yüzden ele bağlı kalmalı mıyım ama...	
00:33:40												
00:33:41												
00:33:42												
00:33:43												
00:33:44												
00:33:45												
00:33:46												
00:33:47											Şu anki bahsettiğimiz ihtiyaçlar bugün	MS
00:33:48											hayatımızdaki bilgisayarın ihtiyaçları olduğu	
00:33:49											için	
00:33:50											Bunun çok da dışına çıkmamamız	
00:33:51											gerektiğini düşünüyorum	
00:33:52											Yani...	
00:33:53												
00:33:54												
00:33:55												
00:33:56												
00:33:57												
00:33:58											Bugünkü ihtiyaçlarımızı karşılayabilecek...	MP
00:33:59											yani bugün piyasaya çıkabilecek bir üründen	

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:34:00											bahsediyorum ben.		
00:34:01													
00:34:02													
00:34:03													
00:34:04													
00:34:05													
00:34:06											Çok uçuk birşey... yani kalkıp da gözümle de		NI
00:34:07											çift tıklayabilirim ben belki ileride		
00:34:08											Gözlerimi kırptığımda tıklayabilirim bi...		
00:34:09											işarete, bir kelimeye, bir yazıya		
00:34:10													
00:34:11													
00:34:12													
00:34:13													
00:34:14													
00:34:15													
00:34:16													
00:34:17													
00:34:18													
00:34:19											Ama bugün... bugünkü koşullarda bunun elle		MD
00:34:20											yapılması gerektiği daha açık gibi		
00:34:21											gözüküyor.		
00:34:22													
00:34:23													
00:34:24													
00:34:25													
00:34:26													
00:34:27													
00:34:28													
00:34:29													
00:34:30											Evet, yani sonuçta ben...		RD
00:34:31											Büyük ihtimalle elimi kullanarak... ben		
00:34:32											bilgisayarla iletişim kullanacağım.		
00:34:33													
00:34:34													
00:34:35													
00:34:36													
00:34:37													
00:34:38													
00:34:39													
00:34:40													
00:34:41													
00:34:42											Kolumu ya da ayağımı kullanamayacağım		MP
00:34:43											herhalde		
00:34:44											Kullanmam da çok sağlıklı olmaz herhalde.		
00:34:45													
00:34:46													
00:34:47													
00:34:48													
00:34:49													
00:34:50													
00:34:51													
00:34:52											Eveet... Bu ürün böyle birşey olabilir mi		Q
00:34:53											acaba?		
00:34:54													
00:34:55													
00:34:56											Şimdi scroll olayını yani menüyü aşağıya		CT
00:34:57											yukarıya hareket ettirmeyi düşündüm.		
00:34:58											Şu şekilde hareket ettirebiliyorum		
00:34:59													

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:35:00													
00:35:01													
00:35:02													
00:35:03													
00:35:04											Tıklamayı nasıl yapacağım, bir işareti nasıl		Q
00:35:05											seçeceğim?		
00:35:06													
00:35:07													
00:35:08											Bir de çift tıklama olayına karşıyım mesela		DI
00:35:09											Niye çift tıklasın ki?		
00:35:10													
00:35:11													
00:35:12													
00:35:13													
00:35:14													
00:35:15											Çünkü hem kullanıcının sağlığı açısından iyi		DI
00:35:16											birşey değil		
00:35:17													
00:35:18													
00:35:19											Hem de bir linke tıklamak için çift tıklamaz		ER
00:35:20											mıyız?		
00:35:21											Yoo... çift tıklamayız, bir kere tıklarız		
00:35:22											Bilgisayar içindeyken, yani önümüzde bir		
00:35:23											explorer sayfası açık değilken		
00:35:24											Bilgisayar içinde dolaşırken masaüstünde		
00:35:25											iconlara hep çift tıklarız		
00:35:26													
00:35:27													
00:35:28													
00:35:29													
00:35:30													
00:35:31													
00:35:32													
00:35:33													
00:35:34											Mesela bunun da önüne geçebilmeliyiz belki		MP
00:35:35											bu üründe		
00:35:36													
00:35:37											Böyle bir ihtiyaç varsa ki ben duyuyorum		MS
00:35:38													
00:35:39													
00:35:40													
00:35:41											O yüzden bütün şeylerimi eee... alttaki ne		MS
00:35:42											çubuğuydu o...		
00:35:43													
00:35:44													
00:35:45													
00:35:46													
00:35:47													
00:35:48											İsmini hatırlamıyorum, oraya		ER
00:35:49											kısayol oluşturur ve menüleri tek tuşla		
00:35:50											açmayı yeğlerim.		
00:35:51													
00:35:52													
00:35:53													
00:35:54											İnsanlar da... çift tıklamak herhalde kolay		MP
00:35:55											olmasa gerek.		
00:35:56													
00:35:57													
00:35:58											Bi de o zaten çift tıklamanın... iki tık		MP
00:35:59											arasındaki sürenin de önemi var		

	Category											
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		Decision
00:36:00											Belli bir süreyi aştığında tıklamıyorsun da.	
00:36:01												
00:36:02												
00:36:03												
00:36:04												
00:36:05											O yüzden dört beş kere tıklamak zorunda	MP
00:36:06											kalabilirsin bu... eee... iconu açmakta bir	
00:36:07											program açmakta.	
00:36:08												
00:36:09												
00:36:10												
00:36:11											Öyle bir olay da var mesela.	RI
00:36:12											Onu karşılayacak bir tuşumuz da olabilir.	
00:36:13												
00:36:14												
00:36:15												
00:36:16												
00:36:17												
00:36:18												
00:36:19												
00:36:20												
00:36:21											Eveet...	CT
00:36:22											Bunun dışında	
00:36:23												
00:36:24												
00:36:25												
00:36:26												
00:36:27											Ekranda imleci gezdirme, işaretleme,	MS
00:36:28											seçme, ekran kaydırma, menü açma,	
00:36:29											kişiselleştirebilme...	
00:36:30											Evet...	
00:36:31											Böyle bir ihtiyacımız da var.	
00:36:32												
00:36:33												
00:36:34												
00:36:35												
00:36:36												
00:36:37												
00:36:38												
00:36:39											Çok fonksyonlu mouse'larda... Yani çok	ER
00:36:40											fonksyonludan ziyade çok tuşlu mouse'larda	
00:36:41											tuşlara kendimiz fonksyon yükleyebiliyoruz	
00:36:42												
00:36:43												
00:36:44												
00:36:45												
00:36:46											Özellikle bizim gibi endüstriyel tasarımcıların	ER
00:36:47											kullandığı çizim programlarında	
00:36:48											Özel komut yüklenmiş tuşlara ihtiyaç	
00:36:49											duyuluyor	
00:36:50												
00:36:51												
00:36:52												
00:36:53												
00:36:54												
00:36:55												
00:36:56												
00:36:57											Zoom, pan gibi falan	ER
00:36:58											O bir ihtiyaç benim için.	
00:36:59												

	Category											
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		Decision
00:37:00												
00:37:01												
00:37:02												
00:37:03											Ama her bilgisayar kullanıcısı bunlara gerek	MS
00:37:04											duymuyor	
00:37:05											Ki bu gerek duymayan insanların da yüzdesi	
00:37:06											bayağı çoğunlukta	
00:37:07											Yani biz azınlıktayız	
00:37:08											Şimdilik bunu o yüzden gözardı edeyim ben.	
00:37:09											Fazla üstünde durmayayım.	
00:37:10												
00:37:11												
00:37:12												
00:37:13												
00:37:14												
00:37:15												
00:37:16												
00:37:17												
00:37:18												
00:37:19												
00:37:20												
00:37:21												
00:37:22												
00:37:23												
00:37:24												
00:37:25												
00:37:26												
00:37:27												
00:37:28												
00:37:29											Evet...	MS
00:37:30												
00:37:31												
00:37:32												
00:37:33												
00:37:34												
00:37:35											Aslında buna benzer bir ürün ortaya...	MS
00:37:36											çıkarsa şu an piyasada bulunanlardan çok	
00:37:37											da uzağa gitmiş olmayacağım gibi geliyor	
00:37:38											bana.	
00:37:39												
00:37:40												
00:37:41												
00:37:42												
00:37:43												
00:37:44											Daha farklı birşeyler olmalı sanki	MS
00:37:45											Bunun üzerinde biraz daha düşünmek...	
00:37:46												
00:37:47												
00:37:48												
00:37:49												
00:37:50												
00:37:51											Yararlı olabilir gibi geliyor	MS
00:37:52												
00:37:53												
00:37:54											Bir de şeyi atladık.	ST
00:37:55											Ekrandaki imlecin sağa sola nasıl hareket	
00:37:56											edileceği.	
00:37:57												
00:37:58												
00:37:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:38:00											Şimdi bazı insanlar...	ER
00:38:01												
00:38:02												
00:38:03												
00:38:04												
00:38:05												
00:38:06												
00:38:07											eee... mouse'u hareket ettirirken bileklerini kullanıyorlar, ki bu oldukça zararlıymış sanırım.	ER
00:38:08												
00:38:09												
00:38:10												
00:38:11												
00:38:12												
00:38:13												
00:38:14											O yüzden bilekten hareket ettirmek en mantıklısıymış şu şekilde, Yani şunu yapmak kötü birşey.	ER
00:38:15												
00:38:16												
00:38:17												
00:38:18												
00:38:19												
00:38:20												
00:38:21											Şunu alayım mouse için...	MS
00:38:22												
00:38:23												
00:38:24											Şunu yapmak oldukça zararlı birşey. Ki şu tarama... mouse'u bütün ekranda gezdirmek için yeterli bir alan.	TI
00:38:25												
00:38:26												
00:38:27												
00:38:28												
00:38:29												
00:38:30												
00:38:31												
00:38:32												
00:38:33												
00:38:34												
00:38:35											Yani bu alanın bu kadarla sınırlı olması insanları bir anlamda da bileklerini hareket ettirmeye zorluyor... demeyeyim de... itiyor.	MP
00:38:36												
00:38:37												
00:38:38												
00:38:39												
00:38:40												
00:38:41												
00:38:42												
00:38:43												
00:38:44												
00:38:45												
00:38:46												
00:38:47												
00:38:48											Yani eğer benim ekrandaki imleci hareket ettirmemdeki alan bundan daha büyük olursa ben o zaman bileğimi, kolumu da hareket ettirme ihtiyacı duyacağım.	MP
00:38:49												
00:38:50												
00:38:51												
00:38:52												
00:38:53												
00:38:54												
00:38:55												
00:38:56												
00:38:57											Böyle birşeyi de ortaya koyabilmeliyim belki	DI
00:38:58												
00:38:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:39:00												
00:39:01											Bunu hareket alanını biraz daha büyük tutup, ya da başka birşey yaparak sadece bileği oynatmalarını engellemeliyim.	NI
00:39:02												
00:39:03												
00:39:04												
00:39:05												
00:39:06												
00:39:07												
00:39:08												
00:39:09											Ya da öyle birşey olmalı ki bu cihaz bileğimi de kapsamalı ve şu şekilde elimi içinde sabit tutabilecek ya da bileğimin oynamasını engelleyebilecek birşey olmalı.	DI
00:39:10												
00:39:11												
00:39:12												
00:39:13												
00:39:14												
00:39:15												
00:39:16												
00:39:17												
00:39:18												
00:39:19											Bir uzantısı olmalı ki ben imleci bileğimle... kolumla hareket ettireyim.	DI
00:39:20												
00:39:21												
00:39:22												
00:39:23												
00:39:24												
00:39:25												
00:39:26												
00:39:27												
00:39:28												
00:39:29												
00:39:30											Öyle birşey de olabilmeli belki.	MS
00:39:31												
00:39:32												
00:39:33												
00:39:34												
00:39:35											Şöyle uzun birşey olmalı Şöyle alttan gelip, şu şekilde kavramalı belki Şu şekilde bir... cihazdan bahsediyoruz.	TI
00:39:36												
00:39:37												
00:39:38												
00:39:39												
00:39:40												
00:39:41												
00:39:42												
00:39:43												
00:39:44												
00:39:45												
00:39:46												
00:39:47												
00:39:48												
00:39:49												
00:39:50												
00:39:51											Evet... bunun dışında neler olabilir.	CT
00:39:52												
00:39:53												
00:39:54												
00:39:55												
00:39:56												
00:39:57												
00:39:58												
00:39:59												

	Category											
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		Decision
00:40:00	■					■						
00:40:01	■					■						
00:40:02	■					■						
00:40:03	■					■					Teknoloji... Tasarımda teknolojinin	ST
00:40:04	■					■					kullanıcıya faydalı kullanımı...	
00:40:05	■					■						
00:40:06	■					■						
00:40:07	■					■						
00:40:08	■					■					Gibi bir kriterimiz var	MS
00:40:09	■					■						
00:40:10	■					■						
00:40:11	■					■						
00:40:12	■					■						
00:40:13	■					■						
00:40:14	■					■						
00:40:15	■					■					Yani bu demek ki... ürünün...	MS
00:40:16						■						
00:40:17						■						
00:40:18						■						
00:40:19						■						
00:40:20						■						
00:40:21						■					Tasarımda teknolojinin kullanıcıya faydalı	MS
00:40:22						■					kullanımı	
00:40:23						■						
00:40:24						■					Yani teknolojiyi elinden geldiğince	MP
00:40:25						■					kullanıcının yararına şeklinde kullanabilmek	
00:40:26						■						
00:40:27						■						
00:40:28						■					Kullanı... da... daha az sağlık sorununa	MP
00:40:29						■					meydan vermek	
00:40:30						■						
00:40:31						■						
00:40:32						■						
00:40:33						■						
00:40:34						■					Onun daha iyi...iletişim... cihazla daha iyi	MP
00:40:35						■					iletişim kurabilmesi demek olmalı	
00:40:36						■						
00:40:37						■						
00:40:38						■						
00:40:39						■						
00:40:40	■					■						
00:40:41	■					■						
00:40:42	■					■						
00:40:43	■					■						
00:40:44	■					■						
00:40:45	■					■					Eveet... bunu dışında...	CT
00:40:46	■					■						
00:40:47	■					■						
00:40:48	■					■					İletişim arabirimi tasarlıyorum şu anda ben	MS
00:40:49	■					■						
00:40:50	■					■						
00:40:51	■					■					Bunu tekrar hatırlamam iyi oldu	MS
00:40:52	■					■					Unutmamam gereken bir faktör	
00:40:53	■					■					İletişim arabirimi...	
00:40:54	■					■						
00:40:55	■					■						
00:40:56	■					■						
00:40:57	■					■						
00:40:58	■					■						
00:40:59	■					■						

	Category											
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		Decision
00:41:00	■					■					İletişim arabirimi...	MS
00:41:01	■					■						
00:41:02	■					■						
00:41:03												
00:41:04											Yani iletişim arabirimi dediğimiz zaman	Q
00:41:05											bunun içinde monitör de olabilir... mi?...	
00:41:06												
00:41:07												
00:41:08												
00:41:09											Televizyon gibi birşey	MP
00:41:10											Sonuçta o da iletişimi kurduğum bir arabirim	
00:41:11											aslında ama benim burada tasarlayacağım	
00:41:12											arabirimin hangi ihtiyaçları karşılayacağı	
00:41:13											belirtildiği için böyle birşeyden...	
00:41:14												
00:41:15												
00:41:16												
00:41:17												
00:41:18												
00:41:19												
00:41:20												
00:41:21												
00:41:22												
00:41:23												
00:41:24												
00:41:25											monitör olmayacağı konusunda... bir hem..	MP
00:41:26											fikire sahibim.	
00:41:27												
00:41:28												
00:41:29												
00:41:30											Ama sonuçta dokunmatik bir ekrandan da	NI
00:41:31											bahsedilebilir burada	
00:41:32												
00:41:33												
00:41:34											Onun da...	MP
00:41:35											Onunla da imleci hareket ettirebilirim	
00:41:36											Yani piyasada olan şeylerden bahsediyorum	
00:41:37											şu anda ama	
00:41:38												
00:41:39												
00:41:40												
00:41:41												
00:41:42											Ekranın üzerinde parmağımı gezindirerek...	DI
00:41:43											İmleci hareket ettirebilirim, birşeye	
00:41:44											tıklayabilirim.	
00:41:45												
00:41:46												
00:41:47												
00:41:48												
00:41:49											Ama sonuçta bu da dikey bir ekranda yorucu	MP
00:41:50											birşey	
00:41:51												
00:41:52												
00:41:53											Zaten kısa süreli kullanımlar için geliştirilmiş	MP
00:41:54											bir teknoloji bu da	
00:41:55											Uzun süreli değil.	
00:41:56												
00:41:57												
00:41:58												
00:41:59											Ha bir de öyle bir faktörümüz var.	MP

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:42:00											Bir kullanıcı bilgisayarın başında uzun süre oturabilir, saatleri aşabilir.	
00:42:01												
00:42:02												
00:42:03												
00:42:04												
00:42:05												
00:42:06											O yüzden mümkün olduğunca ergonomik	MP
00:42:07											birşeyden bahsetmeliyiz.	
00:42:08											Öyle birşey ortaya koymalıyız.	
00:42:09												
00:42:10												
00:42:11												
00:42:12												
00:42:13												
00:42:14											Evet..	MS
00:42:15											Üründe şuna doğru gidiyorum.	
00:42:16												
00:42:17												
00:42:18											Elin tam yatay durmamasına özen	RI
00:42:19											gösteriyorum.	
00:42:20												
00:42:21												
00:42:22												
00:42:23												
00:42:24												
00:42:25											Ha.. yaptığı hareketlerin mümkün olduğunca	RI
00:42:26											ekrandaki hareketle paralel olmasını	
00:42:27											istiyorum.	
00:42:28												
00:42:29												
00:42:30												
00:42:31												
00:42:32												
00:42:33											Yani sağa hareket ettiriyorsa cihazı, ekranda	MP
00:42:34											da sağa hareket edecek	
00:42:35											İleri hareket ettiriyorsa ekranda yukarıya	
00:42:36											doğru çıkacak.	
00:42:37												
00:42:38												
00:42:39												
00:42:40												
00:42:41												
00:42:42												
00:42:43											Ama burada da şeyi atlıyorum mesela	MS
00:42:44												
00:42:45												
00:42:46											Cihazın hareket ettiği yüzey yatayken	MP
00:42:47											erkanda dikey	
00:42:48												
00:42:49											Yine orada bir çelişkiye düşüyorum kendi	MS
00:42:50											içimde	
00:42:51												
00:42:52											Yani yaptığı her hareketin yüz... ekrandaki	MP
00:42:53											harekete paralel olmasını istiyorum ama...	
00:42:54											İleri geri... hareket ettirdiğinde cihazı	
00:42:55											ekranda aşağı yukarı hareket ediyor.	
00:42:56												
00:42:57												
00:42:58												
00:42:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:43:00												
00:43:01												
00:43:02											O zaman scroll'un da...	MS
00:43:03												
00:43:04												
00:43:05												
00:43:06											Scroll diye tabir ettiğimiz tuşun yatayda	DI
00:43:07											hareket etmesiyle ekranda dikeye	
00:43:08											taşınmasında bir sorun olmayabilir.	
00:43:09												
00:43:10												
00:43:11												
00:43:12												
00:43:13												
00:43:14												
00:43:15												
00:43:16											Ama ekranın aşağı yukarı kayması da	MP
00:43:17											imlecin aşağı yukarı hareket etmesinden de	
00:43:18											başka birşey.	
00:43:19												
00:43:20												
00:43:21												
00:43:22												
00:43:23											Sonuçta düzlem hareket ediyor orada	MP
00:43:24												
00:43:25												
00:43:26											Bir imleç bir nesne ekrandaki küçücük bir	MP
00:43:27											nokta hareket etmiyor.	
00:43:28												
00:43:29												
00:43:30												
00:43:31												
00:43:32											O yüzden ben onun aynı paralellikte	RI
00:43:33											olmasını istiyorum.	
00:43:34												
00:43:35												
00:43:36												
00:43:37												
00:43:38											En azından öyle daha rahat olabileceğini	MS
00:43:39											düşünüyorum şu anda	
00:43:40											Bu kullanım sonrasında daha... iyi ortaya	
00:43:41											çıkacak birşey	
00:43:42												
00:43:43												
00:43:44												
00:43:45												
00:43:46												
00:43:47												
00:43:48												
00:43:49												
00:43:50												
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00:43:52												
00:43:53												
00:43:54												
00:43:55												
00:43:56												
00:43:57												
00:43:58												
00:43:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:44:00												
00:44:01												
00:44:02												
00:44:03											Bunun dışında	CT
00:44:04												
00:44:05												
00:44:06												
00:44:07												
00:44:08											Biraz hamuru kenara bırakayım ve kağıtta düşünmeye başlayayım.	MS
00:44:09												
00:44:10												
00:44:11												
00:44:12												
00:44:13											Evet...	MS
00:44:14												
00:44:15											Ve bunda hala bir tık sorunum var, yani işaretleme sorunum vardı	ST
00:44:16												
00:44:17												
00:44:18												
00:44:19											Ve bunu nasıl hareket ettireceğim?	Q
00:44:20												
00:44:21												
00:44:22											Çünkü bu yüksek bir cihaz	MP
00:44:23												
00:44:24												
00:44:25											Sağa sola hareket etmesi, ileri geri hareket ettirilmesi...	
00:44:26												
00:44:27												
00:44:28												
00:44:29												
00:44:30												
00:44:31											Kullanıcıda zor hareket ettirilebilir duygusunu uyandırabilir mi acaba?	Q
00:44:32												
00:44:33												
00:44:34												
00:44:35												
00:44:36												
00:44:37											Böyle bir soru da var karşımda	MS
00:44:38												
00:44:39												
00:44:40												
00:44:41												
00:44:42												
00:44:43												
00:44:44												
00:44:45												
00:44:46												
00:44:47												
00:44:48												
00:44:49												
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00:44:52												
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00:44:54												
00:44:55												
00:44:56												
00:44:57												
00:44:58												
00:44:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:45:00												
00:45:01												
00:45:02												
00:45:03												
00:45:04												
00:45:05												
00:45:06											Biraz daha şekil verecek olursam buna	MS
00:45:07												
00:45:08												
00:45:09												
00:45:10											15 dakika geldi.	
00:45:11												
00:45:12												
00:45:13												
00:45:14												
00:45:15												
00:45:16												
00:45:17												
00:45:18												
00:45:19												
00:45:20												
00:45:21												
00:45:22												
00:45:23												
00:45:24											Birşey sorabilir miyim?	MS
00:45:25												
00:45:26												
00:45:27												
00:45:28												
00:45:29											Süre sonunda bir ürün çıkmış olması gerekiyor mu ortaya?	MS
00:45:30												
00:45:31												
00:45:32												
00:45:33											Kesinlikle, illaki...	MS
00:45:34												
00:45:35												
00:45:36												
00:45:37											Aslında gerekiyor evet, bir ürün alınması gerekiyor.	
00:45:38												
00:45:39											Tamam ok, o zaman.	MS
00:45:40												
00:45:41												
00:45:42												
00:45:43												
00:45:44												
00:45:45											Şimdi tekrar başa dönelim	ST
00:45:46												
00:45:47											Başa dönmek yaptıklarımı toparlamak açısından sadece..	MS
00:45:48												
00:45:49												
00:45:50												
00:45:51												
00:45:52											Şimdi dedik ki bu ürünün kesinlikle insan sağlığına u... eee.. kullanıcının sağlığına önem vermesi gerekiyor, yani sağlık ön plandaki koşul	MP
00:45:53												
00:45:54												
00:45:55												
00:45:56												
00:45:57												
00:45:58												
00:45:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:46:00												
00:46:01												
00:46:02												
00:46:03												
00:46:04											Çünkü saatleri aşan bir kullanım sözkonusu burada Sağlık önemli bir kavram burada benim için	MP
00:46:05												
00:46:06												
00:46:07												
00:46:08												
00:46:09												
00:46:10												
00:46:11											Artı kullanışlılık	MP
00:46:12												
00:46:13												
00:46:14											Yani ürünün kullanıcıyla kurduğu iletişim burada önemli.	MP
00:46:15												
00:46:16												
00:46:17												
00:46:18												
00:46:19												
00:46:20												
00:46:21											Kullanıcının cihazla birlikte yaptığı hareketin ekrana nasıl yansıdığı önemi bir kavram	MP
00:46:22												
00:46:23												
00:46:24												
00:46:25												
00:46:26												
00:46:27											Burada... bu hareketleri mümkün oldukça benzer olsun ki kullanıcı da bu açıdan bir zorluk çekmesin...	RI
00:46:28												
00:46:29												
00:46:30												
00:46:31												
00:46:32												
00:46:33												
00:46:34												
00:46:35												
00:46:36											Diye düşünüyorum.	MS
00:46:37												
00:46:38												
00:46:39												
00:46:40												
00:46:41												
00:46:42												
00:46:43											Görsellik açısından, yani bir cihazı sağa ittiğimde işaretin yukarı çıkması çok anlamsız olur.	MP
00:46:44												
00:46:45												
00:46:46												
00:46:47												
00:46:48												
00:46:49												
00:46:50												
00:46:51												
00:46:52											Yani kullanıcının cihazla mümkün olduğu kadar çabuk ve kolay şekilde ilişki kurabilmesi gerekiyor.	MP
00:46:53												
00:46:54												
00:46:55												
00:46:56												
00:46:57												
00:46:58											ona bir alışma süresi geçirmesi gerekmiyor ya...	MP
00:46:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:47:00												
00:47:01												
00:47:02											Gamepadlerden bahsetmiştim daha önce...	ER
00:47:03												
00:47:04												
00:47:05												
00:47:06												
00:47:07												
00:47:08											Ben hala zorluk çekiyorum onda mesela.	ER
00:47:09												
00:47:10											O yetileri olmayan insanların da bu cihazı kullanmaları gerekiyor.	MP
00:47:11												
00:47:12												
00:47:13												
00:47:14											Çünkü... artık bilgisayar hayatımızın çok önemli bir parçası ve	MP
00:47:15												
00:47:16												
00:47:17												
00:47:18												
00:47:19												
00:47:20											Herkesin de sahip olduğu ya da erişebildiği bir teknoloji olduğu için...	MP
00:47:21												
00:47:22												
00:47:23												
00:47:24												
00:47:25												
00:47:26											Hedef kitle bayağı büyük ve... hepsi de...	MP
00:47:27												
00:47:28												
00:47:29											Bilgisayar da zaten yeni birşey ve çoğu insan bu yetiye sahip olmayabilir.	MP
00:47:30												
00:47:31												
00:47:32												
00:47:33												
00:47:34												
00:47:35											O yüzden kullanışlılık önemli bir kavram tekrar diyo... rum...	MP
00:47:36												
00:47:37												
00:47:38												
00:47:39												
00:47:40												
00:47:41											Eveet...	MS
00:47:42												
00:47:43												
00:47:44											Bunun dışında	CT
00:47:45												
00:47:46												
00:47:47												
00:47:48												
00:47:49											Kullanışlılık dedik yani... yaptığımız hareketlerin ekrana benzer şekilde olması	RI
00:47:50												
00:47:51												
00:47:52												
00:47:53												
00:47:54												
00:47:55												
00:47:56												
00:47:57												
00:47:58											Bunun dışında nasıl bir kavramım vardı...	MS
00:47:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:48:00												
00:48:01											Sağlık, kullanışlılık...	MS
00:48:02												
00:48:03												
00:48:04												
00:48:05												
00:48:06												
00:48:07												
00:48:08												
00:48:09												
00:48:10												
00:48:11												
00:48:12												
00:48:13												
00:48:14												
00:48:15												
00:48:16												
00:48:17												
00:48:18												
00:48:19												
00:48:20												
00:48:21												
00:48:22												
00:48:23												
00:48:24												
00:48:25											Yenilikçilik diye bir kavramımız vardı	MS
00:48:26											Bu benden istenen değerlendirme	
00:48:27											kriterlerinden biri	
00:48:28											Onun üzerine çok fazla konuşmadım	
00:48:29												
00:48:30												
00:48:31												
00:48:32												
00:48:33												
00:48:34												
00:48:35												
00:48:36												
00:48:37												
00:48:38												
00:48:39												
00:48:40												
00:48:41											Bir de ürün estetiğimiz var.	MS
00:48:42												
00:48:43												
00:48:44												
00:48:45												
00:48:46												
00:48:47												
00:48:48											Şimd...	MS
00:48:49											Bu...	
00:48:50											Şu ana kadar konuştuklarımızı kağıda	
00:48:51											aktarıp birşeyler çizmeye çalışayım	
00:48:52												
00:48:53												
00:48:54												
00:48:55											Şimdi dedim ki, insan, kullanıcının sağlığı	MS
00:48:56												
00:48:57												
00:48:58												
00:48:59											Yani şu şekilde elimizi yatay kullanmak bize	RI

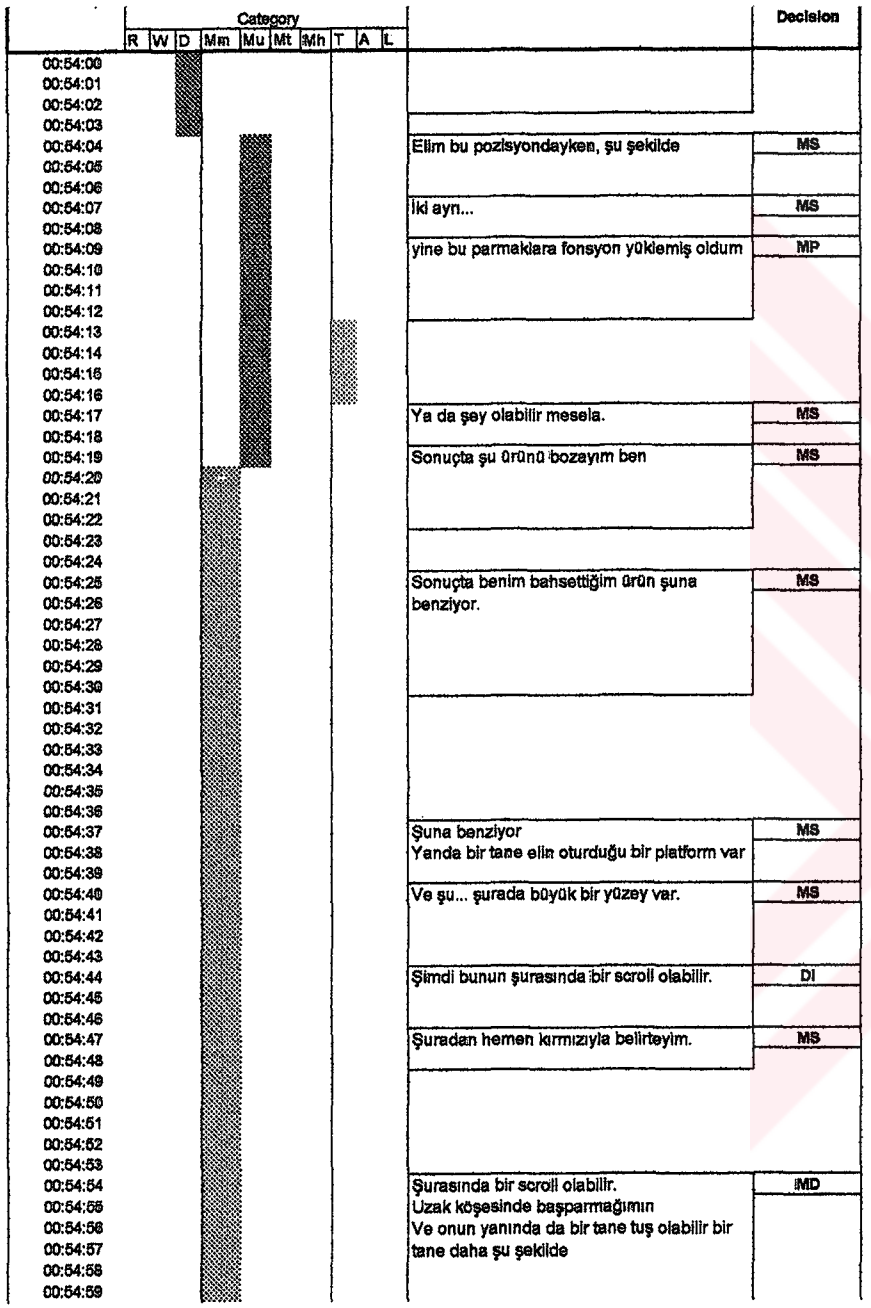
	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:49:00												
00:49:01											zarar veriyor uzun vadede	
00:49:02												
00:49:03											O yüzden şu şekilde elin doğal hali olan...	MP
00:49:04											elin kolla olan... doğal hali olan şunu	
00:49:05											kullanmamızda daha az bir sorun çıkacaktır	
00:49:06											herhalde.	
00:49:07												
00:49:08												
00:49:09												
00:49:10												
00:49:11												
00:49:12												
00:49:13												
00:49:14											O yüzden ben burada mouse'lar yatay	MP
00:49:15											düzlemdeyken ben bunu bir dikey düzleme	
00:49:16											taşıyabilmeliyim.	
00:49:17												
00:49:18												
00:49:19												
00:49:20											O yüzden elimizin şu şekilde düzlem şuysa...	RI
00:49:21											ben bunu şu yüzeye taşıyabilmeliyim.	
00:49:22												
00:49:23												
00:49:24												
00:49:25												
00:49:26												
00:49:27												
00:49:28												
00:49:29												
00:49:30												
00:49:31												
00:49:32											Bunu kavramam açısından tabiki şu şekilde	MS
00:49:33											şuralarda bir el yeri falan olmalı.	
00:49:34												
00:49:35												
00:49:36												
00:49:37												
00:49:38												
00:49:39											Hatta daha sonra da bileğin şurasına,	NI
00:49:40											üzerine koyabileceği bir tabanı falan da	
00:49:41											olmalı şu şekilde.	
00:49:42												
00:49:43												
00:49:44												
00:49:45												
00:49:46												
00:49:47											Şuraya bileği oturtabilirim ki elim rahat olsun	MP
00:49:48												
00:49:49												
00:49:50												
00:49:51												
00:49:52												
00:49:53											Bunun dışında	
00:49:54												
00:49:55												
00:49:56												
00:49:57											Daha sonra scroll'dan bahsetmiştik	CT
00:49:58												
00:49:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:50:00											Scroll'u başparmağımla oynatabilir miyim diye	
00:50:01												
00:50:02												
00:50:03											Onu da eğer elimi şöyle kavrarsam, scroll'da şu şekilde kalıyor	
00:50:04												
00:50:05												
00:50:06												
00:50:07												
00:50:08												
00:50:09											Yani başka bir hamur alalım elimize	MS
00:50:10												
00:50:11											Ya da şunu alayım, şurada hazır vardı	MS
00:50:12												
00:50:13											Scroll'da şu şekilde olabilir belki.	DI
00:50:14												
00:50:15												
00:50:16											mesela bundan farklı bir yaklaşım oldu	MS
00:50:17												
00:50:18											Bunda elim böyleyken, scroll bu şekilde hareket ederken	MS
00:50:19											Bunda bu şekile döndü	
00:50:20												
00:50:21												
00:50:22												
00:50:23												
00:50:24											Ama burada sağa sola hareket ediyorum ve monitörde bu dikey bir harekete...	TI
00:50:25												
00:50:26												
00:50:27												
00:50:28											Burada yatayken monitörde dikey bir harekete neden oluyor	TI
00:50:29												
00:50:30												
00:50:31											Ve bu benim istemediğim bir şey,	MS
00:50:32												
00:50:33											Yani...	MS
00:50:34											Burada yatay bir hareket yapıyorken monitörde dikeye dönüşmesi	
00:50:35												
00:50:36												
00:50:37												
00:50:38											Bu... kullanıcı açısından zor olabilir.	MP
00:50:39												
00:50:40												
00:50:41												
00:50:42											Çünkü farklı düzlemlerde iki hareketten bahsediyoruz	MP
00:50:43												
00:50:44												
00:50:45											İnsanı yöneltmiyor	MP
00:50:46												
00:50:47												
00:50:48											O yüzden şu şekilde hareketi yapabilir miyim?	Q
00:50:49												
00:50:50												
00:50:51												
00:50:52											Belki... yapabilirim	MP
00:50:53											Çok zorlamamak kaydıyla	
00:50:54												
00:50:55												
00:50:56												
00:50:57												
00:50:58												
00:50:59												

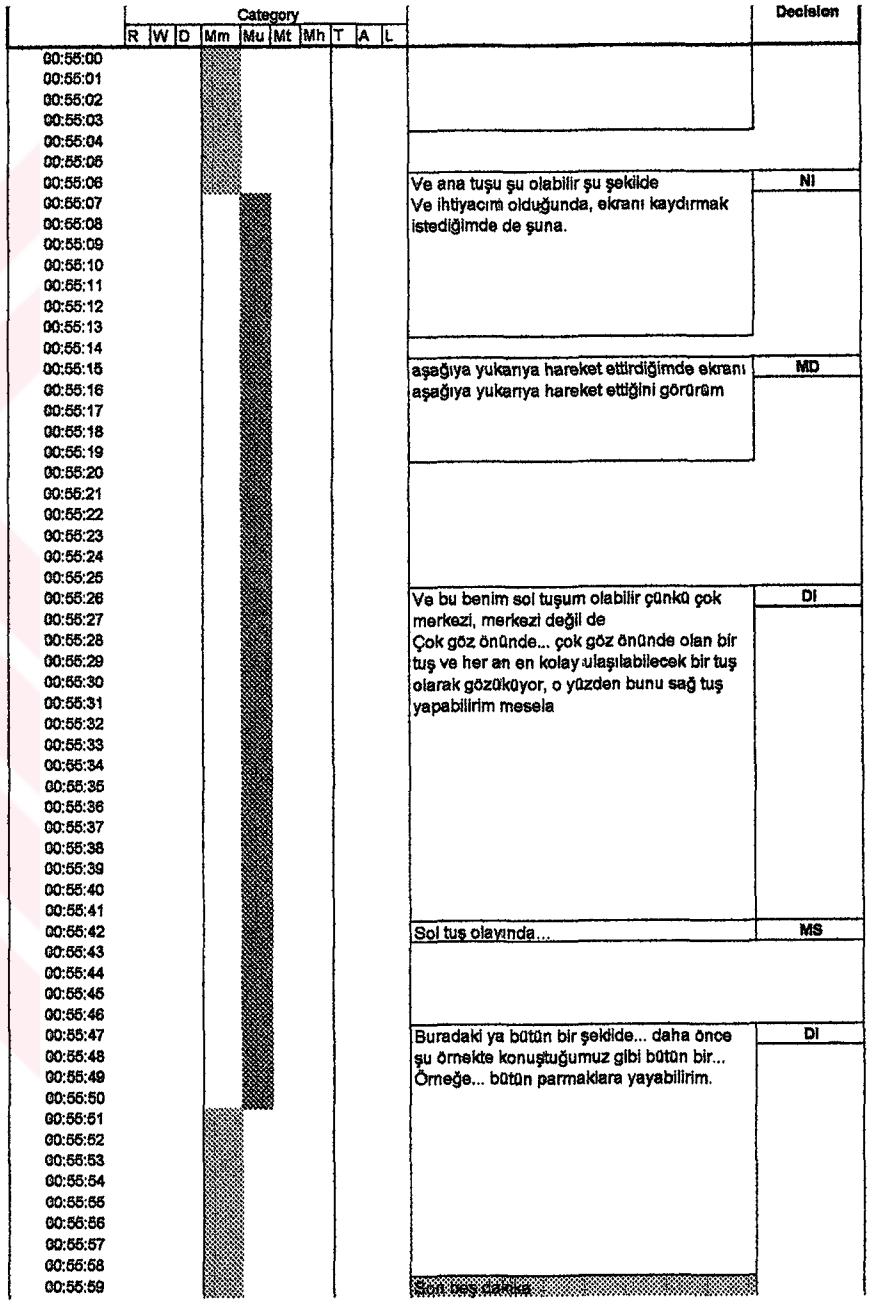
	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:51:00												
00:51:01											Evet...	MS
00:51:02												
00:51:03												
00:51:04												
00:51:05											Şu şekilde dikey bir scroll'dan bahsettik şurada şöyle	RI
00:51:06												
00:51:07												
00:51:08												
00:51:09											Şurası elimizin geldiği yer.	MS
00:51:10												
00:51:11												
00:51:12												
00:51:13											Şöyle... şu şekilde...	MS
00:51:14												
00:51:15												
00:51:16											Şuradan parmak uçlarımız gözükecek şöyle	MS
00:51:17												
00:51:18												
00:51:19												
00:51:20												
00:51:21											Tabii bunlar buraya denk gelecek en	MS
00:51:22											azından	
00:51:23											Baş parmağımız da şu şekilde olacak şuraya	
00:51:24											gele...	
00:51:25												
00:51:26												
00:51:27												
00:51:28												
00:51:29												
00:51:30												
00:51:31												
00:51:32												
00:51:33												
00:51:34												
00:51:35											Şu şekilde parmaklarımız	MS
00:51:36												
00:51:37												
00:51:38												
00:51:39												
00:51:40												
00:51:41												
00:51:42											Evet..	MS
00:51:43												
00:51:44												
00:51:45												
00:51:46											Şu şöyle bir tane	MS
00:51:47												
00:51:48											Bu... nereden görünüş?	MS
00:51:49												
00:51:50												
00:51:51												
00:51:52											Bu cihazın önden görünüşü.	MS
00:51:53											Önden görünüşü dediğimiz yani, bize	
00:51:54											doğru... durduğunda cihazı kullanırken bizim	
00:51:55											gördüğümüz açısı, yani arkadan görünüşü	
00:51:56											diyebiliriz belki buna	
00:51:57												
00:51:58												
00:51:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:52:00												
00:52:01												
00:52:02												
00:52:03												
00:52:04											Yandan baktığımızda da elimiz şu şekilde kavrayacağı için...	MS
00:52:05												
00:52:06												
00:52:07												
00:52:08												
00:52:09											şu şekilde şöyle parmaklarımız	MS
00:52:10												
00:52:11												
00:52:12												
00:52:13												
00:52:14												
00:52:15											şu şekilde	MS
00:52:16											kıvrılmış hali tabi ki	
00:52:17											Şu da başparmağımız şu şekilde	
00:52:18												
00:52:19												
00:52:20												
00:52:21												
00:52:22											Şöyle, şu şekilde, şimdi	RI
00:52:23											Şurada bir scroll'dan bahsetmiştik, şurada şöyle	
00:52:24												
00:52:25											Şurada aksı...	
00:52:26												
00:52:27												
00:52:28												
00:52:29												
00:52:30												
00:52:31												
00:52:32												
00:52:33												
00:52:34												
00:52:35												
00:52:36												
00:52:37											Şuradan avucunun içine	MS
00:52:38											Şurası avuç zaten şöyle	
00:52:39											Şuradan bunun içine oturabilecek ve bileğin	RI
00:52:40											de üzerine oturabileceği bir...	
00:52:41											Düzlemden bahsettik	
00:52:42											şu şekilde	
00:52:43												
00:52:44												
00:52:45												
00:52:46											Bu düzlemimiz olsun, yine	MS
00:52:47												
00:52:48												
00:52:49												
00:52:50											Ellerin oturduğu bir düzlem	RI
00:52:51												
00:52:52												
00:52:53												
00:52:54												
00:52:55												
00:52:56												
00:52:57											Bu da cihazın yandan görünüşü	MS
00:52:58												
00:52:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:53:00												
00:53:01												
00:53:02												
00:53:03												
00:53:04												
00:53:05												
00:53:06												
00:53:07											Ama bur... bu cihazda mesela tıklama sorunu olacak	ST
00:53:08												
00:53:09												
00:53:10											Ben burada işaret parmağıyla tıklayacağım mesela	MP
00:53:11												
00:53:12												
00:53:13												
00:53:14												
00:53:15												
00:53:16												
00:53:17											İşaret parmağıyla buna tıklamam çok kolay olmadı.	MP
00:53:18												
00:53:19											En azından şurada şu şekilde bir tuş...	MS
00:53:20												
00:53:21												
00:53:22												
00:53:23												
00:53:24												
00:53:25											Şöyle... şu şekilde...	TI
00:53:26												
00:53:27												
00:53:28												
00:53:29												
00:53:30												
00:53:31											Normal mouse'da şöyleydi	ER
00:53:32												
00:53:33											Bu nasıl bir ihtiyaç?	TI
00:53:34												
00:53:35											Karşılıyor mu birbirini	TI
00:53:36												
00:53:37											şu şekilde...	MS
00:53:38												
00:53:39												
00:53:40												
00:53:41												
00:53:42												
00:53:43											Mmm...	MS
00:53:44												
00:53:45												
00:53:46												
00:53:47											Şuraya bir tuş, bu sol tuşumuz oluyor...	DI
00:53:48												
00:53:49												
00:53:50												
00:53:51											Denk geldiğinde	MS
00:53:52												
00:53:53											Bir de sağ tuşumuz var...	DI
00:53:54												
00:53:55												
00:53:56												
00:53:57											Sağ tuşumuz da mouse'layken sol parmakta ka.. şey... orta parmağımda kalıyordu.	MP
00:53:58												
00:53:59												



	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:54:00												
00:54:01												
00:54:02												
00:54:03												
00:54:04											Elim bu pozisyondayken, şu şekilde	MS
00:54:05												
00:54:06												
00:54:07											İki ayn...	MS
00:54:08												
00:54:09											yine bu parmaklara fonsyon yüklemiş oldum	MP
00:54:10												
00:54:11												
00:54:12												
00:54:13												
00:54:14												
00:54:15												
00:54:16												
00:54:17											Ya da şey olabilir mesela.	MS
00:54:18												
00:54:19											Sonuçta şu ürünü bozayım ben	MS
00:54:20												
00:54:21												
00:54:22												
00:54:23												
00:54:24												
00:54:25											Sonuçta benim bahsettiğim ürün şuna	MS
00:54:26											benziyor.	
00:54:27												
00:54:28												
00:54:29												
00:54:30												
00:54:31												
00:54:32												
00:54:33												
00:54:34												
00:54:35												
00:54:36												
00:54:37											Şuna benziyor	MS
00:54:38											Yanda bir tane elin oturduğu bir platform var	
00:54:39												
00:54:40											Ve şu... şurada büyük bir yüzey var.	MS
00:54:41												
00:54:42												
00:54:43												
00:54:44											Şimdi bunun şurasında bir scroll olabilir.	DI
00:54:45												
00:54:46												
00:54:47											Şuradan hemen kırmızıyla belirteyim.	MS
00:54:48												
00:54:49												
00:54:50												
00:54:51												
00:54:52												
00:54:53												
00:54:54											Şurasında bir scroll olabilir.	MD
00:54:55											Uzak köşesinde başparmağımın	
00:54:56											Ve onun yanında da bir tane tuş olabilir bir	
00:54:57											tane daha şu şekilde	
00:54:58												
00:54:59												



	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:55:00												
00:55:01												
00:55:02												
00:55:03												
00:55:04												
00:55:05												
00:55:06											Ve ana tuşu şu olabilir şu şekilde	NI
00:55:07											Ve ihtiyacım olduğunda, ekranı kaydırmak	
00:55:08											istediğimde de şuna.	
00:55:09												
00:55:10												
00:55:11												
00:55:12												
00:55:13												
00:55:14												
00:55:15											aşağıya yukarıya hareket ettirdiğimde ekranı	MD
00:55:16											aşağıya yukarıya hareket ettiğini görürüm	
00:55:17												
00:55:18												
00:55:19												
00:55:20												
00:55:21												
00:55:22												
00:55:23												
00:55:24												
00:55:25												
00:55:26											Ve bu benim sol tuşum olabilir çünkü çok	DI
00:55:27											merkezi, merkezi değil de	
00:55:28											Çok göz önünde... çok göz önünde olan bir	
00:55:29											tuş ve her an en kolay ulaşılabilecek bir tuş	
00:55:30											olarak gözüküyor, o yüzden bunu sağ tuş	
00:55:31											yapabilirim mesela	
00:55:32												
00:55:33												
00:55:34												
00:55:35												
00:55:36												
00:55:37												
00:55:38												
00:55:39												
00:55:40												
00:55:41												
00:55:42											Sol tuş olayında...	MS
00:55:43												
00:55:44												
00:55:45												
00:55:46												
00:55:47											Buradaki ya bütün bir şekilde... daha önce	DI
00:55:48											şu örnekte konuştuğumuz gibi bütün bir...	
00:55:49											Örneğe... bütün parmaklara yayabilirim.	
00:55:50												
00:55:51												
00:55:52												
00:55:53												
00:55:54												
00:55:55												
00:55:56												
00:55:57												
00:55:58												
00:55:59											Son beş dakika	

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:56:00												
00:56:01											Yani burada büyük bir tuş olabilir ve bu sadece sol... sağ tuş olabilir.	
00:56:02												
00:56:03												
00:56:04												
00:56:05												
00:56:06											Buna tıkladığımda menü açılabilir. şu şekilde...	TI
00:56:07												
00:56:08												
00:56:09											Şu scroll... daha bir yayık tuş olmalı	DI
00:56:10												
00:56:11												
00:56:12											şu şekilde...	TI
00:56:13												
00:56:14												
00:56:15											şu şekilde buna, sürekli buna basarım, bu da sağ tuş olmalı	TI
00:56:16												
00:56:17												
00:56:18												
00:56:19											Ve buradaki parça da benim... bileğimin... yerden... yerle temasını engeller	RI
00:56:20												
00:56:21												
00:56:22												
00:56:23												
00:56:24												
00:56:25												
00:56:26												
00:56:27												
00:56:28											Ve bunu hareket ettirmesi nasıl engeller?	Q
00:56:29												
00:56:30												
00:56:31												
00:56:32											Mesela monitördeki hareket	TI
00:56:33												
00:56:34												
00:56:35											Mesela şu şekilde hareket ettirebilecek mi?	TI
00:56:36												
00:56:37											Mesela bu kaymıyor burada, bir kağıt alalım şu şekilde, şöyle...	MS
00:56:38												
00:56:39												
00:56:40												
00:56:41												
00:56:42												
00:56:43												
00:56:44												
00:56:45												
00:56:46												
00:56:47												
00:56:48												
00:56:49												
00:56:50											şu şekilde, hareketini yapabilir mi? şu şekilde...	TI
00:56:51												
00:56:52												
00:56:53												
00:56:54												
00:56:55											Ya burada ben göründüğü üzere bileğimi kullanmıyorum artık	RI
00:56:56												
00:56:57												
00:56:58												
00:56:59											Ve hareketi artık kolla yapıyorum	RI

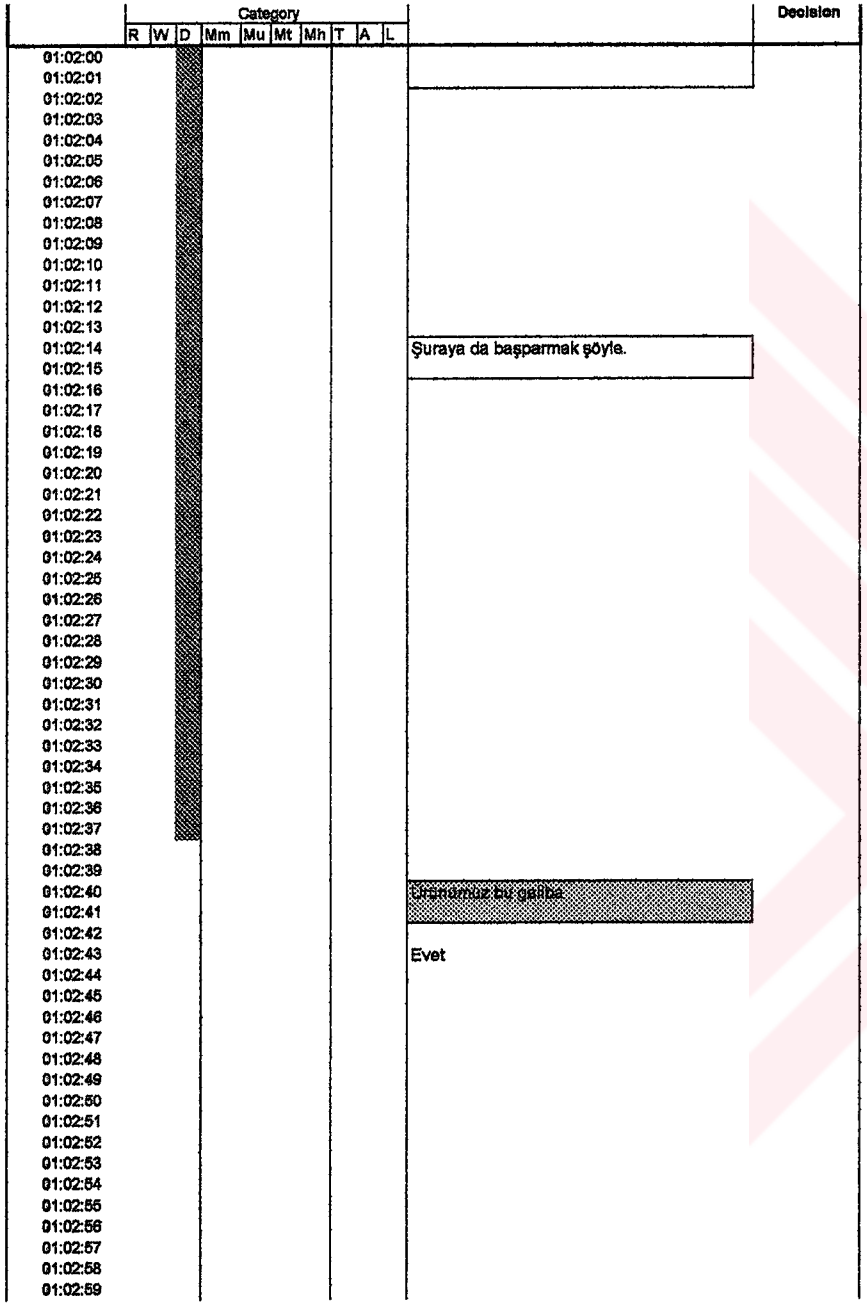
	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:57:00												
00:57:01												
00:57:02											Bu sanırım ergonomi açısından doğru birşey	MS
00:57:03												
00:57:04												
00:57:05												
00:57:06											Artık bileğimi hareket ettirmiyorum	TI
00:57:07											Bütün kolumu hareket ettiriyorum, ileri geri giderken, sağa sola giderken	
00:57:08												
00:57:09												
00:57:10												
00:57:11												
00:57:12											Menüyü aşağı yukarı hare... hareket ettirmek istediğimde	TI
00:57:13												
00:57:14												
00:57:15											Pardon, ekranı... bu tuşu kullanıyorum	TI
00:57:16												
00:57:17												
00:57:18											Sağ tuş olarak bunu ve sol menüyü açmak istediğimde de büyük tuşu kullanıyorum	TI
00:57:19												
00:57:20												
00:57:21												
00:57:22												
00:57:23												
00:57:24												
00:57:25											Aslında bu küçük bir tuş da olabilir, Bu kadar	MP
00:57:26											büyük olmasına gerek yok.	
00:57:27											Sadece şu anda öyle aklıma geldiği için.	
00:57:28												
00:57:29												
00:57:30												
00:57:31												
00:57:32												
00:57:33												
00:57:34												
00:57:35												
00:57:36											Tabi böyle bir üründe ortaya çıkacak	MP
00:57:37											sorunlardan biri de istatistik olayıdır.	
00:57:38												
00:57:39												
00:57:40												
00:57:41											Çünkü çoğu insanın elleri farklıdır.	MP
00:57:42												
00:57:43											Böyle bir mesafeden bahsediyorsak, şu şekilde	MP
00:57:44											İki kısıtlı... iki noktadan bahsediyorsak,	
00:57:45											buraya kiminin eli büyük gelecektir	
00:57:46											sığmayacaktır, kiminin eli küçük geldiği için	
00:57:47											de şu noktaya uzanmakta zorluk	
00:57:48											çekebilecektir.	
00:57:49												
00:57:50												
00:57:51												
00:57:52												
00:57:53												
00:57:54												
00:57:55												
00:57:56												
00:57:57												
00:57:58												
00:57:59											O zaman şey yapılabilir.Belki.	MS

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:58:00													
00:58:01													
00:58:02													
00:58:03													
00:58:04											Şu paf... eee... şu düz... bileğimizi koyduğumuz düzlem için bir olay geliştirilebilir.		MP
00:58:05													
00:58:06													
00:58:07													
00:58:08													
00:58:09													
00:58:10													
00:58:11											Yani, eli küçük insanlar için buradaki yüksekllik arttırılabilir.		NI
00:58:12													
00:58:13													
00:58:14													
00:58:15													
00:58:16											Yani, buraya ek parçalar koyabilir insan ve böylece eli daha yukarıya kalkar ve şu noktaya ulaşması daha kolay olur.		DI
00:58:16													
00:58:17													
00:58:18													
00:58:19													
00:58:20													
00:58:21													
00:58:22											Aynı şekilde eli uzunlar için de burada bulunan parçaları mesela,		DI
00:58:23													
00:58:24													
00:58:25													
00:58:26													
00:58:27													
00:58:28													
00:58:29											Katkat parçalar var dedik. Bu parçaları sökebilir ve buradaki mesafeyi arttırmış olabilir.		DI
00:58:30													
00:58:31													
00:58:32													
00:58:33													
00:58:34													
00:58:35											Böyle birşey... kullanıcıya özel bir özellik katabiliriz bu ürüne		MS
00:58:36													
00:58:37													
00:58:38													
00:58:39													
00:58:40													
00:58:41													
00:58:42													
00:58:43											Hatta bu parçalar, eğer bir bayan eliyse ve bayanın boyu kısaysa, eli de küçük olacaktır		DI
00:58:44													
00:58:45													
00:58:46													
00:58:47													
00:58:48													
00:58:49													
00:58:50											haliyle, o zaman buraya alacağı... satın alacağı ek parçaları üst üste koyarak bişekilde... bu şekilde, o zaman eli daha iyi oturacak ve cihaza daha iyi hükmedebilecektir, şu şekilde.		TI
00:58:51													
00:58:52													
00:58:53													
00:58:54													
00:58:55													
00:58:56													
00:58:57													
00:58:58													
00:58:59													

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:59:00													
00:59:01													
00:59:02													
00:59:03													
00:59:04													
00:59:05													
00:59:06													
00:59:07													
00:59:08													
00:59:09													
00:59:10											Şimdi... Ürünümüz bu gibi gözüküyor şu anda.		END OF ENCODING
00:59:11													
00:59:12													
00:59:13													
00:59:14													
00:59:15													
00:59:16													
00:59:17													
00:59:18													
00:59:19											Bir soru daha sorabilir miyim?		
00:59:20													
00:59:21											Son bir dedik		
00:59:22											Artık kağıda geçirmem için yeterli süre kalmadı herhalde Bunun bir sakıncası var mı?		
00:59:23													
00:59:24													
00:59:25													
00:59:26													
00:59:27											Yapabildiğim kadar yap		
00:59:28													
00:59:29											Tamam Mesela		
00:59:30													
00:59:31													
00:59:32													
00:59:33													
00:59:34													
00:59:35													
00:59:36											Ürünümüzün mesela üstten görünüşü şu şekilde olabilir.		
00:59:37													
00:59:38													
00:59:39													
00:59:40													
00:59:41													
00:59:42													
00:59:43													
00:59:44											Şu başparmağımızın geleceği yer, ama bunun daha geniş olmasında fayda var, şu şekilde.		
00:59:45													
00:59:46													
00:59:47													
00:59:48													
00:59:49													
00:59:50													
00:59:51											Şurada scroll var dedik, şöyle, menüyü... ekranı yukarı aşağı kaydedebileceğimiz... kaydırabileceğimiz.		
00:59:52													
00:59:53													
00:59:54													
00:59:55													
00:59:56													
00:59:57													
00:59:58													
00:59:59											Haliyle tırtıklı olmalı ki, kaymamalı.		

	Category										Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L	
01:00:00			▒								Ve bir de tuş...
01:00:01			▒								
01:00:02			▒								
01:00:03			▒								
01:00:04			▒								Başparmağınızda herzaman sağ tuş... sol tuş olarak kullanabileceğimiz büyükçe bir tuş
01:00:05			▒								
01:00:06			▒								
01:00:07			▒								
01:00:08			▒								
01:00:09			▒								
01:00:10			▒								
01:00:11			▒								Haliyle bu tuşun formu da başparmağın
01:00:12			▒								oturacağı şekilde uygun olmalı, birşekilde.
01:00:13			▒								
01:00:14			▒								
01:00:15			▒								
01:00:16			▒								
01:00:17			▒								
01:00:18			▒								
01:00:19			▒								Ve bileğimizin oturacağı bir yer var dedik.
01:00:20			▒								
01:00:21			▒								
01:00:22			▒								Bu da yandan... üstten baktığımızda da... bu
01:00:23			▒								üst çizim... şu şekilde...
01:00:24			▒								
01:00:25			▒								
01:00:26			▒								
01:00:27			▒								
01:00:28			▒								
01:00:29			▒								
01:00:30			▒								
01:00:31			▒								
01:00:32			▒								
01:00:33			▒								
01:00:34			▒								
01:00:35			▒								
01:00:36			▒								
01:00:37			▒								
01:00:38					▒						hamur var zaten biraz
01:00:39					▒						
01:00:40					▒						Bundan da biraz şey yapabilirim eee... feyz
01:00:41					▒						alabilirim.
01:00:42					▒						
01:00:43					▒						
01:00:44					▒						şu şekilde... üstten görünüş bu.
01:00:45			▒								
01:00:46			▒								
01:00:47			▒								
01:00:48			▒								
01:00:49			▒								
01:00:50			▒								
01:00:51			▒								
01:00:52			▒								Yandan baktığımda ise şu şekilde elin
01:00:53			▒								oturabileceği...
01:00:54			▒								
01:00:55			▒								
01:00:56			▒								
01:00:57			▒								
01:00:58			▒								
01:00:59			▒								

	Category										Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L	
01:01:00			▒								
01:01:01			▒								
01:01:02			▒								
01:01:03			▒								
01:01:04			▒								
01:01:05			▒								
01:01:06			▒								
01:01:07			▒								
01:01:08			▒								
01:01:09					▒						şu şekilde demiştik, şöyle
01:01:10					▒						
01:01:11					▒						
01:01:12					▒						
01:01:13			▒								
01:01:14			▒								
01:01:15			▒								
01:01:16			▒								Avucunun böyle oturabileceği...
01:01:17			▒								
01:01:18			▒								
01:01:19			▒								
01:01:20			▒								
01:01:21			▒								
01:01:22			▒								
01:01:23			▒								
01:01:24			▒								
01:01:25			▒								
01:01:26			▒								Şu da el yeri... ellerin daha iyi oturması için
01:01:27			▒								bir boşluk
01:01:28			▒								Boşluktan ziyade girinti, şöyle...
01:01:29			▒								
01:01:30			▒								
01:01:31			▒								
01:01:32			▒								
01:01:33			▒								Şurada da scroll'umuz var dedik. Onun
01:01:34			▒								yanında da şöyle bir tuşumuz vardı.
01:01:35			▒								
01:01:36			▒								
01:01:37			▒								
01:01:38			▒								Bu scroll'umuz, şöyle...
01:01:39			▒								
01:01:40			▒								
01:01:41			▒								
01:01:42			▒								
01:01:43			▒								
01:01:44			▒								Bu da tuşumuz...
01:01:45			▒								
01:01:46			▒								
01:01:47			▒								Bu yandan görünüş.
01:01:48			▒								
01:01:49			▒								
01:01:50			▒								
01:01:51			▒								Şuraya bileklerimizi koyuyorum, şuraya,
01:01:52			▒								şu...
01:01:53			▒								
01:01:54			▒								Öbür tarafta gözükmüyor şu anda. Tırtıklı
01:01:55			▒								çizgilerle çizdim.
01:01:56			▒								
01:01:57			▒								
01:01:58			▒								
01:01:59			▒								Parmakları da hafifçe yerleştirelim şöyle.


Category
R W D Mm Mu Mt Mh T A L
Decision
01:02:00
01:02:01
01:02:02
01:02:03
01:02:04
01:02:05
01:02:06
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01:02:57
01:02:58
01:02:59
Şuraya da başparmak şöyle.
Evet

Appendix D.2.

Transcription of the protocol of participant Y

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:00:00											Aslında ilk önce kocaman bir araştırma yapmayı seviyorum.	MS
00:00:01												
00:00:02												
00:00:03												
00:00:04												
00:00:05											Ama şimdi araştırma olmadığına göre başka yapmayı sevdiğim bir şey yapacağım.	MS
00:00:06												
00:00:07												
00:00:08												
00:00:09											Hiç olmayan bir şey hakkında biraz düşüncemin sağda solda gezinmesini...	MS
00:00:10												
00:00:11												
00:00:12												
00:00:13											işte yapmak için şey yapacağım.	MS
00:00:14												
00:00:15												
00:00:16											Eee, "Stream of Conciousness" diye bir edebiyat akımı var.	ER
00:00:17												
00:00:18												
00:00:19												
00:00:20											Onun tasarıma uyarlanmış versiyonu var.	ER
00:00:21												
00:00:22											Yedi tane kelime yazılıyor ya da sekiz tane.	ER
00:00:23												
00:00:24											Ama adam yedi tane demiş.	ER
00:00:25												
00:00:26											Ve ben bu objeyi sadece kolaylık olması açısından şimdi mouse olarak adlandırıyorum.	MS
00:00:27												
00:00:28												
00:00:29												
00:00:30												
00:00:31											Ya da.... Hadi şey yapayım.	MS
00:00:32												
00:00:33											İletişim ara birimi diyeyim brief'teki gibi.	MS
00:00:34												
00:00:35											*İletişim ara birimi.*	MS
00:00:36											Bir tarafa, bu iletişim ara birimi yazıyorum.	
00:00:37												
00:00:38											Öteki tarafa da kel alaka yedi tane sözcük yazıyorum:	MS
00:00:39												
00:00:40												
00:00:41												
00:00:42											Ağaç.	MS
00:00:43											Sepet.	
00:00:44											Muz.	
00:00:45											Tanrı.	
00:00:46											Ses.	
00:00:47												
00:00:48												
00:00:49											Aklıma şu anda geliyor bunlar.	MS
00:00:50												
00:00:51											Silgi.	
00:00:52											Bir, iki, üç, dört, beş, altı.	
00:00:53												
00:00:54												
00:00:55											Bir tane daha.	MS
00:00:56											Hamur.	
00:00:57												
00:00:58												
00:00:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:01:00											Şimdi teker teker bu İAE'yle, bundan sonra İE olarak bahsedilecek...	MS
00:01:01												
00:01:02												
00:01:03												
00:01:04											İletişim ara birimiyle...	MS
00:01:05												
00:01:06											Pardon İA.	MS
00:01:07												
00:01:08											*Bunları tek tek yan yana getiriyorum...*	MS
00:01:09											ve başlıyorum ağaç kelimesi deyince aklıma	
00:01:10											gelen şeyleri tek tek yazmaya.	
00:01:11												
00:01:12												
00:01:13											Ağaç.	MS
00:01:14												
00:01:15											Dalları vardır.	MS
00:01:16												
00:01:17											*Yaprakları.*	MS
00:01:18											Yaprakları yeşil.	
00:01:19												
00:01:20											Yeşil yaprakları... Aklıma İrlandalılar geldi.	MS
00:01:21												
00:01:22												
00:01:23												
00:01:24											İrlanda'da yeşilleri geldi.	MS
00:01:25											Neydi o aletin adı ya?	
00:01:26											*Yonca.*	
00:01:27												
00:01:28												
00:01:29												
00:01:30												
00:01:31												
00:01:32											Yonca deyince aklıma iskambil kartları geldi.	MS
00:01:33												
00:01:34												
00:01:35												
00:01:36												
00:01:37											Eğer bu beni bir yere götürmüyorsa bir sü..re	MS
00:01:38											sonra bırakıp diğer kelimeye geçiyorum.	
00:01:39												
00:01:40												
00:01:41												
00:01:42												
00:01:43												
00:01:44											İskambil kartı.	MS
00:01:45												
00:01:46											Babam.	MS
00:01:47											Babam briç oynamayı çok sever.	
00:01:48												
00:01:49												
00:01:50											Eve briç kur... koydum bilgisayara.	MS
00:01:51												
00:01:52												
00:01:53											*Yanlış kurmuşum* çok kızdı.	MS
00:01:54												
00:01:55												
00:01:56											Babam.	MS
00:01:57											Üroloji.	
00:01:58												
00:01:59												

Timestamp	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:02:00											Şey... Bu saçma sapan yerlere gitmeye başladı.	MS
00:02:01												
00:02:02												
00:02:03											Burada kesiyorum bunu.	MS
00:02:04											İA ve sepet.	
00:02:05												
00:02:06												
00:02:07												
00:02:08												
00:02:09											Sepet hımm... orda.	MS
00:02:10												
00:02:11												
00:02:12												
00:02:13											Süpermarket.	MS
00:02:14												
00:02:15											İtalya.	MS
00:02:16												
00:02:17											İtalya'da bir süpermarket çok kazık.	MS
00:02:18												
00:02:19												
00:02:20												
00:02:21											Mouse da satılıyor... satılıyor.	MS
00:02:22												
00:02:23												
00:02:24												
00:02:25												
00:02:26												
00:02:27											Süpermarket.	MS
00:02:28											Acaba bu iletişim ara birimi...	NI
00:02:29												
00:02:30												
00:02:31											sen evden uzaktayken de...	MS
00:02:32												
00:02:33												
00:02:34												
00:02:35												
00:02:36											bilgisayarda bir şekilde iletişim sağlayabilir mi?	Q
00:02:37												
00:02:38												
00:02:39												
00:02:40											Burdan böyle bir soru çıktı.	MS
00:02:41												
00:02:42											Sepeti bırakıyorum.	MS
00:02:43												
00:02:44											Muza geçiyorum.	MS
00:02:45												
00:02:46												
00:02:47												
00:02:48											Muz...	MS
00:02:49												
00:02:50												
00:02:51											Kabuk.	MS
00:02:52												
00:02:53												
00:02:54											Kızartma muz.	MS
00:02:55												
00:02:56												
00:02:57											İçine badem de konur.	MS
00:02:58												
00:02:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:03:00											Muzun şekli, kabuğu.	MS
00:03:01												
00:03:02											Iıhh, hiç sevmedim bu muzu.	MS
00:03:03											Sürekli bu muz üstünde uğraşıyorum.	
00:03:04											Daha sonra dönücem bu muza.	
00:03:05											Bir çizik koyuyorum yana.	
00:03:06												
00:03:07												
00:03:08												
00:03:09											Tanrı.	MS
00:03:10											İletişim ara birimi.	
00:03:11											Tanrı herşeye kadir.	
00:03:12												
00:03:13												
00:03:14												
00:03:15												
00:03:16												
00:03:17											Her yerde... var mı?	MS
00:03:18												
00:03:19												
00:03:20												
00:03:21												
00:03:22												
00:03:23											Cehennem.	MS
00:03:24												
00:03:25											Sıcak.	MS
00:03:26												
00:03:27											Sucuk.	MS
00:03:28											Sıcak sucuk.	MS
00:03:29											Üstüne yumurta.	
00:03:30												
00:03:31											Yumurtadan dumanlar çıkıyor.	MS
00:03:32												
00:03:33												
00:03:34												
00:03:35											Yumurtaları yaktım.	MS
00:03:36												
00:03:37												
00:03:38											Soğanı da yakarım.	MS
00:03:39												
00:03:40												
00:03:41												
00:03:42											Soğanı... yağsız semem.	MS
00:03:43												
00:03:44												
00:03:45											Bu da saçma sapan yerlere gitti.	MS
00:03:46											Ama tanrının herşeye kadir, her yerde olması.	
00:03:47												
00:03:48											Ve bu aletin her yerde olması.	
00:03:49												NI
00:03:50												
00:03:51												
00:03:52												
00:03:53											Ve uzaktan da bilgisayarla iletişim	DI
00:03:54											kurabilmek, her yerde olmak.	
00:03:55												
00:03:56												
00:03:57												
00:03:58											Olmak.	MP
00:03:59											Her yerde olmak deyince aklıma...	

Timestamp	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:04:00		▒									mouse'un bir düzlem gerektirmesi geldi.	
00:04:01		▒										
00:04:02		▒										NI
00:04:03		▒									Mouse'da her zaman bir düzlem gerekiyor kullanım için.	MP
00:04:04		▒										
00:04:05		▒										
00:04:06		▒									O yüzden de elin acıyor.	Q
00:04:07		▒									Düzlemi bir şekilde elimine edebilir miyiz?	
00:04:08		▒										
00:04:09		▒										
00:04:10		▒										
00:04:11											Şunları başka bir kağıda...	RI
00:04:12											Her yerde olmak.	
00:04:13												
00:04:14		▒										
00:04:15		▒										
00:04:16		▒										
00:04:17		▒									Tanrı.	MS
00:04:18		▒									Düzlem.	
00:04:19		▒										
00:04:20		▒									Saate baktım beş dakika olmuş.	MS
00:04:21		▒										
00:04:22												
00:04:23												
00:04:24												
00:04:25												
00:04:26											İyi, fena değil.	MS
00:04:27		▒									Ses.	
00:04:28		▒									Ses... Sesi özellikle seçmemiştim ama.	
00:04:29		▒									Gelmiş.	
00:04:30		▒									Ses.	
00:04:31		▒										
00:04:32		▒										
00:04:33		▒									Sesle kontrol.	NI
00:04:34		▒										
00:04:35		▒										
00:04:36		▒										
00:04:37		▒									MP3.	MS
00:04:38		▒									Sesle mouse ne kadar kontrol edilebilir?	Q
00:04:39		▒										
00:04:40		▒										
00:04:41		▒										
00:04:42		▒									Ses desteği de olabilir mi?	Q
00:04:43		▒										
00:04:44		▒									Annemin sesi... sabah bağırıyor bana, kalk ayağa diye.	ER
00:04:45		▒										
00:04:46		▒										
00:04:47		▒										
00:04:48		▒										
00:04:49		▒										
00:04:50		▒										
00:04:51		▒									Ahh, lise üç geldi aklıma.	MS
00:04:52		▒										
00:04:53		▒									Lise üçte bilgisayarın mouse'u geldi birden aklıma.	ER
00:04:54		▒										
00:04:55		▒										
00:04:56		▒									Mouse'un topuna sinir olmuştum.	ER
00:04:57		▒										
00:04:58		▒									Temizlemekten canım çıkmıştı.	ER
00:04:59		▒										

Timestamp	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:05:00		▒										
00:05:01		▒										
00:05:02		▒									Sonra bu altında şey olan... kırmızı ışıklı	ER
00:05:03		▒									mouse'lar çıktı.	
00:05:04		▒										
00:05:05		▒										
00:05:06		▒									Kırmızı ışık.	
00:05:07		▒									Iıhh sevmedim bunu.	
00:05:08		▒									Sesle kontrol.	
00:05:09		▒									Sesle kontrol zaten insanın aklına gelir.	
00:05:10		▒									Böyle bir şey yapmaya gerek yok.	
00:05:11		▒									Sinirlendim kendi kendime böyle bir şey	
00:05:12		▒									olduğu için.	MD
00:05:13		▒										
00:05:14		▒										
00:05:15		▒									Silgi.	MS
00:05:16		▒									İletişim ara birimi.	
00:05:17		▒									Bu kalemi hiç sevmedim.	
00:05:18		▒									Sinir oldum!	
00:05:19		▒									İletişim ara birimi.	
00:05:20		▒									Sil..gi.	
00:05:21												
00:05:22												
00:05:23												
00:05:24												
00:05:25												
00:05:26												
00:05:27											Eğer uygun kalemle yazamazsam devam	MS
00:05:28											edemem.	
00:05:29												
00:05:30												
00:05:31												
00:05:32											Silgi.	MS
00:05:33											Evet.	
00:05:34											Şimdi daha iyi hissediyorum kendimi.	
00:05:35												
00:05:36												
00:05:37		▒									Çok daha iyi hissediyorum.	MS
00:05:38		▒										
00:05:39		▒									Silgi.	MS
00:05:40		▒									Silgi.	
00:05:41		▒									Telefonun arkası da rubber.	
00:05:42		▒										
00:05:43		▒										
00:05:44		▒										
00:05:45		▒									O da siliyor.	MS
00:05:46		▒										
00:05:47		▒										
00:05:48		▒									Ara birim üstünden geçtiği yüzeyi temizlese	NI
00:05:49		▒									çok mu şey olur?	
00:05:50		▒										
00:05:51		▒										
00:05:52		▒									Yok ne gerek var.	MD
00:05:53		▒									Yemek.	
00:05:54		▒									Tencere.	
00:05:55		▒									Tencereye nerden geldim ben?	
00:05:56		▒										
00:05:57		▒									Silgi.	MS
00:05:58		▒									Silgiye tekrar dönüyorum.	
00:05:59		▒									Silgi.	

	Category												
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		Decision
00:06:00											Rubber.	
00:06:01												
00:06:02												
00:06:03												
00:06:04												
00:06:05											*Bu aletin dış formu acaba şey olabilir mi?*	NI
00:06:06											Sürekli değişen bir form.	
00:06:07												
00:06:08												
00:06:09												
00:06:10												
00:06:11												
00:06:12											Değişen bir form.	RI
00:06:13												
00:06:14												
00:06:15											Böyle bir şey görmüştüm Domus'ta.	ER
00:06:16											Bir tane rubber'ın içine koyuyorlar.	
00:06:17												
00:06:18												
00:06:19												
00:06:20												
00:06:21											Onu da yazayım.	ER
00:06:22											Rubber.	
00:06:23											Yok silikon.	
00:06:24											Silikajen hatta.	
00:06:25											Elinin şeklini alıyor.	
00:06:26											O, eee.. cep telefonuydu.	
00:06:27												
00:06:28												
00:06:29											Bunu yazdım.	MS
00:06:30												
00:06:31												
00:06:32												
00:06:33												
00:06:34												
00:06:35											Hamur.	MS
00:06:36											İletişim ara birimi.	
00:06:37											Hamur... Nasıl bir iletişim ara birimi?	
00:06:38											Hamuru hmmm...	
00:06:39											Hamurdan iletişim ara birimi.	
00:06:40												
00:06:41												
00:06:42											Hamur.	MS
00:06:43											Yemek.	
00:06:44												
00:06:45												
00:06:46												
00:06:47											Kemalpaşa tatlısı... tatlısı.	MS
00:06:48												
00:06:49												
00:06:50											Şurup.	MS
00:06:51												
00:06:52												
00:06:53											Tatmak.	MS
00:06:54											Tatma.	MS
00:06:55											Dokunma	
00:06:56											Görme.	
00:06:57												
00:06:58											Mouse görme duyusuyla ilgili.	MP
00:06:59												

	Category												
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		Decision
00:07:00											Şu andaki ara birimimiz.	MS
00:07:01												
00:07:02												
00:07:03												
00:07:04											Dokunma az kere dokunuyor.	MP
00:07:05											Koku yok.	
00:07:06												
00:07:07												
00:07:08												
00:07:09												
00:07:10												
00:07:11											Ses... klikle var.	MP
00:07:12												
00:07:13												
00:07:14												
00:07:15												
00:07:16												
00:07:17												
00:07:18											Bu duyma.	MS
00:07:19												
00:07:20											Pardon, ses klik, duyma düzelteyim.	MS
00:07:21												
00:07:22												
00:07:23												
00:07:24											Uff... Koku.	MS
00:07:25												
00:07:26											İşitme.	MS
00:07:27												
00:07:28											Görme.	MS
00:07:29												
00:07:30											Dokunma.	MS
00:07:31											Tat...ma.	MS
00:07:32												
00:07:33												
00:07:34											Mouse ile tat.	MP
00:07:35											Bu biraz alakasız ama koku kullanılabilir	MP
00:07:36											gibi.	
00:07:37												
00:07:38												
00:07:39											Koku.	MS
00:07:40												
00:07:41											Dokunmanın mouse'daki yüzdesi arttırılabilir	Q
00:07:42											mi?	
00:07:43												
00:07:44												
00:07:45												
00:07:46												
00:07:47											Değişken form.	RI
00:07:48											Tatma.	
00:07:49											Dokunma.	
00:07:50											Kaç dakika oldu?	
00:07:51											*On dakika olmuş.*	
00:07:52												
00:07:53												
00:07:54												
00:07:55											Zaman planlaması yapalım şimdi.	MS
00:07:56												
00:07:57												
00:07:58											Zaman planlaması yapalım şimdi. Bir	MS
00:07:59											saatimiz var.	

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:08:00											On dakika yeter herhalde.	
00:08:01												
00:08:02											Fazla bile.	MP
00:08:03											Neye ulaştık?	
00:08:04											Her yerde olma.	
00:08:05											Düzlem sorunu.	RI
00:08:06												
00:08:07												
00:08:08												
00:08:09												
00:08:10												
00:08:11												
00:08:12												
00:08:13												
00:08:14											Ses..le kontrol.	RI
00:08:15												
00:08:16												
00:08:17												
00:08:18												
00:08:19												
00:08:20											Değişken form.	RI
00:08:21												
00:08:22												
00:08:23												
00:08:24											Koku.	MS
00:08:25											Dokunma.	MS
00:08:26												
00:08:27												
00:08:28												
00:08:29												
00:08:30												
00:08:31												
00:08:32												
00:08:33											Şimdi.	RI
00:08:34											Her yerde olma.	
00:08:35											Bir mouse nasıl her yerde olabilir?	Q
00:08:36												
00:08:37												
00:08:38												
00:08:39											Kablosuz.	
00:08:40												
00:08:41												
00:08:42											Bilgisayarın mouse...	MS
00:08:43											Mouse deyip duruyorum alete ama mouse	
00:08:44											değil aslında.	
00:08:45												
00:08:46												
00:08:47												
00:08:48												
00:08:49											Ağzım alışmış.	MS
00:08:50												
00:08:51												
00:08:52											Uzaktayken de yanında taşınabilecek bir	RI
00:08:53											şey.	
00:08:54												
00:08:55												
00:08:56											Bilgisayarın bazı işleri mesela.	DI
00:08:57											Yan odadan bu aleti kullanım.	
00:08:58												
00:08:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:09:00												
00:09:01											Bilgisayarın açılması.	
00:09:02											Düzlem sorunu.	MP
00:09:03												
00:09:04											Bence düzlem sorunu bu yazdıklarım	MS
00:09:05											arasında en önemlisi.	
00:09:06												
00:09:07												
00:09:08											Çünkü bu aletin bir düzleme gereksinimi	MP
00:09:09											var...	
00:09:10											ve beni sinir ediyor.	ER
00:09:11											Çoğu zaman bigisayarın yanında koyacak	
00:09:12											yer olmuyor falan filan.	
00:09:13												
00:09:14											Düzlemsizlik.	RI
00:09:15											Bir şey nasıl düzlemsiz olabilir ki?	
00:09:16												Q
00:09:17												
00:09:18												
00:09:19											Zamanda, mekanda spatial kelimesi geldi	MS
00:09:20											aklıma.	
00:09:21												
00:09:22												
00:09:23												
00:09:24											Değişken form.	RI
00:09:25												
00:09:26											Bu da güzeldi.	MS
00:09:27											Dokunma ve diğer duyular.	
00:09:28											Düzlem sorunu.	
00:09:29											Dokunma.	
00:09:30											Diğer duyular.	
00:09:31												
00:09:32												
00:09:33												
00:09:34												
00:09:35											Aa aklıma bir anda apache pilotlarının	ER
00:09:36											kullandığı işaretler mekanizması geldi.	
00:09:37												
00:09:38												
00:09:39												
00:09:40											Gözleriyle ne yapıyorlar?	Q
00:09:41												
00:09:42												
00:09:43												
00:09:44												
00:09:45												
00:09:46												
00:09:47												
00:09:48											Şöyle bir şey...	MS
00:09:49												
00:09:50												
00:09:51												
00:09:52												
00:09:53											Adam gözlükle bakıyor sağa sola...	TI
00:09:54											veya alttaki alete.	
00:09:55												
00:09:56												
00:09:57												
00:09:58											O da böyle.	MS
00:09:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:10:00											Acaba göze bir alet taksa onunla işaretlese	NI
00:10:01											Gözü yorar mı bir süre sonra?	
00:10:02											Bütün gün şöyle kafayı dolaştıracaksın,	
00:10:03											kolunu dolaştırdığın gibi.	
00:10:04												
00:10:05												
00:10:06												
00:10:07												
00:10:08												
00:10:09												
00:10:10												
00:10:11												
00:10:12												
00:10:13												
00:10:14												
00:10:15											Şuradan gözlüğüm de var, şanslıyım	MS
00:10:16												
00:10:17												
00:10:18												
00:10:19												
00:10:20												
00:10:21												
00:10:22												
00:10:23											Böyle bir şey.	DI
00:10:24												
00:10:25												
00:10:26											Böyle dolaştırıyorum.	TI
00:10:27												
00:10:28											Burada bir ekran var	DI
00:10:29											İşaretlemek için de "fiuuv" yapıyorum.	
00:10:30											Mesela "puırt" yapıyorum	
00:10:31												TI
00:10:32												
00:10:33												
00:10:34												
00:10:35												
00:10:36												
00:10:37												
00:10:38												
00:10:39											Belki mouse'un bir ara birimi olabilir.	DI
00:10:40											Bu bir yerde dursun şöyle.	
00:10:41												
00:10:42												
00:10:43												
00:10:44												
00:10:45												
00:10:46											Belki...	MP
00:10:47											Bu mouse'un böyle bir ara birimi de olabilir.	
00:10:48											Canın sıkıldığı zaman gözünde de	
00:10:49											kullanıyorsun.	
00:10:50											Spatial, göze takılan mouse yazıyorum.	
00:10:51												
00:10:52												MS
00:10:53												
00:10:54												
00:10:55												
00:10:56											Mouse'u durduruyorum artık.	MS
00:10:57											Sinir oldum.	
00:10:58												
00:10:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:11:00												
00:11:01												
00:11:02											Göze takılan mouse ile...	CT
00:11:03											Böylece düzlemsizlikle ilgilendik yine.	
00:11:04											Başka nasıl olabilir?	
00:11:05												
00:11:06												
00:11:07												
00:11:08												
00:11:09												
00:11:10												
00:11:11												
00:11:12												MP
00:11:13												
00:11:14												
00:11:15												
00:11:16												
00:11:17											Malevitch'in...	ER
00:11:18												
00:11:19												
00:11:20												
00:11:21												
00:11:22												
00:11:23												
00:11:24												
00:11:25												
00:11:26												
00:11:27												
00:11:28												
00:11:29												
00:11:30												
00:11:31												
00:11:32											Bilgisayar masanın üstünde şöyle.	MS
00:11:33											Montör de TFT olsun.	
00:11:34											Daha fazla çizmekle uğraşmayayım.	
00:11:35												
00:11:36												
00:11:37												
00:11:38												
00:11:39												
00:11:40												
00:11:41												
00:11:42												
00:11:43												
00:11:44												
00:11:45												
00:11:46											Böyle bir şey. Klavyesi var.	NI
00:11:47											Klavyeyi... klavyeyi out etsem mi acaba?	
00:11:48											Ne yazıyor brief'te?	
00:11:49												
00:11:50												
00:11:51												
00:11:52												
00:11:53												
00:11:54												
00:11:55												
00:11:56												
00:11:57											Klavyeyi omit etmeyeyim.	MD
00:11:58											Klavye... çünkü bilgisayar...	
00:11:59												

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:12:00											Bir noktadan sonra çok soyut şeyleri ifade etmek lazım.		MS
00:12:01			▓										
00:12:02			▓										
00:12:03			▓										
00:12:04			▓										
00:12:05			▓										
00:12:06			▓								O da... Aklım orada karışıyor... dersek... Klavye mutlaka olmalı.		
00:12:07			▓										
00:12:08			▓										RD
00:12:09			▓										
00:12:10			▓								Seste... sesli iletişim... "cık" kavye olacak.		RI
00:12:11			▓										
00:12:12			▓										
00:12:13			▓										
00:12:14			▓										
00:12:15			▓								Klavye olmalı.		RD
00:12:16			▓								Klavyenin sağında ya da solunda...		
00:12:17			▓								ya da altında ya da üstünde bir yerde nir düz		
00:12:18			▓								alan var.		
00:12:19			▓										
00:12:20			▓										
00:12:21			▓										
00:12:22								▓					
00:12:23								▓					
00:12:24								▓					
00:12:25								▓					
00:12:26								▓			Parmağın ucuna takılsa alet,		NI
00:12:27								▓					
00:12:28								▓					
00:12:29								▓			e ben parmağımı başka bir yerde, kendi		DI
00:12:30								▓			referansımı kendim verdiğim bir yerde		
00:12:31								▓			hareket ettirsem.		
00:12:32								▓					
00:12:33								▓					
00:12:34								▓			Ama üzerine...		Q
00:12:35								▓			Parmağın konumunu çevirince alet anlar		
00:12:36								▓			mı?		
00:12:37								▓					
00:12:38								▓					
00:12:39								▓					
00:12:40								▓			Parmağımı çeviriyorum.		DI
00:12:41								▓			Ya da...başka bir düzlem var.		
00:12:42								▓					
00:12:43								▓					
00:12:44								▓					
00:12:45								▓					
00:12:46								▓					
00:12:47			▓										
00:12:48			▓								Parmağımın ucuyla bir şey takmışım.		DI
00:12:49			▓								Bunun da üstünde hareket ettiriyorum;		
00:12:50			▓								Mouse'u hareket ettirmek yerine.		
00:12:51			▓										
00:12:52			▓										
00:12:53			▓										
00:12:54													
00:12:55													
00:12:56											E bileğime ne yarayacak ki bu?		Q
00:12:57											...diye takılı olsa bu.		
00:12:58					▓								
00:12:59					▓								

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:13:00													
00:13:01					▓						Şöyle dolaştırsam		TI
00:13:02					▓						Klikliyorum.		
00:13:03					▓						Çift klikliyorum.		
00:13:04					▓								
00:13:05					▓								
00:13:06					▓								
00:13:07					▓								
00:13:08					▓								
00:13:09					▓								
00:13:10					▓						Aaa, Minority Report'ta vardı böyle birşey.		ER
00:13:11					▓								
00:13:12					▓								
00:13:13					▓								
00:13:14					▓								
00:13:15					▓						Şöyle... hımm... enteresan.		MS
00:13:16					▓						Bu bilgisayarı buraya kuralım.		
00:13:17					▓						... da kolay olur.		
00:13:18					▓								
00:13:19					▓								
00:13:20					▓								
00:13:21					▓								
00:13:22					▓								
00:13:23					▓								
00:13:24					▓								
00:13:25					▓								TI
00:13:26					▓								
00:13:27					▓								
00:13:28					▓								
00:13:29					▓						Hımm, tuttum.		MS
00:13:30					▓						Elinle kullanıyorsun.		
00:13:31					▓								
00:13:32					▓								
00:13:33					▓								
00:13:34					▓								
00:13:35					▓								
00:13:36					▓								
00:13:37					▓						Hem çok daha şey... insana daha yakın, mı		MS
00:13:38					▓						acaba?		
00:13:39					▓						Elinin ucuna bir şey takılı.		
00:13:40					▓								
00:13:41					▓								
00:13:42					▓								
00:13:43					▓								
00:13:44					▓						Böyle elini dinlendirebiliyorsun.		MP
00:13:45					▓						Burda da dinlendirebilirsin.		
00:13:46					▓								
00:13:47					▓								
00:13:48					▓						Bir tane düzlem olur.		DI
00:13:49					▓						yerde olur o.		
00:13:50					▓						Onun üzerinde elini şöyle mouse gibi		
00:13:51					▓						kullanabilirsin.		
00:13:52					▓								
00:13:53					▓								
00:13:54													
00:13:55													
00:13:56													
00:13:57													
00:13:58													
00:13:59											İkincisi de ekranda olur.		DI

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:14:00													
00:14:01											Bunun bir modu olur belki kenarında.		
00:14:02													
00:14:03													
00:14:04													
00:14:05											Bu yerde, unutmayalım, bu fikri sevdim.		MS
00:14:06													
00:14:07													
00:14:08													
00:14:09													
00:14:10													
00:14:11													
00:14:12											Bir tane ekran modu.		DI
00:14:13											Bu modun değiştirisi...		
00:14:14													
00:14:15													
00:14:16													
00:14:17													
00:14:18													
00:14:19													
00:14:20													
00:14:21											yerdekini şey yaparsın.		MP
00:14:22													
00:14:23													
00:14:24													
00:14:25													
00:14:26													
00:14:27													
00:14:28													
00:14:29													
00:14:30													
00:14:31													
00:14:32													
00:14:33											Hımm... yerdeki var mı böyle bir şey?		RI
00:14:34											Bir şey daha demiştik.		
00:14:35											Göze takılan alet.		
00:14:36													
00:14:37													
00:14:38													
00:14:39													
00:14:40											Evet, bu kafayı çevirmekten çok daha iyi.		MP
00:14:41													
00:14:42											Kafayı çevirmek çok sevimsiz bir fikir gibi		MS
00:14:43											geldi bana.		
00:14:44													
00:14:45											"Fiuuv", apache pilotlarına özüldüm şimdi		MS
00:14:46													
00:14:47													
00:14:48													
00:14:49													
00:14:50													
00:14:51													
00:14:52													
00:14:53													
00:14:54													
00:14:55													
00:14:56													
00:14:57													
00:14:58													
00:14:59											Neyse tamam.		MS

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:15:00											Bu fikri bir kenarda tuttuk.		MS
00:15:01											Bir.		
00:15:02											Şöyle bir kafa yazayım.		
00:15:03											Kafa yazarsak unutulmuyor.		
00:15:04													
00:15:05													
00:15:06													
00:15:07													
00:15:08													
00:15:09													
00:15:10													
00:15:11											Gafa.		MS
00:15:12													
00:15:13													
00:15:14													
00:15:15											Gafasuz		MS
00:15:16											Evet... sonra...		MS
00:15:17											Düzlemler.		
00:15:18											Malewich yazalım, bir de		
00:15:19													
00:15:20													
00:15:21													
00:15:22											Şunu alalım üstünden.		MS
00:15:23											Başka nerede kal... ne demiştik?		
00:15:24													
00:15:25													
00:15:26													
00:15:27													
00:15:28											Düzlemsizliğe geri döndüm		RI
00:15:29													
00:15:30													
00:15:31													
00:15:32													
00:15:33													
00:15:34													
00:15:35											Su... Hımm.		MS
00:15:36													
00:15:37													
00:15:38													
00:15:39													
00:15:40													
00:15:41													
00:15:42													
00:15:43													
00:15:44													
00:15:45													
00:15:46											Bu alette aynı zamanda bir takım komutlar		RI
00:15:47											var sesle.		
00:15:48													
00:15:49													
00:15:50													
00:15:51													
00:15:52											Bilgisayarı aç geliyorum.		TI
00:15:53													
00:15:54													
00:15:55													
00:15:56													
00:15:57													
00:15:58											Belgelerimin altında...		TI
00:15:59													

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:16:00								▒			Hımm, bir kere bu alet ses tanıma		DI
00:16:01											teknolojisinde o kadar derin değil, onu		
00:16:02											biliyorum.		
00:16:03											Geçen sene çok uğraştım onunla.		
00:16:04											Bu alet sadece benim sesimi tanıyor.		
00:16:05											Başka bir kullanıcının sesini biraz zor tanır.		
00:16:06													
00:16:07													
00:16:08													
00:16:09													
00:16:10											Onu da belki tanır.		DI
00:16:11											Aslında tanıyanlar var.		
00:16:12											Neyse...		
00:16:13											Bunu şimdi düşünmeyeyim.		
00:16:14													
00:16:15													
00:16:16													
00:16:17													
00:16:18		▒									Ses tanıma.		RI
00:16:19		▒											
00:16:20		▒											
00:16:21		▒											
00:16:22		▒									Ses tanıma.		RI
00:16:23		▒											
00:16:24		▒											
00:16:25		▒											
00:16:26		▒									Belki belirli şeyler kodlanabilir.		DI
00:16:27		▒									Bir, iki, üç, dört.		
00:16:28		▒									Mesela bir.		
00:16:29		▒									Bir belgelerimi açıyor.		
00:16:30		▒											
00:16:31		▒											
00:16:32		▒											
00:16:33		▒											
00:16:34		▒									Ben en çok ne yapıyorum bilgisayarı		Q
00:16:35		▒									açınca?		
00:16:36		▒									İki winamp'i açıyor.		TI
00:16:37		▒									Üç kapatıyor.		
00:16:38		▒											
00:16:39		▒											
00:16:40		▒									Böylece başlat kapatabiliyoruz.		
00:16:41		▒									Ya da programlanabilir belki.		
00:16:42		▒											NI
00:16:43		▒											
00:16:44		▒											
00:16:45		▒											
00:16:46		▒									Bunun bir kaç tane özelliği olacak böyle.		
00:16:47		▒									Programlanabilir, ...bilir.		
00:16:48		▒											
00:16:49		▒											
00:16:50		▒											
00:16:51		▒									Saat kaç?		MS
00:16:52		▒									Aa, ne çabuk geçmiş.		
00:16:53		▒											
00:16:54		▒											
00:16:55		▒											
00:16:56		▒											
00:16:57		▒											
00:16:58		▒											
00:16:59		▒											

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:17:00		▒									Özellikler.		MS
00:17:01		▒									İyi.		
00:17:02		▒									Yarım saatte de artık temel şeylere karar		
00:17:03		▒									verdik.		
00:17:04		▒											
00:17:05													
00:17:06													
00:17:07													
00:17:08													
00:17:09											İyi.		MS
00:17:10											Yarım saatte karar verirsem,		
00:17:11											yavaş yavaş başlayacak... Görselleşme		
00:17:12													
00:17:13													
00:17:14		▒											
00:17:15		▒									Programlayalım		MD
00:17:16		▒									Şimdi neye karar verdik?		
00:17:17		▒									Bu alet parmağa takılır bir şey olacak.		
00:17:18		▒											
00:17:19		▒											
00:17:20		▒											
00:17:21		▒									Sırf... ekran üzerinde...		RI
00:17:22		▒									bir düzlem üzerinde kullanmak,		
00:17:23											hem bu eski şeye de gönderme yapıyor.		
00:17:24													
00:17:25													
00:17:26													
00:17:27													
00:17:28													
00:17:29													
00:17:30													
00:17:31													
00:17:32													
00:17:33													
00:17:34													
00:17:35											Ama kullanıcının bunu öğrenmesi lazım bir		MP
00:17:36											süre.		
00:17:37											Çift tıkla.		
00:17:38											Belki iki parmakta olacak bu zamazingo.		
00:17:39											Çift tıkla sağla, çift tıkla solla.		
00:17:40											Ya da şöyle.		TI
00:17:41											Aa, hayır, bu elini kullanmasın		
00:17:42											Bunla tıklayacak		
00:17:43													
00:17:44													
00:17:45													
00:17:46													
00:17:47					▒								
00:17:48					▒								
00:17:49					▒								
00:17:50					▒								
00:17:51					▒								
00:17:52					▒						Sarıyla daha rahat çalışabilecekmişim gibi		MS
00:17:53					▒						geldi birden. Sarı yaptım.		
00:17:54					▒						Çok önemli olan renk... şey yaptım...		
00:17:55					▒						O yüzden, sarı.		
00:17:56					▒								
00:17:57					▒								
00:17:58					▒								
00:17:59					▒								

Timestamp	Activity Category										Transcription	Design Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:18:00												
00:18:01												
00:18:02												
00:18:03												
00:18:04											Böyle bir şey var parmağımda.	TI
00:18:05											Bunun içinde bir de ... var.	
00:18:06											Bunun bir de ara birimi var.	
00:18:07												
00:18:08												
00:18:09												
00:18:10												
00:18:11											Şimdi ne yapacağım?	Q
00:18:12											Belgelerim.	
00:18:13											Bir dakika.	
00:18:14												
00:18:15												
00:18:16											Şu bilgisayar ekranımız olsun.	MS
00:18:17												
00:18:18												
00:18:19											Start	MS
00:18:20												
00:18:21												
00:18:22											Ooo, tool'lar.	MS
00:18:23												
00:18:24												
00:18:25											Burda computer'ım.	MS
00:18:26												
00:18:27												
00:18:28												
00:18:29											Çöp tenekem.	MS
00:18:30												
00:18:31												
00:18:32												
00:18:33												
00:18:34											Sonra vesaire vesaire gidiyor.	MS
00:18:35												
00:18:36												
00:18:37											Burada da bir şeyler var.	ER
00:18:38											Folder'lar var bir kaç tane.	
00:18:39											Şurada ben ne kullanıyorum?	
00:18:40											Rhino var.	
00:18:41												
00:18:42												
00:18:43												
00:18:44											Burada ne var?	Q
00:18:45												
00:18:46												
00:18:47											TTNet'e bağlantı var.	ER
00:18:48												
00:18:49											Tamam yeter bu kadar.	MS
00:18:50											Bir de word olsun şurada.	
00:18:51												
00:18:52												
00:18:53											Şimdi bilgisayar ekranımız.	TI
00:18:54												
00:18:55												
00:18:56												
00:18:57												
00:18:58												
00:18:59												

Timestamp	Activity Category										Transcription	Design Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:19:00											Ooo, bu oraya girer mi ki?	TI
00:19:01											Girmedi.	
00:19:02											Girmek zorundasın.	
00:19:03											Neyse şöyle olsun.	
00:19:04												
00:19:05												
00:19:06												
00:19:07												
00:19:08												
00:19:09												
00:19:10												
00:19:11												
00:19:12											Taktım bunu da.	TI
00:19:13											Açtım.	
00:19:14											Computer'a çift tıklıyorum.	
00:19:15												
00:19:16												
00:19:17												
00:19:18												
00:19:19											A harddiskinde, iniyorum.	TI
00:19:20												
00:19:21											İki tıklıyorum üstüne.	TI
00:19:22											Açtım.	
00:19:23											Güzelmiş ya!	
00:19:24												
00:19:25												
00:19:26												
00:19:27											Peki böyle olsa.	TI
00:19:28											Tıklıyorum.	
00:19:29												
00:19:30												
00:19:31												
00:19:32												
00:19:33											Tamam hem ekrandan çalışsın,	NI
00:19:34											hem de bu aletle çalışsın.	
00:19:35											Adamın elini dinlendirmesi kolay olur.	
00:19:36												
00:19:37												
00:19:38												
00:19:39											Ama o zaman mouse'u yine bir yere dayama	MP
00:19:40											sorunu çıkıyor ortaya.	
00:19:41												
00:19:42											Ben ne dedim?	RI
00:19:43											Düzlemsizlik dedim.	
00:19:44											Belki avuca alacak,	NI
00:19:45											böylece istediği yere dayayacak.	
00:19:46												
00:19:47												
00:19:48											Aaa, süper!	TI
00:19:49											İstediği yere dayayacak böyle.	
00:19:50												
00:19:51												
00:19:52												
00:19:53											Eline alacak şöyle.	TI
00:19:54												
00:19:55												
00:19:56												
00:19:57											Böyle ekrana bakacak.	TI
00:19:58												
00:19:59												

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:20:00											Bunda, windows mu?		Q
00:20:01													
00:20:02													
00:20:03													
00:20:04													
00:20:05											Aaa, süperi		
00:20:06													
00:20:07													
00:20:08											Hmmm, evet.		
00:20:09													
00:20:10											Bu, bu düzlemi ben tanımlayım.		NI
00:20:11											Böyle bir düzlem olmasın.		
00:20:12													
00:20:13											Bu yere koyulacak bir şey olmasın.		DI
00:20:14													
00:20:15											Bu adamın tanımladığı bir düzlem olsun.		
00:20:16													
00:20:17											Mesela duvarda bir kitap duruyor...		TI
00:20:18													
00:20:19													
00:20:20													
00:20:21													
00:20:22													
00:20:23													
00:20:24											Bu alet biliyorum ki uzaydaki dört noktanın		DI
00:20:25											koordinatlarına gidebilir kendisi.		
00:20:26													
00:20:27													
00:20:28											O zaman ya ekranı kullanıcak düzlem		DI
00:20:29											olarak...		
00:20:30											ekran...		
00:20:31											ya da herhangi bir şey...		
00:20:32											Bir düzlem tamamlamak için üç nokta		
00:20:33											gerekli.		
00:20:34													
00:20:35													
00:20:36													
00:20:37													
00:20:38													
00:20:39													
00:20:40													
00:20:41													
00:20:42											Ama klasik şey olsun, dört nokta.		MD
00:20:43											Tamam dört noktalı bir düzlem		
00:20:44											tanımlayacak,		
00:20:45											uzayda herhangi bir yerde.		
00:20:46											Ara birim, düzlem.		
00:20:47													
00:20:48													
00:20:49													
00:20:50													
00:20:51													
00:20:52													
00:20:53													
00:20:54													
00:20:55													
00:20:56											Ara birim bu dört noktanın koordinatını...		MP
00:20:57													
00:20:58													
00:20:59													

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:21:00											Tamam.		DI
00:21:01											Bu temel komutlarda sessiz olsun. Hiçbir şey		
00:21:02											koymayalım.		
00:21:03													
00:21:04											Yeni düzlem tanımla diye bir temel komut		DI
00:21:05											olsun mesela.		
00:21:06													
00:21:07													
00:21:08											Ben mesela...		MS
00:21:09													
00:21:10											Şöyle bir tane kitabım var.		TI
00:21:11											Şöyle duruyor.		
00:21:12											Dört noktasından bu düzlemi tanımlıyorum		
00:21:13											ve...		
00:21:14											ondan sonraki çalışma düzlemim o oluyor.		
00:21:15													
00:21:16													
00:21:17											Burada başlıyorum çalışmaya.		TI
00:21:18											Ekranı tanımlıyorum.		
00:21:19											Ekran zaten tanımlı bir düzlem,		
00:21:20											default olarak var.		
00:21:21													
00:21:22													
00:21:23											Orada çalışmaya başlıyorum.		TI
00:21:24											Ya da ne bileyim...		DI
00:21:25											Parmağımım ucunu tanımlıyorum.		
00:21:26													
00:21:27											Alet, o düzlemi tanımlıyorum ve...		DI
00:21:28											benim mouse'umun üstüne gittiği düzlem o		
00:21:29											oluyor bundan sonra.		
00:21:30													
00:21:31													
00:21:32													
00:21:33													
00:21:34													
00:21:35											Güzel.		MS
00:21:36											Belli bir mesafede bu düzlemi gidiyorum		DI
00:21:37											ve... o düzlem üstünde oynayabiliyorum		
00:21:38											istediğim gibi.		
00:21:39											Canım sıkılıyorsa... Mesela elimi başka bir		
00:21:40											pozisyona almak istiyorum mesela.		TI
00:21:41													
00:21:42													
00:21:43											En uygun pozisyon ne olur bilgisayar		Q
00:21:44											karşısında?		
00:21:45													
00:21:46											Dik oturulur ama ben dik oturmam.		ER
00:21:47											Ben yatakta oturmayı çok severim mesela.		
00:21:48													
00:21:49													
00:21:50													
00:21:51											Yatakta oturdum.		TI
00:21:52											Şurada bir düzlem tanımladım kendime.		
00:21:53											Yaklaşık şöyle duruyor.		
00:21:54											Ben bu düzlemin nerede olduğunu çok iyi		
00:21:55											biliyorum.		
00:21:56													
00:21:57													
00:21:58													
00:21:59													

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:22:00												
00:22:01											O düzlemin x ve y'si, bilgisayar ekranının x ve y'siyle bire bir.	MP
00:22:02												
00:22:03												
00:22:04												
00:22:05											Sevdim bu fikri.	MS
00:22:06											Ama acaba böyle bir şey yapılabilir mi?	
00:22:07												
00:22:08												
00:22:09												
00:22:10											Teknik olanaklar...	MP
00:22:11											Neydi?	
00:22:12											Tasarımda yenilikçilik.	
00:22:13												
00:22:14												
00:22:15											Sağlıklı ve...	MP
00:22:16											Evet.	
00:22:17											Aletimiz üç aşağı beş yukarı böyle bir şey olacak.	
00:22:18												
00:22:19												
00:22:20												
00:22:21												
00:22:22												
00:22:23												
00:22:24												
00:22:25												
00:22:26												
00:22:27												
00:22:28												
00:22:29												
00:22:30											Şimdi...	MS
00:22:31												
00:22:32											Bu alet parmağa takılacak.	RD
00:22:33												
00:22:34												
00:22:35												
00:22:36												
00:22:37												
00:22:38												
00:22:39											Parmağa takılacak bir şey...	NI
00:22:40											Bir yüzük.	
00:22:41											Güzel.	
00:22:42											Herkese uyacak bir yüzük.	
00:22:43												
00:22:44												
00:22:45												
00:22:46												
00:22:47												
00:22:48												
00:22:49												
00:22:50												
00:22:51												
00:22:52												
00:22:53												
00:22:54												
00:22:55												
00:22:56											Kolayca bunu geçirebilir parmağına.	DI
00:22:57											Şuraya da... içerisi var.	
00:22:58												
00:22:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:23:00												
00:23:01											Şöyle bir yüzük... tırnak gibi.	DI
00:23:02												
00:23:03												
00:23:04											Sauron'un tırnağı gibi.	ER
00:23:05												
00:23:06												
00:23:07												
00:23:08												
00:23:09											"Cık" bu koyu olmaz.	MS
00:23:10											Bu doğru kalem değil.	
00:23:11											Doğru kalem bu.	
00:23:12												
00:23:13												
00:23:14												
00:23:15												
00:23:16												
00:23:17												
00:23:18												
00:23:19												
00:23:20												
00:23:21												
00:23:22												
00:23:23												
00:23:24											Ses algılayıcısını bu aletin üstüne koymanın	MP
00:23:25											hiç bir mantığı yok.	
00:23:26												
00:23:27												
00:23:28											Burada bir ses algılayıcısı olmasın bence.	MD
00:23:29												
00:23:30												
00:23:31											Evet.	MP
00:23:32											Bir ara birim var bilgisayarın.	
00:23:33												
00:23:34											Tekrar...	MP
00:23:35											Ses algılayıcısını bunun üzerine, ...	
00:23:36											kullanmadığı zaman da bu cihaz...	
00:23:37											buna beraber takılıyor.	
00:23:38												
00:23:39												
00:23:40												
00:23:41												
00:23:42												
00:23:43												
00:23:44												
00:23:45												
00:23:46											Güzel.	MS
00:23:47												
00:23:48											İyi.	MS
00:23:49												
00:23:50												
00:23:51											Yüzük şeklinde.	RI
00:23:52											Aaa, Nokia'nın... Nokia'nın değildi ya...	ER
00:23:53											Şöyle.	
00:23:54												
00:23:55												
00:23:56											Bir dakika şimdi.	RD
00:23:57											Bu alet bir parmağa mı takılacak,	
00:23:58											iki parmağa mı takılacak?	
00:23:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:24:00												
00:24:01											Çift klik sağ, çift klik sol.	TI
00:24:02												
00:24:03												
00:24:04												
00:24:05												
00:24:06												
00:24:07											Hangi iki parmak?	TI
00:24:08											Hangi iki parmak olduğunun önemi yok.	
00:24:09												
00:24:10												
00:24:11											Adam istediği parmağına taksın.	TI
00:24:12												
00:24:13												
00:24:14												
00:24:15												
00:24:16											Bir tane olabilir.	MP
00:24:17											Ama o zaman sağ-sol klik olayı karışıyor.	
00:24:18												
00:24:19												
00:24:20											Bunu mouse'a yaklaştırmaya çalışıyorum bir	MS
00:24:21											şekilde.	
00:24:22											Çünkü kullanım süresinin kısalmasını	MP
00:24:23											istiyorum.	
00:24:24											Hiç olmayan bir şeyi zembille gökten	MS
00:24:25											indirirsem,	
00:24:26											"oha" falan olacaklar.	
00:24:27												
00:24:28												
00:24:29												
00:24:30												
00:24:31											Böyle bir şeyin kullanma süresi... gerçi	MS
00:24:32											mouse ilk çıktığında hiç yoktu ama...	
00:24:33											Ihh, yok hayır.	
00:24:34												
00:24:35											Şimdi mouse çok kullanılan bir şey.	MP
00:24:36												
00:24:37											Bu da mouse'a rakip olacak bizim firmada.	MP
00:24:38												
00:24:39											Böyle tamamıyla yabancı, alien bir şey	MD
00:24:40		▒									olmalı.	
00:24:41		▒									Alien yazalım buraya.	
00:24:42		▒										
00:24:43		▒										
00:24:44												
00:24:45												
00:24:46												
00:24:47												
00:24:48												
00:24:49												
00:24:50												
00:24:51												
00:24:52												
00:24:53		▒										
00:24:54		▒										
00:24:55		▒										
00:24:56		▒									Bu aletin bir imleci olsun ki,	NI
00:24:57		▒									o simgesel bir şey olsa bile,	
00:24:58		▒									bir gösterme anlamı olsun.	
00:24:59		▒										

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:25:00		▒										
00:25:01		▒										
00:25:02		▒										
00:25:03		▒									Yani bu, şöyle şuradan...	MS
00:25:04		▒										
00:25:05												
00:25:06												
00:25:07					▒							
00:25:08					▒							
00:25:09					▒							
00:25:10					▒							
00:25:11					▒							
00:25:12					▒							
00:25:13					▒							
00:25:14					▒							
00:25:15					▒							
00:25:16					▒							
00:25:17					▒							
00:25:18					▒							
00:25:19					▒							
00:25:20					▒							
00:25:21					▒							
00:25:22					▒							
00:25:23					▒							
00:25:24					▒							
00:25:25					▒							
00:25:26					▒							
00:25:27					▒							
00:25:28					▒							
00:25:29					▒							
00:25:30					▒							
00:25:31					▒							
00:25:32					▒							
00:25:33					▒							
00:25:34					▒							
00:25:35					▒							
00:25:36					▒							
00:25:37						▒					Bu kadar ayı bir şey olmamalı.	DI
00:25:38						▒					Kibar bir şey olmalı.	
00:25:39						▒						
00:25:40						▒						
00:25:41						▒					Bütün olay ara birimde olmalı.	DI
00:25:42						▒					Bu sadece basit bir verici-alıcı...	
00:25:43						▒						
00:25:44						▒						
00:25:45						▒					Bir tane de blue tooth belki üstünde.	DI
00:25:46						▒						
00:25:47						▒						
00:25:48						▒					Tabi bu kadar ağır da olmamalı bu alet.	MP
00:25:49						▒						
00:25:50						▒						
00:25:51						▒					Çok ağır oldu benim yaptığım şey.	MP
00:25:52						▒						
00:25:53						▒						
00:25:54						▒						
00:25:55						▒					Düzlemi, düzlem tanımla. Bi bip...	TI
00:25:56						▒						
00:25:57						▒						
00:25:58					▒						Burada ara birim var.	TI
00:25:59					▒							

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:26:00											Düzlem tanımlıyorum bunla.		TI
00:26:01											Tamamladım düzlemi.		
00:26:02													
00:26:03													
00:26:04													
00:26:05													
00:26:06													
00:26:07											Düzlemim burası, burada çalışıyorum.		TI
00:26:08											Çift tıklıyorum.		
00:26:09											Açıldı.		
00:26:10													
00:26:11													
00:26:12													
00:26:13													
00:26:14											Evet...		MS
00:26:15													
00:26:16													
00:26:17											Bu alet neyle çalışacak falan filan?		RD
00:26:18											Neyse şimdi...		
00:26:19											Parmağa takılacağını biliyoruz. Parmak.		
00:26:20													
00:26:21													
00:26:22													
00:26:23													
00:26:24													
00:26:25											İki tane olacak...		MP
00:26:26											Ara birim...		
00:26:27											Ara birim iki tane baştan aşağı bir şey.		
00:26:28													
00:26:29													
00:26:30													
00:26:31													
00:26:32													
00:26:33													
00:26:34													
00:26:35													
00:26:36													
00:26:37													
00:26:38													
00:26:39													
00:26:40													
00:26:41													
00:26:42													
00:26:43													
00:26:44													
00:26:45											Bu tırnak fikri benim hoşuma gitti.		MP
00:26:46													
00:26:47											Ama erkekler ne der buna acaba?		Q
00:26:48													
00:26:49											Elinde iki tane tırnak.		TI
00:26:50													
00:26:51											Yok canım.		MS
00:26:52													
00:26:53													
00:26:54													
00:26:55													
00:26:56													
00:26:57													
00:26:58													
00:26:59													

	Category												Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L			
00:27:00													
00:27:01													
00:27:02													
00:27:03													
00:27:04													
00:27:05													
00:27:06											Şimdi...		MS
00:27:07													
00:27:08													
00:27:09													
00:27:10													
00:27:11													
00:27:12													
00:27:13													
00:27:14													
00:27:15													
00:27:16													
00:27:17													
00:27:18													
00:27:19													
00:27:20													
00:27:21													
00:27:22													
00:27:23													
00:27:24													
00:27:25													
00:27:26													
00:27:27													
00:27:28													
00:27:29											Ne biçim çizdim.		MS
00:27:30											Sinir oldum.		
00:27:31											Böyle çizince sinir oluyorum.		
00:27:32											Hiç bir şey yapamıyorum.		
00:27:33													
00:27:34													
00:27:35													
00:27:36											Böyle bir tane tırnak gibi bir şey var.		MS
00:27:37													
00:27:38													
00:27:39													
00:27:40													
00:27:41													
00:27:42													
00:27:43											Böyle taktım.		TI
00:27:44													
00:27:45											İkisi hiyerarşik olarak farklı ama bu		NI
00:27:46											yüzüklerin.		
00:27:47													
00:27:48													
00:27:49											Çünkü bir kliği yaptığın,		MP
00:27:50											ötekinden her zaman daha farklı.		
00:27:51													
00:27:52													
00:27:53											Bir tanesi belki biraz daha küçük.		DI
00:27:54													
00:27:55													
00:27:56													
00:27:57													
00:27:58													
00:27:59											Belki şekli değişik biraz.		MS

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:28:00												
00:28:01												
00:28:02												
00:28:03												
00:28:04												
00:28:05												
00:28:06												
00:28:07												
00:28:08												
00:28:09											Biraz şekli değiştirdik.	MS
00:28:10											Bir tane de ara birim var.	
00:28:11												
00:28:12												
00:28:13												
00:28:14												
00:28:15												
00:28:16											O ara birimin yanında da...	MS
00:28:17												
00:28:18												
00:28:19											İleride... bir alet takılıyor.	DI
00:28:20												
00:28:21												
00:28:22												
00:28:23												
00:28:24											Ara birimin kablosu da bilgisayarımızla	MP
00:28:25											iletişim kuruyor.	
00:28:26												
00:28:27												
00:28:28												
00:28:29												
00:28:30												
00:28:31											Aynı türde bir tane ses kablosu var.	MS
00:28:32												
00:28:33												
00:28:34												
00:28:35												
00:28:36											Ses alıcısı...	RI
00:28:37												
00:28:38												
00:28:39												
00:28:40												
00:28:41												
00:28:42												
00:28:43												
00:28:44											Kablo takma yerleri.	
00:28:45												
00:28:46												
00:28:47												
00:28:48											Bu aletlerin nasıl olacağı üç aşağı bir yukarı	MS
00:28:49											belli.	
00:28:50												
00:28:51												
00:28:52											İki tane hiyerarşik... hiyerarşik...	RI
00:28:53												
00:28:54												
00:28:55												
00:28:56												
00:28:57												
00:28:58												
00:28:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:29:00											Tekrar başa dönüyorum.	CT
00:29:01												
00:29:02												
00:29:03											Her yerde olma.	RI
00:29:04											Düzlem sorunu.	
00:29:05											Düzlem sorunu tamam.	RD
00:29:06											Sesle kontrol tamam.	RD
00:29:07											Değişken form.	RI
00:29:08											Değişken forma gerek kalmadı.	MD
00:29:09											Olay çünkü...,	
00:29:10											düzleme ihtiyacımız...,	
00:29:11											zaten düzlemin kendisi vardı.	
00:29:12												
00:29:13												
00:29:14											Koku.	MS
00:29:15												
00:29:16												
00:29:17											Koku.	MS
00:29:18												
00:29:19												
00:29:20												
00:29:21											Bunu atmıştık.	MS
00:29:22												
00:29:23												
00:29:24												
00:29:25											Koku.	MS
00:29:26											Koku bu aletle nasıl...?	Q
00:29:27												
00:29:28												
00:29:29												
00:29:30												
00:29:31												
00:29:32												
00:29:33												
00:29:34												
00:29:35												
00:29:36												
00:29:37											Alet sinirlenecek olsa...	Q
00:29:38												
00:29:39												
00:29:40												
00:29:41												
00:29:42												
00:29:43												
00:29:44												
00:29:45												
00:29:46											Ne diyor?	Q
00:29:47											...Bir iletişim ara birimi.	MP
00:29:48												
00:29:49												
00:29:50												
00:29:51												
00:29:52												
00:29:53												
00:29:54											Bu aletin başka ne fonksiyonu olacak?	Q
00:29:55											Bazı şeyleri uzaktan programlayabiliyor.	
00:29:56												RI
00:29:57												
00:29:58												
00:29:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:30:00												
00:30:01											Mail box.	TI
00:30:02											Box açıl.	
00:30:03												
00:30:04												
00:30:05											Hımm, güzel.	MS
00:30:06												
00:30:07											Yarım saat.	
00:30:08											Yarım saat.	
00:30:09											Mail box'ın açıldığı...ve mail box açılıyor.	TI
00:30:10												
00:30:11												
00:30:12												
00:30:13												
00:30:14												
00:30:15												
00:30:16												
00:30:17												
00:30:18												
00:30:19											Mail box açıl...	TI
00:30:20											Bilgisayarı aç.	
00:30:21												
00:30:22											Bu öyle bir obje olmalı ki,	NI
00:30:23											aynı zamanda kişisel bir mücevher bile	
00:30:24											takılabilmeli.	
00:30:25												
00:30:26												
00:30:27												
00:30:28												
00:30:29												
00:30:30												
00:30:31												
00:30:32												
00:30:33												
00:30:34											Bunu bu kadar devasa bir şey olması	MP
00:30:35											gerek...	
00:30:36											Sadece şu doğrultuyu verebilecek bir şey...	
00:30:37												
00:30:38												
00:30:39												
00:30:40												
00:30:41												
00:30:42												
00:30:43												
00:30:44												
00:30:45												
00:30:46												
00:30:47												
00:30:48												
00:30:49											Adam iki eline birden takmasın o zaman.	DI
00:30:50												
00:30:51												
00:30:52												
00:30:53												
00:30:54												
00:30:55												
00:30:56											"Tık"	Q
00:30:57											Ha, bir de klik ve drag olayı ne olacak bu	
00:30:58											alette?	
00:30:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:31:00												
00:31:01											Bir şeyin üstüne tıklama iyi de,	Q
00:31:02											ekrandaki herhangi bir şey üzerine tıklama	
00:31:03											nasıl olacak?	
00:31:04												
00:31:05												
00:31:06												
00:31:07												
00:31:08												
00:31:09											Hımm, bir ses komutu olur.	RI
00:31:10												
00:31:11												
00:31:12												
00:31:13												
00:31:14											Klik.	TI
00:31:15											Klik...	TI
00:31:16												
00:31:17												
00:31:18												
00:31:19												
00:31:20											Mouse'ta onu hiç düşünmemiştim.	MS
00:31:21												
00:31:22												
00:31:23												
00:31:24												
00:31:25												
00:31:26												
00:31:27											Drag... hımm...	TI
00:31:28											Ekrandaki bir yere tıklasam.	
00:31:29											Tıkla. Bırak	
00:31:30												
00:31:31												
00:31:32												
00:31:33												
00:31:34												
00:31:35												
00:31:36												
00:31:37												
00:31:38												
00:31:39												
00:31:40												
00:31:41												
00:31:42												
00:31:43												
00:31:44												
00:31:45												
00:31:46												
00:31:47												
00:31:48											Tıkla. Bırak.	TI
00:31:49											Güzel.	
00:31:50											Tıkla. Bırak.. Bırak.	
00:31:51											Tıkla. Bırak.	
00:31:52												
00:31:53												
00:31:54												
00:31:55											Nerede bizim şey?	TI
00:31:56											Şu folder'ı ben tutarak çekmek istiyorum.	
00:31:57											Tıkla.	
00:31:58												
00:31:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:32:00												
00:32:01											Niye tıkla ki ya?	TI
00:32:02											Tıkla çok sal... çok acayip bir şey.	
00:32:03											Tık diye bir şey yok ki zaten.	
00:32:04											Al. Bırak.	
00:32:05											Al.	
00:32:06											Bunu da al.	
00:32:07											Bunu da al.	
00:32:08											Aaa, benim... başı çok iyi ya.	
00:32:09											Control'a basıp bir sürü dosya alması	
00:32:10											gerekiyor buraya.	
00:32:11											Al.	
00:32:12											Bunu da al.	
00:32:13											Ulan bunu da al.	
00:32:14											Utanma bun	
00:32:15												
00:32:16											Ha...	TI
00:32:17											Al... Al bunu da al.	
00:32:18											Bunu da al.	
00:32:19											Bunu da al.	
00:32:20											Beş tane dosya aldım.	
00:32:21											Al.	
00:32:22											Hoop, getir. Bırak.	
00:32:23											Aa, ne güzel.	MD
00:32:24											Ses de kesinlikle olmalı bu alette.	
00:32:25												
00:32:26												
00:32:27											O zaman...	MS
00:32:28												
00:32:29												
00:32:30											Bütün her şeyi de yapmasın sesle.	DI
00:32:31											İyice uzay çağı şeyi olur o zaman.	
00:32:32												
00:32:33												
00:32:34												
00:32:35											Tamam.	MS
00:32:36											Al. Bırak.	NI
00:32:37											Temel bir takım...	
00:32:38											bir takım fonksiyonları yükleyelim o zaman	
00:32:39											sadece buna.	
00:32:40												
00:32:41												
00:32:42											Mesela temel fonksiyonlar ne?	Q
00:32:43											Al. Bırak.	
00:32:44											Windows ortamı için düşünüyorum.	
00:32:45											Kopyala.	
00:32:46											"Cık".	
00:32:47												
00:32:48												
00:32:49												
00:32:50												
00:32:51												
00:32:52												
00:32:53												
00:32:54												
00:32:55												
00:32:56												
00:32:57												
00:32:58												
00:32:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:33:00											Hooh, ucu kurudu, nefret ederim bu işten.	MS
00:33:01												
00:33:02												
00:33:03												
00:33:04												
00:33:05												
00:33:06												
00:33:07												
00:33:08												
00:33:09												
00:33:10												
00:33:11												
00:33:12												
00:33:13												
00:33:14												
00:33:15												
00:33:16												
00:33:17												
00:33:18												
00:33:19												
00:33:20												
00:33:21												
00:33:22											Al.	DI
00:33:23											Bırak.	
00:33:24											Kopyala.	
00:33:25											Sil.	
00:33:26											Taşı.	
00:33:27												
00:33:28												
00:33:29											Başka ne var temel fonksiyon?	Q
00:33:30												
00:33:31												
00:33:32											Aç, kapa bilgisayarı.	DI
00:33:33												
00:33:34											Cep telefonum var.	ER
00:33:35											Cep telefonundaki fonksiyonları göz önüne	
00:33:36											alsam.	
00:33:37											Neyse...	
00:33:38												
00:33:39												
00:33:40												
00:33:41											Cep telefonunda neler var?	ER
00:33:42											Şey... atayabiliyorsun tuşları.	
00:33:43											Hızlı arama.	
00:33:44												
00:33:45												
00:33:46												
00:33:47												
00:33:48												
00:33:49												
00:33:50												
00:33:51											Eee..., cep telefonunda...	TI
00:33:52											mesela bu tuş menüye gidiyor.	
00:33:53											Menüyü açtık.	
00:33:54											İnternet, borsa, mesajlar, kayıtlar, profiller...	
00:33:55											Bunlar default.	
00:33:56												
00:33:57												
00:33:58												
00:33:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:34:00											Bu tuşa da şey atıyorsun...	TI
00:34:01											Finans, bilmem ne, ıvır zıvır...	
00:34:02												
00:34:03												
00:34:04											Ya da tuşla şey arama.	TI
00:34:05											Tamam.	
00:34:06												
00:34:07											Bir böyle temel fonksiyonları olacak bu aletin,	MD
00:34:08												
00:34:09												
00:34:10											...bir de kullanıcıya göre programlanabilir fonksiyonları olacak.	MD
00:34:11												
00:34:12												
00:34:13												
00:34:14												
00:34:15											... Bilir... programlanabilir fonksiyonlar ne?	DI
00:34:16												
00:34:17												
00:34:18												
00:34:19												
00:34:20											Mesela, hımm...	MS
00:34:21											Winamp'i aç.	TI
00:34:22												
00:34:23											Mesela adam Chop Suey'e hasta.	ER
00:34:24											Chop Suey'i çal.	
00:34:25												
00:34:26												
00:34:27												
00:34:28												
00:34:29												
00:34:30												
00:34:31												
00:34:32											Mail box'ım programlanabilir olmasın.	MP
00:34:33											Açıyorum çünkü sürekli.	
00:34:34											Mail box'ı aç.	TI
00:34:35												
00:34:36												
00:34:37											Annem çok sever bunu valla.	ER
00:34:38											Şifreyi girecek, bilmem ne yapacak,	
00:34:39											yazacak...	
00:34:40											Mail box'ı aç diyecek, bitecek.	
00:34:41												
00:34:42												
00:34:43												
00:34:44												
00:34:45											Yarına bu alet,	MS
00:34:46											eğer böyle bir teknoloji yoksa, belli...	
00:34:47											Ama çok hoş.	
00:34:48											Belirli şeyler olsun.	
00:34:49												
00:34:50												
00:34:51												
00:34:52												
00:34:53												
00:34:54												
00:34:55											Mesela @ işareti yapınca mail box'ımı açsın.	NI
00:34:56											Havaya bir @ imliyorum.	
00:34:57											Eee...	
00:34:58												
00:34:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:35:00											Şeyde vardı.	ER
00:35:01											Kermit'te vardı.	
00:35:02											Böyle havaya üçgen çiziyordu.	
00:35:03											Kermit, aklıma Kermit geldi.	
00:35:04											Kermit üçgen çiziyor.	
00:35:05											Ee bakın, üçgen.	
00:35:06												
00:35:07												
00:35:08												
00:35:09											Ben de @ çiziyorum.	TI
00:35:10											@ çiz mail box.	
00:35:11												
00:35:12												
00:35:13											Başka...	DI
00:35:14											Winamp'ı işaretlesem ben W olarak	
00:35:15											kodlarım.	
00:35:16											Güzel, işaret kodlama.	MS
00:35:17											Bu, sesten daha sevimli geldi.	
00:35:18												
00:35:19												
00:35:20												
00:35:21											Hem daha yakın, kodlama.	MD
00:35:22											Ses de olabilir.	
00:35:23											Sesi atmayayım iyice.	
00:35:24											İşaret kodlama olsun bu alette.	
00:35:25											Se...	TI
00:35:26											Ne var mesela?	
00:35:27											Chop Suey'i ben C kodlarım.	
00:35:28											Aaa, sevgilimin resimleri... Kalp.	
00:35:29												
00:35:30												
00:35:31												
00:35:32												
00:35:33												
00:35:34												
00:35:35											Güzel.	RD
00:35:36											İşaret kodlama.	
00:35:37												
00:35:38												
00:35:39												
00:35:40											Belki bu aletin iki versiyonu olacak.	NI
00:35:41											Biri işaretle çalışacak...	
00:35:42												
00:35:43												
00:35:44												
00:35:45												
00:35:46												
00:35:47											bir tanesi sesle.	DI
00:35:48												
00:35:49											Ama işaret fikri nedense bana daha sevimli	MS
00:35:50											geldi.	
00:35:51											Ama, bu al, yine ses lazım ya.	
00:35:52											Al. Bırak.	
00:35:53											Tamam.	
00:35:54												
00:35:55												
00:35:56												
00:35:57												
00:35:58											İkisini bir şekilde karıştıralım bunun.	DI
00:35:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:36:00		▒									Hem sesli, hem işaretli.	RI
00:36:01		▒										
00:36:02		▒										
00:36:03		▒									Hem sesli, hem işaretli.	RI
00:36:04		▒										
00:36:05		▒										
00:36:06		▒										
00:36:07		▒									Tamam.	MD
00:36:08		▒										
00:36:09		▒										
00:36:10		▒										
00:36:11		▒										
00:36:12		▒										
00:36:13		▒										
00:36:14		▒									Şimdi o zaman...	RD
00:36:15		▒									Hem sesli, hem işaretli.	
00:36:16		▒										
00:36:17		▒										
00:36:18		▒									Temel fonksiyonlar.	RD
00:36:19		▒									Yardımcı fonksiyonlar.	
00:36:20		▒										
00:36:21		▒										
00:36:22		▒										
00:36:23		▒										
00:36:24		▒										
00:36:25		▒										
00:36:26		▒										
00:36:27		▒										
00:36:28		▒									*Alet ile ara birim.*	RI
00:36:29		▒									İki adet.	
00:36:30		▒										
00:36:31		▒										
00:36:32		▒										
00:36:33		▒										
00:36:34		▒									Parmak aleti.	RD
00:36:35		▒										
00:36:36		▒										
00:36:37		▒									Parmak mekanizması.	MS
00:36:38		▒										
00:36:39		▒										
00:36:40		▒										
00:36:41		▒										
00:36:42		▒									Düzlemsiz.	RI
00:36:43		▒										
00:36:44		▒										
00:36:45		▒										
00:36:46		▒									Spatial.	MS
00:36:47		▒									Güzel.	MS
00:36:48												
00:36:49								▒			Bu alet nasıl bir şey olmalı?	Q
00:36:50								▒			Normal yüzük gibi olsa, ki öyle olacak.	
00:36:51								▒				
00:36:52								▒				
00:36:53								▒				
00:36:54								▒			Şu an için en... şey olan,	NI
00:36:55								▒			parmağın ucuna doğru olması.	
00:36:56								▒				
00:36:57								▒				
00:36:58								▒				
00:36:59								▒				

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:37:00								▒				
00:37:01								▒				
00:37:02								▒				
00:37:03								▒				
00:37:04								▒				
00:37:05								▒				
00:37:06								▒				
00:37:07								▒				
00:37:08								▒				
00:37:09								▒				
00:37:10		▒						▒				
00:37:11		▒						▒				
00:37:12		▒						▒				
00:37:13		▒						▒				
00:37:14		▒						▒				
00:37:15		▒						▒			Niye ben hep bu şekli çiziyorum ya?	MS
00:37:16		▒						▒			Sinir oldum şimdi.	
00:37:17		▒						▒				
00:37:18		▒						▒				
00:37:19		▒						▒				
00:37:20		▒						▒				
00:37:21		▒						▒				
00:37:22		▒						▒				
00:37:23		▒						▒				
00:37:24		▒						▒				
00:37:25		▒						▒			Tırnak çizip duruyorum.	MS
00:37:26		▒						▒				
00:37:27		▒						▒				
00:37:28		▒						▒				
00:37:29		▒						▒				
00:37:30		▒						▒				
00:37:31		▒						▒				
00:37:32		▒						▒				
00:37:33		▒						▒				
00:37:34		▒						▒				
00:37:35		▒						▒				
00:37:36		▒						▒				
00:37:37		▒						▒				
00:37:38		▒						▒				
00:37:39		▒						▒				
00:37:40		▒						▒				
00:37:41		▒						▒				
00:37:42		▒						▒				
00:37:43		▒						▒				
00:37:44		▒						▒				
00:37:45		▒						▒				
00:37:46		▒						▒				
00:37:47		▒						▒				
00:37:48		▒						▒				
00:37:49		▒						▒				
00:37:50		▒						▒				
00:37:51		▒						▒				
00:37:52		▒						▒				
00:37:53		▒						▒				
00:37:54		▒						▒				
00:37:55		▒						▒			Ara birim oldukça basit olsun.	MP
00:37:56		▒						▒			İlgiyi üstüne yoğunlaştırmasın.	
00:37:57		▒						▒				
00:37:58		▒						▒				
00:37:59		▒						▒				

	Category										Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L	
00:38:00											
00:38:01											PP
00:38:02											
00:38:03											
00:38:04											
00:38:05											
00:38:06											
00:38:07											
00:38:08											
00:38:09											
00:38:10											CT
00:38:11											
00:38:12											
00:38:13											
00:38:14											
00:38:15											
00:38:16											
00:38:17											
00:38:18											
00:38:19											
00:38:20											
00:38:21											
00:38:22											
00:38:23											
00:38:24											
00:38:25											
00:38:26											
00:38:27											
00:38:28											MS
00:38:29											
00:38:30											
00:38:31											
00:38:32											
00:38:33											
00:38:34											
00:38:35											
00:38:36											
00:38:37											
00:38:38											
00:38:39											ER
00:38:40											
00:38:41											NI
00:38:42											
00:38:43											
00:38:44											
00:38:45											MP
00:38:46											
00:38:47											
00:38:48											
00:38:49											
00:38:50											
00:38:51											
00:38:52											MD
00:38:53											
00:38:54											
00:38:55											
00:38:56											
00:38:57											MS
00:38:58											
00:38:59											

Burada da bu aleti takabileceğimiz bir adet boşluğu var.
Bunu daha önce yine çizmiştim.
Boşu boşuna çiziyorum.

Önce şunların şeklinde ara verip çok daha temel olgularla uğraşayım.

Yine tırnak çizdim.

Minority Report'taki herifin şöyle bir eldiveni vardı.

Bunlar ikisi bir birine bağlı şeyler olsa...

Ama o zaman, "cık" ikisini birden ayrı ayrı...

Olamaz,
bağlı olursa o zaman bu klikle bu klik karışır.
"Cık" bağlı olmayacak.

Belki maymunluk yapıyorlar.
İkisiyle birden ...

	Category										Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L	
00:39:00											
00:39:01											Q
00:39:02											
00:39:03											
00:39:04											
00:39:05											
00:39:06											
00:39:07											
00:39:08											
00:39:09											
00:39:10											MP
00:39:11											
00:39:12											
00:39:13											
00:39:14											RD
00:39:15											
00:39:16											
00:39:17											PP
00:39:18											
00:39:19											
00:39:20											
00:39:21											MP
00:39:22											
00:39:23											
00:39:24											
00:39:25											
00:39:26											
00:39:27											
00:39:28											MP
00:39:29											
00:39:30											
00:39:31											
00:39:32											
00:39:33											
00:39:34											
00:39:35											NI
00:39:36											
00:39:37											
00:39:38											
00:39:39											
00:39:40											
00:39:41											
00:39:42											
00:39:43											
00:39:44											
00:39:45											DI
00:39:46											
00:39:47											
00:39:48											
00:39:49											
00:39:50											
00:39:51											
00:39:52											DI
00:39:53											
00:39:54											
00:39:55											
00:39:56											
00:39:57											
00:39:58											ER
00:39:59											

Ne olabilir başka?

Sonuçta, aslında, temel olarak bir yuvarlağımız var.

Parmağa takılıyor.
Bir dikdörtgenimiz var.

Bu da işaret ediyor.
Dikdörtgen olması şart değil.
Yuvarlağımızın olduğu kesin.

Bu yuvarlağın her bir kere parmağa girmesi gerekiyor bu zabazingonun.

Evet, önemli bir kısmı o.
Her parmağa girilebilirite.

Her parmağa giren bir şey nasıl olsun?

Şöyle bir şey olsa.
Tık tık tık, altından çıksa bir şeyler.

Tık tık, yok ya deli misin?
Ne gerek var?

Direkt burda...

Bu mesela silikon içinden bir strüktür geçer...

şeylerdeki gibi.
Onu parmağınla kapatırsın.

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:40:00												
00:40:01											Amcamız şişmansa, şurda da cihazın kendisi var.	MP
00:40:02												
00:40:03												
00:40:04												
00:40:05											Böyle kapatır parmağını istediği gibi.	MD
00:40:06												
00:40:07												
00:40:08												
00:40:09												
00:40:10												
00:40:11												
00:40:12											Klik klik klik...	TI
00:40:13											Klik yok.	TI
00:40:14											Hımm.	
00:40:15											Nasıl?	
00:40:16												
00:40:17												
00:40:18												
00:40:19												
00:40:20												
00:40:21												
00:40:22											Sarı...	MS
00:40:23											Bir dakika bu daha uzun.	
00:40:24												
00:40:25												
00:40:26												
00:40:27												
00:40:28												
00:40:29												
00:40:30												
00:40:31												
00:40:32												
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00:40:36												
00:40:37												
00:40:38												
00:40:39												
00:40:40												
00:40:41												
00:40:42												
00:40:43												
00:40:44												
00:40:45												
00:40:46											İstediğim gibi koparamadım.	MS
00:40:47												
00:40:48												
00:40:49											Sinir oldum.	TI
00:40:50											Aldım.	
00:40:51											"İiyt".	
00:40:52											Böyle bir şey.	
00:40:53											Hoop bunu taktım parmağıma.	TI
00:40:54												
00:40:55											Birleştirdim.	MS
00:40:56											Güzel.	
00:40:57											Tamam.	
00:40:58												
00:40:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:41:00												
00:41:01												
00:41:02												
00:41:03												
00:41:04											Şimdi.	MS
00:41:05												
00:41:06												
00:41:07												
00:41:08												
00:41:09												
00:41:10											Bu aletin ama...	NI
00:41:11											Belki de üstünde bir ışık olacak.	
00:41:12											*Kullanıcıya bir feedback verecek.*	
00:41:13												
00:41:14												
00:41:15												
00:41:16											Böyle o... gidiyorum ben.	Q
00:41:17											Ama nereye gidiyorum?	
00:41:18												
00:41:19												
00:41:20												
00:41:21												
00:41:22												
00:41:23												
00:41:24												
00:41:25												
00:41:26												
00:41:27												
00:41:28												
00:41:29												
00:41:30												
00:41:31												
00:41:32											Bu aletin belki üstü mouse imleci şeklinde	NI
00:41:33											olacak.	
00:41:34											Windows'taki...	
00:41:35												
00:41:36												
00:41:37											He he he...	DI
00:41:38											Windows'un mouse imleci nasıldı tam	
00:41:39											hatırlamıyorum şimdi ama...	
00:41:40											Klasik bir şeydi.	
00:41:41											Şöyle...	
00:41:42												
00:41:43											O olacak burada.	DI
00:41:44												
00:41:45												
00:41:46												
00:41:47											Burada da yüzüğümüz olacak.	DI
00:41:48												
00:41:49												
00:41:50												
00:41:51											Ama çok eblek oldu ya.	MS
00:41:52											Esprili oldu ama yapacak bir şey yok hiç.	
00:41:53												
00:41:54												
00:41:55												
00:41:56											Estetik değil.	MP
00:41:57											Yooo...	
00:41:58											Belki bu...	
00:41:59												

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:42:00												
00:42:01		▒									Bu alet bence gümüş olabilir, mücevherler arasında. İsteyen krolara altın olabilir.	NI
00:42:02		▒										
00:42:03		▒										
00:42:04		▒										
00:42:05		▒										
00:42:06		▒										
00:42:07		▒									Platinium olabilir.	DI
00:42:08		▒										
00:42:09		▒										
00:42:10		▒									Var.	DI
00:42:11		▒									Bunu böyle çeşitlendirirsin...	
00:42:12		▒									platinium, gümüş, plastik.	
00:42:13		▒										
00:42:14											Gençlere plastik.	DI
00:42:15											"Civuci" var bir tane.	
00:42:16											Anneme bir tane gümüş, şık şöyle.	DI
00:42:17												
00:42:18												
00:42:19												
00:42:20											Sonra dolmuşçu amcaya evinde	DI
00:42:21											kullanacaksa bir tane altın...	
00:42:22												
00:42:23											bezemeli, kakmalı, oymalı moymalı.	DI
00:42:24												
00:42:25											Dolmuşçu amca interneti kesin kullanır	Q
00:42:26											ileride diye düşünüyorum.	
00:42:27												
00:42:28		▒										
00:42:29		▒										
00:42:30		▒									Şimdi bir dakika burayı ne yaptık?	Q
00:42:31		▒										
00:42:32		▒									Burası böyle.	RD
00:42:33		▒									Ayarlanabilitesi olan... bilite.	
00:42:34		▒										
00:42:35		▒										
00:42:36		▒										
00:42:37		▒										
00:42:38		▒										
00:42:39		▒									Burası değişken kısmımız.	MS
00:42:40		▒										
00:42:41		▒										
00:42:42		▒									Bunlar hep sabit olacak.	MS
00:42:43		▒									Burada değişik... iki tane var bunların.	
00:42:44		▒										
00:42:45												
00:42:46								▒				
00:42:47								▒				
00:42:48								▒				
00:42:49								▒				
00:42:50								▒				
00:42:51								▒				
00:42:52								▒				
00:42:53								▒				
00:42:54								▒				
00:42:55								▒				
00:42:56								▒			Böyle çok high tech de bir şey olsun	MP
00:42:57								▒			istemiyorum.	
00:42:58								▒				
00:42:59								▒				

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:43:00								▒			İstiyor muyum?	Q
00:43:01								▒				
00:43:02								▒				
00:43:03			▒									
00:43:04			▒									
00:43:05			▒									
00:43:06			▒									
00:43:07			▒									
00:43:08			▒									
00:43:09			▒									
00:43:10			▒									
00:43:11			▒									
00:43:12			▒									
00:43:13			▒									
00:43:14			▒									
00:43:15			▒									
00:43:16			▒									
00:43:17											Nasıl yapılabilir?	Q
00:43:18											Nasıl yapayım?	
00:43:19								▒				
00:43:20								▒			Tamam.	MS
00:43:21								▒				
00:43:22								▒				
00:43:23								▒				
00:43:24								▒				
00:43:25								▒				
00:43:26								▒				
00:43:27								▒				
00:43:28								▒				
00:43:29								▒				
00:43:30								▒				
00:43:31								▒				
00:43:32								▒				
00:43:33								▒				
00:43:34								▒				
00:43:35								▒			Şu an ne biliyorum bununla ilgili?	RI
00:43:36								▒			Bir tarafı göstermesini istediğimi biliyorum.	
00:43:37								▒			Bir de bir yüzüğü olmasını istediğimi	
00:43:38								▒			biliyorum.	
00:43:39								▒			Başka da bir şey istemi... bilmiyorum.	RI
00:43:40			▒									
00:43:41			▒									
00:43:42			▒									
00:43:43			▒									
00:43:44			▒									
00:43:45			▒									
00:43:46			▒								Şu tarafa doğru şöyle olsa...	TI
00:43:47			▒									
00:43:48			▒									
00:43:49			▒									
00:43:50			▒									
00:43:51								▒			Off.	MS
00:43:52								▒				
00:43:53								▒				
00:43:54								▒				
00:43:55								▒				
00:43:56								▒				
00:43:57								▒				
00:43:58								▒				
00:43:59								▒				

Timestamp	Activity Category										Transcription	Design Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:44:00											... başka da hiç bir şey gelmiyor aklıma.	MS
00:44:01												
00:44:02												
00:44:03												
00:44:04											Ne kadar sinir bozucu.	MS
00:44:05												
00:44:06												
00:44:07												
00:44:08												
00:44:09												
00:44:10												
00:44:11											15 dakika	
00:44:12												
00:44:13												
00:44:14												
00:44:15												
00:44:16												
00:44:17												
00:44:18												
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00:44:22												
00:44:23												
00:44:24												
00:44:25												
00:44:26												
00:44:27												
00:44:28												
00:44:29												
00:44:30											Tırnak olsun, ne yapalım?	RI
00:44:31											Bir kaç tane modeli olsa.	
00:44:32												
00:44:33												
00:44:34												
00:44:35												
00:44:36												
00:44:37											Bunu piyasaya göre çeşit çeşit sürersiniz.	DI
00:44:38												
00:44:39												
00:44:40												
00:44:41											Ara birim sabit kalır.	DI
00:44:42												
00:44:43											Altından maltından sonra...	DI
00:44:44												
00:44:45												
00:44:46											Mesela, üstünde ok olan...	RI
00:44:47												
00:44:48												
00:44:49												
00:44:50												
00:44:51											Üstünde ok olan.	DI
00:44:52												
00:44:53												
00:44:54											Bu yüzük böyle değil,	MS
00:44:55											yanlış çiziyorum.	
00:44:56											Şöyle aslında.	
00:44:57												
00:44:58												
00:44:59												

Timestamp	Activity Category										Transcription	Design Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:45:00											Böyle ayarlanabilitesi olan bir şey.	RD
00:45:01												
00:45:02												
00:45:03												
00:45:04												
00:45:05												
00:45:06												
00:45:07											Başka...	MS
00:45:08												
00:45:09												
00:45:10												
00:45:11												
00:45:12												
00:45:13												
00:45:14												
00:45:15												
00:45:16											Bu udilerin kullandığı şey gibi.	ER
00:45:17											Yine o tırnak.	
00:45:18											Hepsi tırnak bunların.	
00:45:19												
00:45:20												
00:45:21												
00:45:22												
00:45:23											Belki ... belki ...	MS
00:45:24												
00:45:25												
00:45:26												
00:45:27												
00:45:28												
00:45:29												
00:45:30												
00:45:31												
00:45:32												
00:45:33												
00:45:34												
00:45:35												
00:45:36												
00:45:37												
00:45:38												END OF ENCODING
00:45:39												
00:45:40												
00:45:41												
00:45:42												
00:45:43												
00:45:44												
00:45:45												
00:45:46											Resmen takıldım tırnağa.	
00:45:47											Aslında şu aşamada,	
00:45:48											benim bir tane daha başta yaptığımdan	
00:45:49											yapmam lazım.	
00:45:50												
00:45:51												
00:45:52											Normal koşullarda.	
00:45:53											Ama zaman az kaldı.	
00:45:54												
00:45:55											Şuna döneyim.	
00:45:56											Bir de formla ilgili şöyle bir şey yapabilirim.	
00:45:57												
00:45:58												
00:45:59												

Timestamp	Activity Category									Transcription	Design Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:46:00											Ama, "cık", yapmayayım.	
00:46:01												
00:46:02												
00:46:03												
00:46:04												
00:46:05											Eğer zamanım azsa, bulduğum figür	
00:46:06											üstünde durmayı tercih ediyorum.	
00:46:07												
00:46:08												
00:46:09												
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00:46:58												
00:46:59												

	Category										Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L	
00:47:00											
00:47:01											
00:47:02											
00:47:03											
00:47:04											
00:47:05											Bu yüzüğün bir de küçük kardeşi var.
00:47:06											
00:47:07											
00:47:08											
00:47:09											
00:47:10											
00:47:11											
00:47:12											
00:47:13											
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00:47:16											
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00:47:18											
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00:47:25											
00:47:26											
00:47:27											
00:47:28											
00:47:29											
00:47:30											
00:47:31											
00:47:32											
00:47:33											
00:47:34											Bir de bunu bir ... halinde deneyim.
00:47:35											Gördünüz son derece ince bir şey oldu.
00:47:36											
00:47:37											
00:47:38											
00:47:39											
00:47:40											
00:47:41											
00:47:42											
00:47:43											
00:47:44											
00:47:45											
00:47:46											Aynı yüzey ... nasıl bir ... zorunluluğu mu
00:47:47											var?
00:47:48											Tam bu cihazların orada.
00:47:49											
00:47:50											
00:47:51											
00:47:52											
00:47:53											
00:47:54											*Şurada tam arkasına geliyor.*
00:47:55											
00:47:56											
00:47:57											
00:47:58											İki tane şey var.
00:47:59											

	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:48:00											Tam bu ortada, burada bir ses alıcısı var...	
00:48:01												
00:48:02												
00:48:03												
00:48:04												
00:48:05											Ses alıcısı var.	
00:48:06												
00:48:07												
00:48:08											Tırnak bir, tık diye basıyorsun, böyle	
00:48:09											basıyorsun çıkıyor.	
00:48:10												
00:48:11												
00:48:12												
00:48:13												
00:48:14												
00:48:15												
00:48:16												
00:48:17											Şöyle.	
00:48:18												
00:48:19												
00:48:20											Tırnak iki de şu tarafında.	
00:48:21												
00:48:22											Hatta maymunun gözü gibi bir mouse	
00:48:23											şeklinde yapabilir burada.	
00:48:24												
00:48:25												
00:48:26												
00:48:27											Hih... Mouse metaforu.	
00:48:28												
00:48:29												
00:48:30												
00:48:31												
00:48:32												
00:48:33												
00:48:34											Mouse aslında mouse,	
00:48:35											ama mouse değil.	
00:48:36											Belki... olabilir mi?	
00:48:37												
00:48:38												
00:48:39												
00:48:40												
00:48:41											Mouse şeklinde bir ara birim var.	
00:48:42											Sen onu kullanmıyorsun aslında.	
00:48:43												
00:48:44												
00:48:45											Aslında o ara birim bu.	
00:48:46											Niye olmasın?	
00:48:47											Olabilir.	
00:48:48												
00:48:49											Kesin bir yerde dursun.	
00:48:50											Ne olacak?	
00:48:51												
00:48:52												
00:48:53											Mouse ara birimi...	
00:48:54											Mouse ara birimi.	
00:48:55											Ama olması gerekenler bunlar.	
00:48:56											Cihazların...	
00:48:57												
00:48:58												
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	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
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00:49:08												
00:49:09												
00:49:10											Şurda tırnağımız.	
00:49:11											Burda ses alıcısı.	
00:49:12											Bir tane ışığımız olsun ki,	
00:49:13											bu alet aktifken böyle bili bili bili yapsın.	
00:49:14											Bir de görsel şey versin.	
00:49:15												
00:49:16												
00:49:17												
00:49:18												
00:49:19												
00:49:20												
00:49:21											Işık da mesela şurda.	
00:49:22											Işık.	
00:49:23												
00:49:24												
00:49:25												
00:49:26												
00:49:27											Ses alıcısı.	
00:49:28												
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00:49:31												
00:49:32												
00:49:33												
00:49:34												
00:49:35												
00:49:36												
00:49:37											O zaman, şöyle bir...,	
00:49:38												
00:49:39												
00:49:40												
00:49:41												
00:49:42											ne salak çizdim sinir oldum,	
00:49:43											...bilgisayarımız var.	
00:49:44												
00:49:45												
00:49:46												
00:49:47											Bu da das ist meine monitor.	
00:49:48												
00:49:49												
00:49:50												
00:49:51												
00:49:52												
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	Category											Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L		
00:50:00												
00:50:01											Neyse abartmayayım monitör olayını. Klavyemiz var.	
00:50:02												
00:50:03												
00:50:04												
00:50:05												
00:50:06												
00:50:07												
00:50:08												
00:50:09												
00:50:10												
00:50:11												
00:50:12												
00:50:13											Bu aletin kablolu olması gerekmiyor. Başka bir şey olabilir.	
00:50:14												
00:50:15												
00:50:16												
00:50:17											Ara birimimiz de var.	
00:50:18												
00:50:19												
00:50:20												
00:50:21												
00:50:22											Tırnak yerleri ve ışığımız burada. Ses alıcısı burada.	
00:50:23												
00:50:24												
00:50:25												
00:50:26												
00:50:27												
00:50:28												
00:50:29											Buraya ne takılıyor? Bizim meşhur alet takılıyor.	
00:50:30												
00:50:31												
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00:50:33												
00:50:34												
00:50:35												
00:50:36												
00:50:37												
00:50:38												
00:50:39												
00:50:40											Esas fikir aslında bu. Tamam.	
00:50:41												
00:50:42												
00:50:43												
00:50:44												
00:50:45												
00:50:46												
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	Category											Decision
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00:51:44												
00:51:45												
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00:51:49												
00:51:50											... bu şekilde yapmamız lazım.	
00:51:51												
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	Category										
	R	W	D	Mm	Mu	Mt	Mh	T	A	L	Decision
00:52:00											Işık.
00:52:01											Anlamamı kolaylaştırıyor yüzeyleri.
00:52:02											
00:52:03											
00:52:04											Burada ara birim var.
00:52:05											
00:52:06											
00:52:07											Tırnak takma yeri.
00:52:08											
00:52:09											
00:52:10											
00:52:11											
00:52:12											
00:52:13											
00:52:14											
00:52:15											
00:52:16											
00:52:17											Ses alıcısı.
00:52:18											
00:52:19											
00:52:20											
00:52:21											
00:52:22											Işık.
00:52:23											Yani yaklaşık şöyle bir ... mouse'u gibi bir
00:52:24											şey oldu.
00:52:25											
00:52:26											
00:52:27											
00:52:28											Fakat formu hiç hoşuma gitmedi bu
00:52:29											aşamanın.
00:52:30											Şu an genel olarak böyle bir şey.
00:52:31											
00:52:32											
00:52:33											Formuyla uğraşmak lazım.
00:52:34											
00:52:35											
00:52:36											Formu çok önemli böyle bir şeyin.
00:52:37											
00:52:38											
00:52:39											
00:52:40											
00:52:41											
00:52:42											
00:52:43											Bunu çerçeveye alıyorum.
00:52:44											Şu yandaki ürünün değişikliği belli olsun.
00:52:45											
00:52:46											
00:52:47											
00:52:48											
00:52:49											
00:52:50											Bir de tırnakla beraber çizelim.
00:52:51											
00:52:52											
00:52:53											
00:52:54											
00:52:55											
00:52:56											Ara birimimiz.
00:52:57											
00:52:58											
00:52:59											

	Category										
	R	W	D	Mm	Mu	Mt	Mh	T	A	L	Decision
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00:53:01											
00:53:02											
00:53:03											
00:53:04											
00:53:05											Eeeh, ... oldu.
00:53:06											
00:53:07											
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	Category											Decision
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00:54:19												
00:54:20												
00:54:21												
00:54:22												
00:54:23												
00:54:24												
00:54:25											Tırnak, tırnak diyorum artık.	
00:54:26											Tırnak kaldı adı.	
00:54:27												
00:54:28												
00:54:29												
00:54:30												
00:54:31												
00:54:32												
00:54:33											Ses alıcısı.	
00:54:34												
00:54:35												
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00:54:37												
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00:54:39												
00:54:40												
00:54:41											Işık.	
00:54:42												
00:54:43												
00:54:44												
00:54:45											Garip bir şey, düzgün olmayan skeçleri	
00:54:46											düzgünlere tercih etmeye başladım bu	
00:54:47											aralar.	
00:54:48												
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00:54:58											45 saniye...	
00:54:59												

	Category											Decision
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00:55:00												
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00:55:03												
00:55:04											Ara birim.	
00:55:05												
00:55:06												
00:55:07												
00:55:08											Artı.	
00:55:09											Bunun adı niye ara birimse?	
00:55:10											Ara birim bu aslında.	
00:55:11												
00:55:12												
00:55:13												
00:55:14											Tırnak.	
00:55:15											Tırnak.	
00:55:16												
00:55:17												
00:55:18												
00:55:19												
00:55:20												
00:55:21												
00:55:22											Hiç dokika.	
00:55:23												
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00:55:33												
00:55:34												
00:55:35												
00:55:36												
00:55:37											Bunu ele takılırken de göstermek lazım	
00:55:38											şimdi değil mi?	
00:55:39											Hiç el çizesim yok.	
00:55:40											El çizmekten nefret ederim zaten.	
00:55:41												
00:55:42												
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00:55:52												
00:55:53												
00:55:54											Bunun asıl olayı düzlemin olmaması.	
00:55:55											Düzlemin olmamasını anlatmam lazım.	
00:55:56												
00:55:57												
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	Category										Decision
	R	W	D	Mm	Mu	Mt	Mh	T	A	L	
00:56:00											
00:56:01											Bilgisayarımız.
00:56:02											
00:56:03											Klavyemiz ...
00:56:04											
00:56:05											Ara birimimiz.
00:56:06											
00:56:07											
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00:56:11											
00:56:12											
00:56:13											
00:56:14											
00:56:15											
00:56:16											
00:56:17											Burada da böyle ikisi başka bir düzlem.
00:56:18											
00:56:19											
00:56:20											
00:56:21											
00:56:22											
00:56:23											
00:56:24											
00:56:25											
00:56:26											
00:56:27											
00:56:28											
00:56:29											Burada bir yerde bu var.
00:56:30											
00:56:31											
00:56:32											
00:56:33											
00:56:34											
00:56:35											
00:56:36											
00:56:37											
00:56:38											
00:56:39											Şimdi bunu alıyorum.
00:56:40											
00:56:41											
00:56:42											
00:56:43											
00:56:44											
00:56:45											Şunların arasında bir ilişki var.
00:56:46											Bunların arasında bir ilişki var.
00:56:47											
00:56:48											
00:56:49											Bir de bunlar, bu ikisinin arasında bir ilişki var.
00:56:50											
00:56:51											
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	Category										
	R	W	D	Mm	Mu	Mt	Mh	T	A	L	
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00:57:09											
00:57:10											
00:57:11											
00:57:12											Normal, bu aslında.
00:57:13											
00:57:14											
00:57:15											
00:57:16											
00:57:17											
00:57:18											Evet, kullanıcının kendi ayarladığı düzen.
00:57:19											
00:57:20											
00:57:21											
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00:57:23											
00:57:24											
00:57:25											
00:57:26											
00:57:27											
00:57:28											Hımm.
00:57:29											Haa, bir de ses var şurada.
00:57:30											
00:57:31											
00:57:32											
00:57:33											
00:57:34											
00:57:35											
00:57:36											Ses.
00:57:37											
00:57:38											
00:57:39											
00:57:40											Bilgisayara bağlı.
00:57:41											Bilgisayarla bağlantı içinde.
00:57:42											
00:57:43											
00:57:44											
00:57:45											
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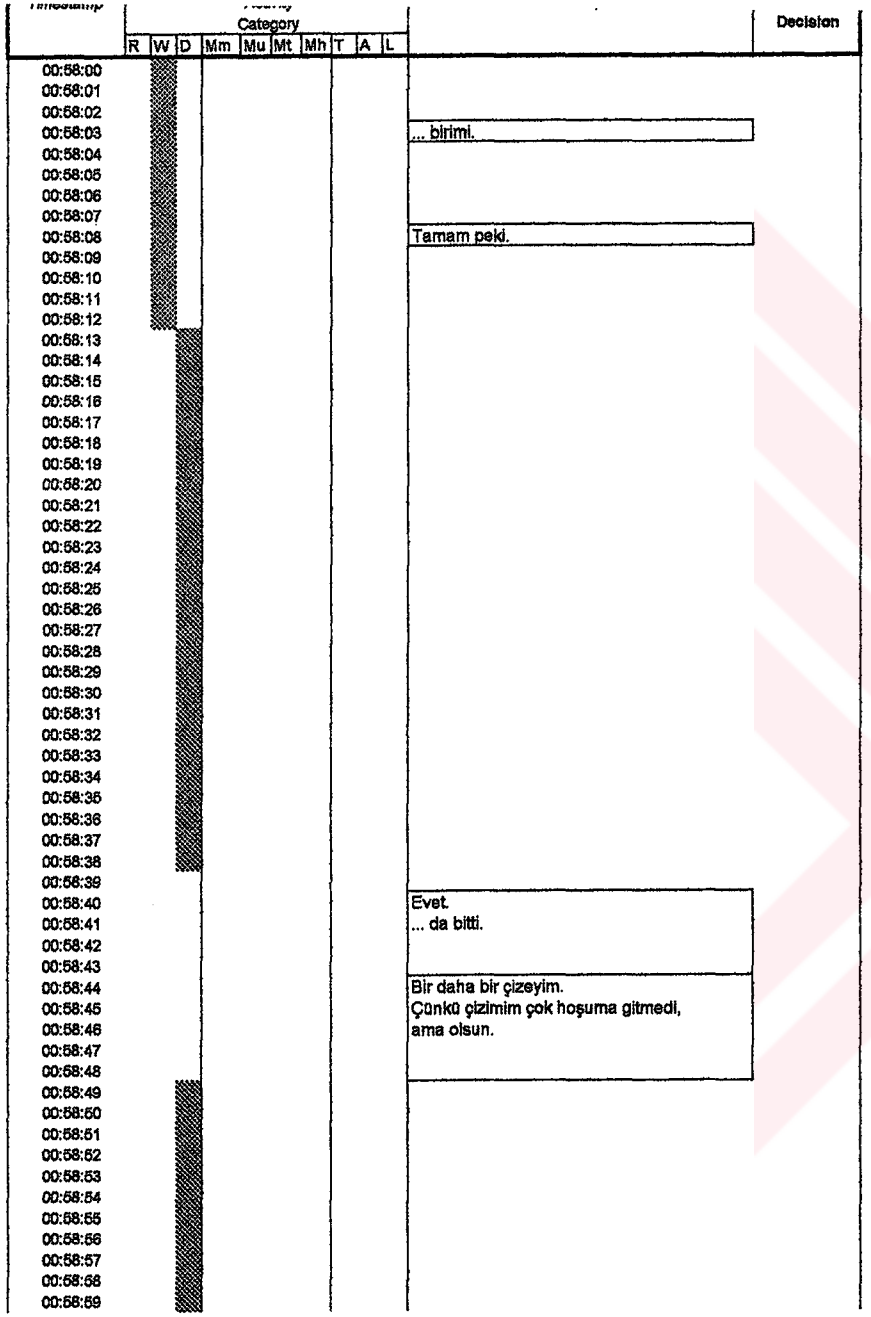
00:57:55											
00:57:56											
00:57:57											Kullanıcı ara birimi.
00:57:58											
00:57:59											


Category
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Decision
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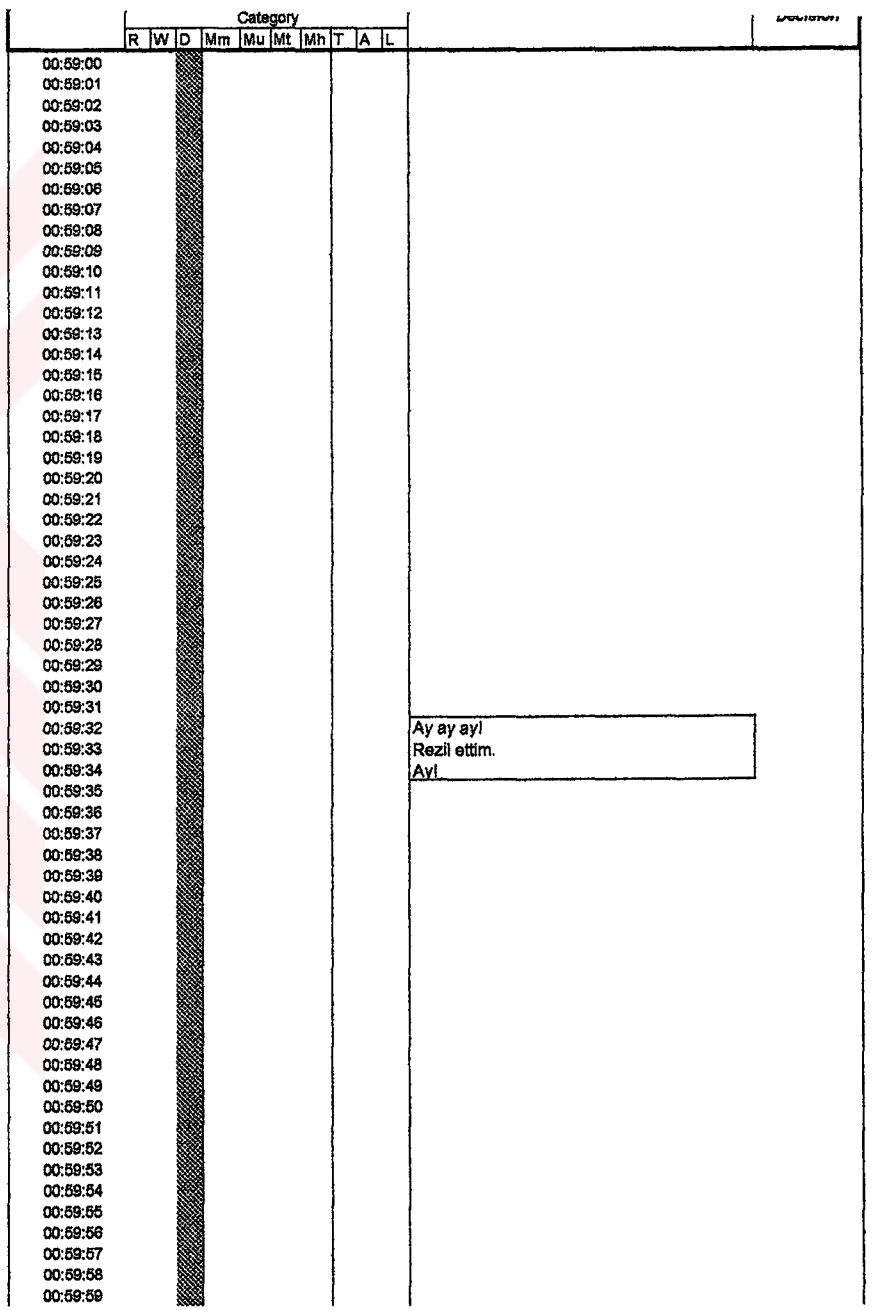
... birimi.
Tamam peki.
Evet.
... da bitti.
Bir daha bir çizeyim.
Çünkü çizimim çok hoşuma gitmedi,
ama olsun.


Category
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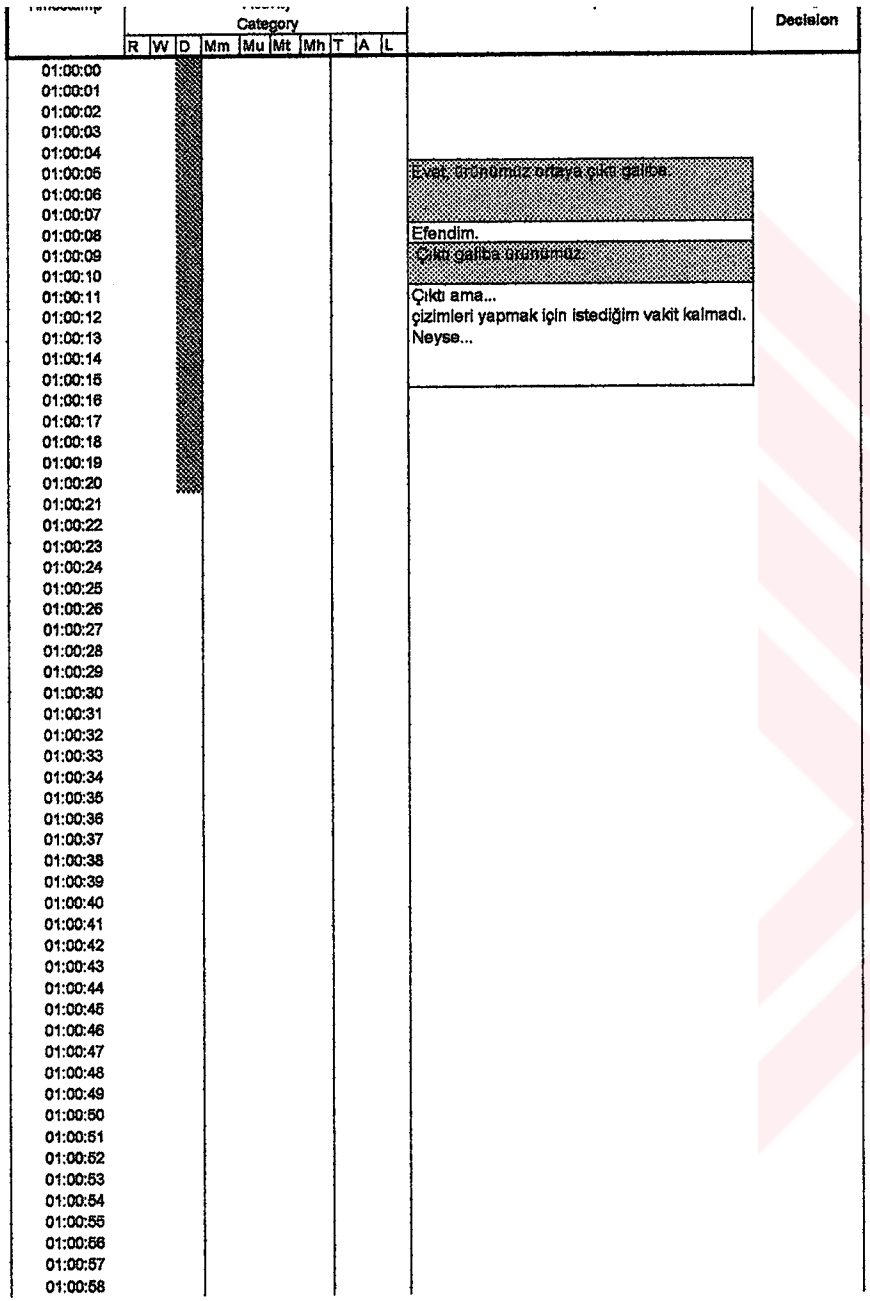
Ay ay ay!
Rezil ettim.
Ay!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Evet, ürünümüz ortaya çıkı galiba.
Efendim.
Çıktı galiba ürünümüz.
Çıktı ama...
çizimleri yapmak için istediğim vakit kalmadı.
Neyse...

CURRICULUM VITAE

Sinan Ödekan, born in İstanbul in 1974, after graduating from Sankt Georg Austrian High School, started his undergraduate study in 1993, at the Boğaziçi University, Faculty of Engineering, Department of Mechanical Engineering. In 1999, he graduated as a Mechanical Engineer and started his graduate study in the Industrial Design Programme, at the Technical University of İstanbul, Institute of Science and Technology. Same year he was appointed as a research assistant at the same department. He is still working as a research assistant.