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Categorizing information in manuals

Creating a universal categorization in declarative information

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Abstract

In previous research on the topic of text types in manuals, many different definitions of text types have been used. This makes it more difficult than necessary to compare the results of research on this topic. To solve this problem a complete universal categorization of the information in manuals is needed. A part of this categorization is readily available. Three types of information are currently discerned in manuals. Two come in the form of well defined procedural and motivational information, while the third, often used, term of declarative information lacks uniformity in its definition and internal categorization. This study aims to split up declarative information into a well defined categorization. To accomplish this, three forms of research have been conducted: a literature review, a content analysis of real-life manuals, and open and closed card sort studies among a group of participants with professions related to this field of research as well as a group of participants unfamiliar with the field.

The literature review indicated that in available research many different implementations and definitions of declarative information were used. All these different views of declarative information were collected and compared, leading to a universal categorization with six different categories: internal working, purpose, advice, topology, comparison and terminology.

The content analysis of real-life manuals was carried out to check whether current manuals would contain information not covered by this categorization, but did not indicate any need for redefinition of these categories or the inclusion of any others.

The open card sort was conducted to check what alternative categories participants would create. This study showed that some of the participants created categorizations in which the categories from the literature review could be discerned and others created interesting alternative categories; however these categories will have to be researched to determine whether they are a viable alternative.

The closed card sort was conducted to determine whether the suggested universal categorization scheme would lead participants to categorize pieces of information consistently. It appeared that the items created for the purpose category were difficult to categorize; whether this was due to the chosen items or the definition of the category is not entirely clear. As the group of participants familiar with the field of research had a strong tendency to categorize these items as advice, the advice and purpose category were merged into the newly formed use category, leading to the following evolution of the categorization:

Use: Information about when or why the procedure could be used
Terminology: Information that defines the terms used in the manual
Internal working: Information about the internal working of the product
Topology: Information about the parts of the subject, where they are located and how they are connected
Comparison: Information in which a part of the subject is compared to another system

Table of contents

1. Introduction

The manuals of devices are frequently criticized. They are accused of not helping the user enough and being too complex. Despite this reputation of manuals, the majority of users still read the manuals (Schriver, 1997; Jansen & Balijon, 2002). Since both users and manufacturers want the best manuals for their products, research into manuals has to be conducted. This research was started in the eighties by companies like IBM which had to provide manuals with their hardware and software. From this research the notion was raised that the users of manuals use an action oriented approach when using manuals; they seem prefer to learn by doing (Carroll & Mack, 1983).

Since different parts of manuals have different goals to accomplish, there is a variety of different types of information that can be distinguished. To research the effects of these types of information these need good definitions. There are already various definitions for information types in manuals, but there is not one universally used categorization.

The type of information in manuals that enables the users to learn by doing is procedural information. This type of information consists of the steps that have to be taken, the preconditions for these steps and the reactions of the product. Procedural information enables the users to learn by doing, and its value has rarely been questioned.

That procedural information is well defined is partially due to the focus on this type of information by researchers with the perspective of minimalism. The name of this perspective could lead to some confusion, but contrary to what the name would suggest, minimalism does not promote the minimization of manuals, but rather the user-centered design of manuals (Van der Meij, 2003). Minimalism consists of four principles: Choose an action-oriented approach; Anchor the tool in the task domain; Support error recognition and recovery; and Support reading to do, study, and locate (Van der Meij, 2003, p. 222). Minimalism focuses on the procedural information in instructional text.

Farkas (1999) introduced a method to write manuals resembling minimalism named the streamlined step procedure. With this method the procedure to get from the start state to the desired state is the focus of an instructional text. This method is still widely used and the results of this method can for example currently be found in the help function of Microsoft Windows.

In contrast to procedural information, the value of all other types of information has been the subject of debate and research with a variety of conclusions. These studies however have been conducted with various definitions of the types, making it difficult to compare their results.

In the other types of information one can distinguish motivational information on one hand and all other types on the other. The latter category is known as declarative information. Since this type of information consists of all other types of information, it is difficult to research the effects of these types of information without a complete categorization. The lack of such a categorization prevents an easy comparison between studies.

This research aims to construct a general categorization of declarative information in manuals. To make this model as versatile as possible this research will consist of three different parts. The first part is a literature review. It consists of a summary of each definition of (a subset of) declarative information used in previous research. From this summary a definite categorization based on literature on declarative information is constructed. The second part is a corpus research. In this part

the types of information used in existing manuals are compared to the categorization derived from the literature. The focus of this part is to find additions to the categorization from literature. In the third part of this research the users are asked to generate a categorization of declarative information. To accomplish this, participants were asked to perform both an open card sort and a closed card sort of a collection of pieces of declarative information selected from the manuals used in the corpus research. The open card sort was performed to study the different categorizations the users would construct and the closed card sort was performed to see whether the users could use the created universal categorization of declarative information.

2. Information types in manuals

When looking at information in manuals a global distinction of three information types can be made: procedural, motivational, and declarative information. The necessity of procedural information is well established in practice. The effects of motivational and declarative information, however, are not as clear cut. The following paragraphs will give (1) a description of procedural information, (2) a description of motivational information, and (3) a description of declarative information, the current state of declarative information research and the problems that have risen in available research.

2.1. Procedural information

Procedural information is the most frequently used type of information in real-life manuals. The definition used for procedural information in this study is in line with the definition used by Ummelen (1997) as well as Karreman, Ummelen and Steehouder (2005). Procedural information is the information that consists of actions, reactions from the system or device, and the conditions for the actions.

The different elements of procedural information are illustrated in the following example:

The gas hose has to be connected before cooking. (condition)

1. Turn on the gas. (action 1)
2. Light the gas with a match. (action 2)

The burner is now on. (result/reaction)

The use of procedural information was established early in the history of research on manuals. Carroll and Mack (1983) found in their research that users of manuals prefer an action-oriented approach; in other words that users prefer to learn by doing. This requires that a manual is written in such a manner that it accommodates such usage.

2.2. Motivational information

Motivational information has hardly been studied in the past, but has recently received more attention. For this study motivational information is defined as information designed to encourage users to follow the procedure, to remove any fear that users might be experiencing, and to assure users that they have made the right decision.

An example of motivational information is:

There is nothing to worry about; anyone can follow these instructions.

Loorbach, Karreman and Steehouder (2007) recently conducted a study in which they used manuals written with different strategies:

- A control version;
- A version aimed at increasing the attention of the user; in this manual a number of headings used questions or idioms, and colors were used to accentuate certain segments;
- A version to prove the relevance of the procedures; this was achieved by adding the uses of procedures, previews of coming information, and narratives;

- A version aimed at increasing the confidence of the user; in this version segments were added to increase the user's confidence about operating the device.

The task performance was significantly better in the relevance and confidence versions than in the control version. The confidence version differed in the results from the control version; the participants who used the confidence version gave up significantly later than users in the control version in one of the three presented tasks.

Another example of a recent study concerned with motivational information focuses on the use of agents to influence the motivation of the users of a manual (Van der Meij, 2008). For this study a basic manual and a modified manual were constructed. The basic version was a manual constructed with the streamlined step procedure. The modified version had added personas and motivational parts. The results of this study proved that the basic manual supported learning and doing better than the modified manual.

The use and implementations of motivational information are different among researchers. Since these definitions are similar, this type of information lends itself well to a general definition.

2.3.   Declarative information

Declarative information in turn is all information about the device available in manuals which is not procedural or motivational information. This definition is very broad and therefore difficult to use without a proper categorization of its own. Declarative information can, for example, provide the reader with an image of the internal working of the device or an overview of its components.

A few examples of declarative information are:

V means that the certificate chain is trusted and valid.

With a conference call, you can have a joint conversation with two or more persons.

This paragraph consists of two parts: the first discusses the current state of declarative information research. In the second part the problems with recent research will be discussed.

Current state

Various researchers have conducted studies on the topic of declarative information. These studies used different subtypes of declarative information. The effects were separated in positive effects and negative effects.

Advantages

There are five types of positive effects of declarative information in manuals found in research.

- Declarative information helps users to build a better mental representation of the subject of the manual. Although users do generate a mental model without declarative information (Carroll & Mack, 1983), it can aid them in constructing an accurate representation of the subject. This accurate representation will help the users with following the instructions and correcting errors (Kieras & Bovair, 1984). Kieras and Bovair (1984) do however add the note that the addition can also lead to an incorrect representation of the subject and cause a myriad of problems.

- Users can be made less error prone. This effect can be obtained when the declarative information is used to explain the purpose of parts of procedures (Kieras & Bovair, 1984).
- Users remember the procedures better (Catrambone, 1995). This is an effect of declarative information that explains the purpose of the steps in the procedure.
- Declarative information can help users to perform faster. This can either imply that they are immediately faster due to the use of examples and principles (Catrambone, 1995) or that they are faster when faced with a new task (Smith & Goodman, 1982).
- Declarative information promotes transfer; declarative information aids the user when conducting a new task in the same domain. When users are faced with a new task, those that use a manual with principles or sub-goals perform better than those using a plain manual (Smith & Goodman, 1982). Users reading declarative information about the used device performed better when the location of buttons on the device differed between the training device and the testing device compared to users reading marketing information (Karreman, 2004). This was the only effect found by Karreman when she researched transfer; when the labels of the buttons changed to synonyms the difference in transfer did not prove to be significant.

Disadvantages
There are two known disadvantages of declarative information:

- The addition of declarative information in manuals increases the reported cognitive pressure of the users (Karreman, 2004, p. 119). This could be due to the fact that the readers of the manuals have to process more information which increases the cognitive pressure.
- Declarative information in manuals lowers the confidence of the users of the manual (Karreman, 2004, p. 120). This could be due to the fact that additional information in manuals consisting of large quantities of declarative information can make the device appear more complex.

Problems with available research
There are some notes to be placed with available research, as found by Mirel (1991). She performed a literature review on instructive text research and found that the research published in the nineteen eighties lacked comparability. The research did not use a standard method and there was no standard manual as control group. This practice prohibits carrying out a direct comparison between the studies. A specific case of instructive text research, declarative information research, was found to suffer from this problem by Karreman, Ummelen and Steehouder (2005). The various studies conducted suffer to this day from the differences in definitions and implementations of declarative information used. This leads to reduced comparability. To remove this problem for future research there should be a definite categorization of declarative information. When this categorization is widely adopted future research will be more comparable. Having each study use the same categorization would improve the efficiency of future research. Each type of information could be separately researched to create a complete picture of the effects of the types of declarative information. This would enable the authors of instructive texts and manuals to make an informed decision on the types of information that need to be incorporated into their work.

Creating the categorization of declarative information

From the available literature it is concluded that no general categorization of declarative information exists. To remedy this problem, this study aims to create a usable categorization. To create this categorization four sources are used: (1) the literature available on this subject, to build the categorization on the current scientific view; (2) a selection of current manuals, to determine whether there are additions to be made to the categorization from literature; (3) professional targeted users of the categorization, to determine whether the technical writers and researchers used other categorizations and could use the created categorization from literature and practice; and (4) an equivalent group of laymen, to determine whether different categories would be created without prior knowledge of the domain and whether the categorization from literature and practice is usable for participants without prior knowledge.

Research question:

- What is the most usable categorization of declarative information for research?

Sub-questions:

- What categorization can be derived from previous research on declarative information?
- What additional categories can be derived from current manuals to complete this categorization?
- How do professionals and laymen categorize declarative information?
- Are professionals and laymen able to use the categorization derived from literature and practice?

3. Literature research into current definitions

Since there are many different defined types and subtypes of declarative information used in research a new categorization has to be created that considers each of those definitions. This chapter aims to provide a categorization based on available literature.

3.1. Method

In available literature different definitions and implementations of declarative information were found. All these definitions and implementations were compared and combined to create one single categorization of declarative information.

3.2. Results

This paragraph provides an overview of each of the types of information found in literature. Table 2 (see page 15) has been constructed to create an overview of the differences and overlap of the various definitions of declarative information. This table is constructed to answer the first sub-question of the study. The exact terms in the studies can be found in each of the following category descriptions. The categories are sorted by the number of studies that feature them.

Internal working

The internal working category is the type of information that gives the reader of the manual a look at the internal working of the product. This type is referred to in research as 'system information' (Karreman, 2004), 'supportive information' (Kester, Kirschner, Van Merriënboer, & Baumer, 2001), 'general principles' (Kieras & Bovair, 1984), 'elaborations' (Reder, Charney, & Morgan, 1986), or just 'principles' (Smith & Goodman, 1982). In addition to this variety in terminology, the authors use different definitions and occasionally no definition whatsoever. To come to a single definition those found in the literature are compared.

Karreman (2004) defines 'system information' as the "information about the internal working of the product". Kester et al. (2001) use the term supportive information. This type of information describes the operation of the subject and the principles underlying it. Kieras and Bovair (1984) use no definition of the term general principles used in their study. From the implementation it can however be derived that they use it to explain the internal working of the subject of the manual; Reder, Charney and Morgan (1986) use explanations about the system in one of their experiments, and refer to this type of information as basic elaboration. Smith and Goodman (1982) use the implementation as a general schema of the working of the subject. This provides yet another understanding of this type of information, but no definition.

For a general definition of this subcategory of declarative information the definition of Karreman (2004) will be used, as it is clearly stated in the book: "Information about the internal working of the product". An example of this type of information is: "The TV can receive video and audio signals simultaneously when using an HDMI cable."

Purpose

The purpose category indicates the purpose of a procedure to users of a manual. Different authors use different terms for this type of information: 'principles' (Catrambone, 1995), a subtype of 'utilization information' (Karreman, 2004), 'design rationale' (Kieras & Bovair, 1984), 'purpose' (Reder, Charney, & Morgan, 1986), 'goals and subgoals' (Smith & Goodman, 1982), 'introduction',

and 'usefulness' (Ummelen, 1997). This type of information is researched frequently and there is a wide variety of terms used for this type of information.

The implementations of this type of information are as follows: (1) Catrambone (1995) uses a circular definition, which does not suit the purpose of this study, from his implementation it can be derived that 'principles' can provide a rationale for actions. (2) Karreman (2004) uses the purpose category as a subtype of utilization information, described as providing the user with "a reason why (…) particular functions of the system can be used". (3) Kieras and Bovair (1984) use design rationale as term for a subset of their interpretation of declarative information. This provides the user with the reason for the procedure to be as it is. (4) Reder, Charney and Morgan (1986) mention the purpose of the commands as one of the types of information used in their experiments. They provide no definition of this type of information. (5) Smith and Goodman (1982) have used sub-goals in their functional manual to give the users a framework to anchor the used steps. (6) Ummelen (1997) mentions the introduction as a type of information which informs the user of the purpose of the provided procedures. She also uses the explanation of usefulness as a type of information; she used as description for this term the term functionality, which is strange since she uses functionality later on as a term to convey when the subject can be used.

There is no general definition of information in the purpose category found in literature. This information will therefore be defined as "Information about the purpose and goal of the current procedure". An example of purpose is: "With a conference call, you can have a joint conversation with two or more persons."

Advice
Information in the advice category answers the question of when it is a good idea to use a function or setting of the product. This type of information is applied by three researchers; Karreman (2004) uses this type of information as 'timing' in her definition of utilization information, Reder, Charney and Morgan (1986) use it as timing in the concept-rich version of their created manual, and Ummelen (1997, p. 26) uses a similar concept: functionality.

Karreman (2004) uses in her research the timing information as a subpart of a larger type of declarative information named utilization information. Another part of the utilization information is the circumstances of use. The circumstances of use are only mentioned by Karreman (2004). An example of this type of information is a table with different cooking times of different types of food in the manual of a microwave oven. This type of information appears at first sight to be very similar to the conditions of the procedural information. However, the circumstances sketch a possible situation and pose no condition contrary to the procedural conditions. Just as advice, the circumstances of use provide the user with an answer to the question when it is advisable to use a specific function of the product. In this study the circumstances will therefore be placed in the advice category. Reder, Charney and Morgan (1986) use the timing as a type of content rich information. Ummelen (1997) uses the term 'functionality' with as elaboration: 'when is it useful?'

In summary, all these authors acknowledge the existence of this type of information, but do not implement it as a separate category. No existing definition of this information type was found in literature; therefore a new definition was created for the categorization. Information of the advice category will be defined as "Information about when it is a good idea to use the procedure".

12

Topology

The topology category refers to the location of the different parts of the subject both in its interface and physical composition. This information type has been referred to as prerequisite information (Kester, Kirschner, Van Merriënboer, & Baumer, 2001), topology (Kieras & Bovair, 1984) and as compositions, description and location (Ummelen, 1997).

Kester, Kirschner, Van Merriënboer and Baumer (2001) use topology as part of their prerequisite information, they illustrate this part by providing example questions that could be answered by this type of information. These questions concern the locations and names of parts of the subject. Kieras and Bovair (1984) define the topology to show "what is connected to what", thus providing the user with a location of each part of the system and how these parts are connected. Three types of information defined by Ummelen (1997) are considered topology. She does not state a definition of the first type: compositions. She does however use an example to illustrate the use of composition in her study. She uses the example of a cell address of a spreadsheet that consists of an x coordinate that represents the column of the cell, a y coordinate that represents the row of the cell, and a z coordinate that represents the page on which the cell is located. The second type she acknowledges is the type named description. This type of information should answer the question: "What does it look like?" Finally she defines location information which describes where the parts of the subject can be found.

Since there is no definition available from used literature, a new definition has been created to use in the categorization. This definition is: "information about the parts of the subject and how they are located and connected". An example of information from the topology category is: "The music home screen has two parts, the upper part contains locally stored audio content, and the lower part shows online audio content. When online content is not available, the lower part shows local content."

Comparison

The comparison category contains the type of information that gives users a comparison to another more familiar setting to improve the understanding of the system. This information has been referred to as metaphors (Payne, 1988) and analogies (Reder, Charney, & Morgan, 1986; Ummelen, 1997). The usage of this type of information is more uniform than the other types, partially because it is used by fewer researchers. Payne (1988) illustrates the use of metaphors in his article by giving examples. The metaphors are comparisons of the subject of the manual to a familiar system. Reder, Charney and Morgan (1986) similarly provide no definition. However from the implementation it is derived that they use it as a comparison of the subject with another familiar system. Ummelen (1997, p. 27) uses the definition of an analogy as a piece of information in which "a part of the system is compared to another system".

The general definition of this subcategory will incorporate the definition used by Ummelen (1997): "Information in which a part of the system is compared to another system". An example of the comparison information is entering text with the remote control of a television, just like you would enter the letters in a SMS on the keypad of a mobile phone.

Terminology

The terminology category includes all information that defines or names parts or procedures of the subject of the manual. Reder, Charney and Morgan (1986) use two terms to refer to information that fit in the definition of terminology: details and definitions. They do not provide a clear definition of

these types of information and details are only mentioned briefly, but derived from their example of these types of information, definitions can be put in the terminology category. Ummelen (1997, p. 26) uses two types of information that can be placed in this category: definition; 'what is it?' and terminology; 'what is it called?' This first term used by Ummelen (1997) poses a problem as it is broader than the terminology category.

Since there is no current definition for terminology in literature, it is defined as: "Information that defines the terms used in the manual". An example of terminology is: "V means that the certificate chain is trusted and valid."

Examples
Multiple researchers have researched the use of examples in manuals. This is sometimes defined as declarative information. In this study, examples are not considered to be declarative information, because examples are specific cases of procedures; that is, they consist therefore of procedural, motivational and declarative information. Examples have been researched by both Catrambone (1995) and Reder, Charney and Morgan (1986). An example is an illustration of the current procedure (Catrambone, 1995) and the concept of this type of information is similar among all authors.

Options
The options category consists of a type of declarative information mentioned by Ummelen (1997). In her view options are declarative information that answers the question: what possibilities are there? This type of information can be used in various ways. For example advice can be given about when a function of the product can be used; in that case this type of information will be grouped in with the advice category. This will not be considered a separate category; each of the possible information from this category can be placed in another already defined category.

3.3.   Summary of categories from literature
The definitive version of the categorization derived from literature is as follows: Internal working; Purpose, Advice, Topology, Comparison, and Terminology. In table 1 the proposed names and definitions of the subtypes of declarative information are listed.

Table 1

Categories derived from literature

Name	Definition
Internal working	Information about the internal working of the product
Purpose	Information about the purpose and goal of the current procedure
Advice	Information about when it is a good idea to use the procedure
Topology	Information about the parts of the subject, where they are located and how they are connected
Comparison	Information in which a part of the subject is compared to another system
Terminology	Information that defines the terms used in the manual

Table 2

Different used definitions and implementations of declarative information in research

Source	Internal working	Purpose	Advice	Topology	Comparison	Terminology
Catrambone (1995)		Principles				
Karreman (2004)	System information	Utilization information: Reason why	Utilization information: Circumstances/Timing			
Kester et al. (2001)	Supportive information			Prerequisite information		
Kieras & Bovair (1984)	General principles	Design rationale		Topology		
Payne (1988)					Metaphors	
Reder, Charney & Morgan (1986)	Elaboration	Purpose	When it is a good idea to use them		Analogies	Details/Definitions
Smith & Goodman (1982)	Principles	Goals and Sub-goals				
Ummelen (1997)	Description	Introduction/ Usefulness	Functionality	Composition/ Description/ Location	Analogies	Definition/ Terminology

4. Content analysis of information types in real-life manuals

The previous chapter provided a picture of the declarative information types used in research; this raises the question: are any alterations to the categorization from literature necessary? This chapter aims to provide an answer to this question.

4.1. Method

To provide an answer to which of the found types of declarative information are used in practice, the different types of information that are currently used have to be assessed. This has been accomplished by the execution of a content analysis of a corpus of recent real-life manuals. As a basis for the classification scheme of this corpus research the literature-derived categorization is used.

Selected manuals

This research is conducted on twenty-three manuals spread over four categories: audio, set-top box, telephone, and television. These categories are selected because manuals are still provided with the products in these categories. For each of these categories the biggest or most prominent manufacturers have been selected, and of these manufacturers the latest, according to their website, product was used. The manuals were downloaded from the websites of the manufacturers and only official manuals are used. Pages which do not contain any relevant information are omitted from the sample. These are the pages which contain the table of contents, lists of trademarks and copyrights and indexes. From all the remaining pages of the manuals, ten pages were randomly selected with the random number generator from random.org. This resulted in a corpus of 230 pages from current manuals from different manufacturers. The manual with the least amount of pages had twenty pages, so it was possible to randomly choose ten pages from all manuals. For a more detailed look at the categorization refer to appendix 1 for detailed information about the manuals in the corpus. These selected pages were subsequently analyzed with the following categories: procedural information, motivational information, six types of declarative information derived from the literature review, and uncategorizable information (See also table 3 and appendix 2: Annotator Instruction).

Procedure

The sample of the manuals is divided into blocks to enable the annotators to categorize the available information. These blocks of information are defined by the layout of the manual, in the form of bullet points, blank lines and returns, unless there are more types of information available in the block; then each of those types of information is annotated. This procedure has been chosen to enable the annotators to count subsequent pieces of the same type of information, and it will enable them to acknowledge different types of information in the same block that is defined by layout.

The corpus was annotated by one rater. When all information in the selected pages was annotated, an inventory was made to see which types of information was available in real-life manuals, which information was uncategorizable, and which categories could be constructed to categorize the, so far, uncategorizable information. With the additional categories from this part added to the categorization from literature, the result was a categorization derived from both literature and practice.

A second rater annotated a sample to determine consistency of the categorization. The second rater rated one tenth of the analyzed pages. An interrater reliability analysis was performed using the

Kappa statistic (Cohen, 1960) to confirm the consistency among raters. The second rater used one tenth of the pages of the corpus, twenty three pages in total. The second rater used every third page of the random selections of the manuals.

The interrater reliability was found to be Kappa = 0.58, 95% CI (0.513, 0.643). When the data is analyzed it appears that many blocks are interpreted as being procedural and purpose by one rater and as entirely procedural by the other rater. When these cases are combined into the procedural category, the Kappa increases to 0.64, 95% CI (0.581, 0.705). This corrected Kappa indicates a substantial agreement (Landis & Koch, 1977). This leads to a final interrater reliability of 0.64 with a 95% confidence interval of (0.581, 0.705).

Table 3

Categories used to classify information in manuals

Category	Name	Definition
Procedural	Procedural	Information about actions, conditions and results of the actions
Motivational	Motivational	Information to encourage the user
Declarative	Terminology	Information about names of parts and functions of the product
Declarative	Internal working	Information about the internal working of the product
Declarative	Topology	Information about the parts of the subject, where they are located and how they are connected
Declarative	Comparison	Information in which a part of the subject is compared to another system
Declarative	Purpose	Information about the purpose and goal of the current procedure
Declarative	Advice	Information about when it is a good idea to use the procedure
Unidentified	Uncategorizable	Information that does not fit in another category

4.2.   Results
This paragraph consists of the findings of the corpus research, in particular the information types found in the corpus, the analysis of the uncategorizable information and the consistency of the categorization.

Information types in the corpus
Each type of information from the categorization was found in the corpus. However the information pieces are not evenly spread among the categories. Half of the information was classified as procedural information (49.7%). Some of the types of information were hardly used in the researched corpus. 0.5% of the pieces of information were categorized as motivational information, just one piece (0.0%) as comparison and 0.8% as advice. Table 4 summarizes of the number of blocks per type of information. A table with the complete results is available in appendix 3, which contains a summary of the number of blocks per type of information for each manual.

Uncategorizable information
In the analysis it was found that 5.1% of all pieces of information fell in the uncategorizable category. To make a more usable categorization this information was analyzed. Most of the uncategorizable information falls in the category 'internal references'. This category consists of references to other parts of the manual and it contained 79.4% of all information classified as uncategorizable. Among

the discerned types of uncategorizable information are no types of declarative information. The table with the complete analysis of the uncategorizable information is available in appendix 4.

Table 4

Blocks of information per type of information

	Total	Mean	Ratio
Procedural	1541	67.0	49.7%
Motivational	15	0.7	0.5%
Terminology	557	24.2	18.0%
Internal working	304	13.2	9.8%
Topology	325	14.1	10.5%
Comparison	1	0.0	0.0%
Purpose	172	7.5	5.6%
Advice	24	1.0	0.8%
Uncategorizable	159	6.9	5.1%
Total	3098	135.0	

4.3. Conclusion

All types of information that existed in the categorization where found in the analyzed manuals. The most used type of information is the procedural information. Of the declarative information only the terminology and topology categories accounted for more than 10% of the blocks in the manuals. The least found types of information in the manual were: the motivational category, only one manual used this information type to comfort the users; the comparison category, only one manual used this type of information and tried to explain a feature using an analogy; and finally the advice category. The most frequently encountered type of uncategorizable information was of the internal reference category. However, this category will not be considered in the remainder of this research because it is not a form of declarative information.

Each of the types of information was found, but from some categories there were only a few blocks. This indicates a discrepancy between literature and practice; real-life manuals contained, per type of information, little declarative information while there is quite some focus on different types of declarative information in literature. The interrater reliability was substantial but not perfect; this is probably due to the fact that the manuals from practice frequently combine different kinds of information in a single sentence. As a result of this, the categorization is not optimal when used to categorize real-life manuals. It is however possible to use this categorization to create manuals. In that case the information blocks can be kept exclusively in a single category; thus, the categorization is usable for this purpose.

5. Card sort study to determine a categorization

The previous two chapters paint a picture of a categorization as extracted from literature and a picture of usability of this categorization when faced with manuals from practice. This chapter aims to provide a picture of the categorization that users would create and whether users are able to work with the categorization as derived from literature and practice. To reach these two targets a two-part study has been carried out. The first part was an open sort method to let the users generate categories on the basis of blocks of information and the second part was a closed sort method to let the users place the pieces of information in the categories derived from literature.

5.1. Method

This third study is a two-part study: the first part is designed to generate a list of alternative categorizations in addition to the categorization derived from literature; the second part is designed to test the usability of the categorization for declarative information created from literature and practice. For both of these questions a sorting method has been selected.

For the first question an open card sort was conducted. This method can be used to let participants generate categorizations on their own (Coxon, 1999). The open card sort offers the freedom to the participants to not only generate the categories, but also give a rationale for the created categorization (Coxon, 1999, pp. 8-9). Unfortunately there are two disadvantages to the open card sort. These are (1) the broad range of the number of categories that the participants can generate, from one (the "lumper", who lumps every piece of information in the same category) to the number of pieces of information (the "splitter", who separates each piece of information in its own category) and (2) the possibility of the participants generating categorizations that are of no interest to the researcher. It is possible to counter the first problem by using fixed-sorting, a subtype of card sorting where the researcher poses a limit on the number of categories the participant can use. This fix has the disadvantage that the natural grouping of the participants is disrupted. The disadvantage of this fix was considered to outweigh the disadvantage of the open sort method; the disturbance of all participants might influence the results more than a few lumpers and splitters (Coxon, 1999, pp. 20-21), so the unrestricted open sort is used. The second problem can be countered by providing an explicit criterion for sorting the objects (Coxon, 1999, p. 8), but a more explicit criterion than 'sort by text type' was not deemed beneficial to the study at hand, as it would have limited the range of possible results.

For the second question a closed card sort was conducted. This method can be used to test the usability of an existing categorization. The closed card sort offers a good method of verification for the categories derived from literature. By forcing the participants to use the predefined categorization the clarity of the categorization will become clear.

Participants

The participants (N=36) comprised two groups. One group consisted of 16 professionals: 8 researchers and 8 technical writers; this group had existing knowledge in the field of technical communication. This group will be referred to as the professionals. Of these participants one of the technical writers only completed the open sort and two of the researchers only completed the two sorts but did not answer the questions about the demographic characteristics. The other participants all completed the entire study. The second group consisted of 20 socially recruited highly educated participants; this group had no existing knowledge in the field of technical communication. These

participants were from various fields of study except the field of technical communication. This group will be referred to as the laymen. Two of the laymen only did the open sort. Each of the other laymen completed the entire study.

The mean age of the professionals is 44, in contrast to the mean age of 25 for the laymen. Both groups consist of highly educated participants. For a more detailed summary of the participants refer to table 5. For a representative sample fifteen participants per group were needed (Nielsen, 2004) (Tullis & Wood, 2004).

Table 5

Summary of sort participants

	N	Sex		Education			Mean Age
		Male	Female	VWO/Lyceum	HBO/HTS	WO	
Professionals	16[*]	8	5	0	2	11	44
Laymen	20[**]	12	7	4	2	13	25
Total	35	20	12	4	4	24	

*   Three of the professionals did not enter the demographical variables
**   One of the laymen did not enter the demographical variables

Materials
Thirty pieces of information from the sample of the content analysis (see chapter 0) were used as cards for the card sort study. These pieces are blocks of information as defined by the content analysis. Six pieces of information were selected for each of the five researched categories of declarative information. The sixth type of declarative information, comparison information, is not used because only one instance of this type of information was found in the corpus. For each of the English blocks from the content analysis sample exactly the same was picked from the equivalent Dutch real-life manual. These were selected based on the clarity of the blocks and were selected only when the Dutch equivalent manual was available. These blocks were in Dutch to allow the participants to more easily classify the information. The information in the blocks was stripped of product names; each instance was replaced by a neutral term. For example 'iPhone' was replaced with 'device' or 'telephone'. Each of the blocks of information is available in appendix 5.

Procedure
During the experiment the participant was asked to group the blocks of information into different categories based on text type. The card sort was an online card sort through websort.net. The sets of information blocks were randomized for each sort task. This randomization was chosen to avoid possible biasing due to the order in which the items are presented (Coxon, 1999, p. 16). The participant was greeted with an instruction about the card sort. The first sort was the open card sort to prevent the closed card sort from having an influence on the open card sort.

When the participant was content with his categorization the participant could save it and continue with the closed sort.

During this second sort the participants sorted the text blocks in five different predefined categories with the title provided; this to provide the participants with easily identifiable categories. When the

participant was content with the sorting of the blocks, the participant could continue to the third part which contained questions about demographical data and offered the opportunity to place remarks.

A pretest was conducted with three extra participants from the laymen to determine the usability of this procedure; this led to small alterations to the participant instructions. The exact instructions are available in appendix 6.

Analysis

The goal of the open sort is to find new viewpoints on the subject. This was accomplished by using websort.net's analysis tools. These tools generated a list of created categorizations by the participants and dendrograms of the sort data. The goal of the closed sort was to find whether the categorization is usable by both groups. The closed sort data was also analyzed using websort.net's analysis tools. This provided tables with in each cell the percentage of participants who placed the item in that category. The remarks made by the participants are used to illustrate the sort of the participants.

5.2. Results of the open sort

This paragraph contains the results of the open sort analysis. The categorizations are first roughly described, and then each of the sub-types of categorizations is described one by one.

The open sorts ranged from three to fourteen created categories. Ten of the participants created four categories. The complete distribution of participants by number of categories created is available in figure 1.
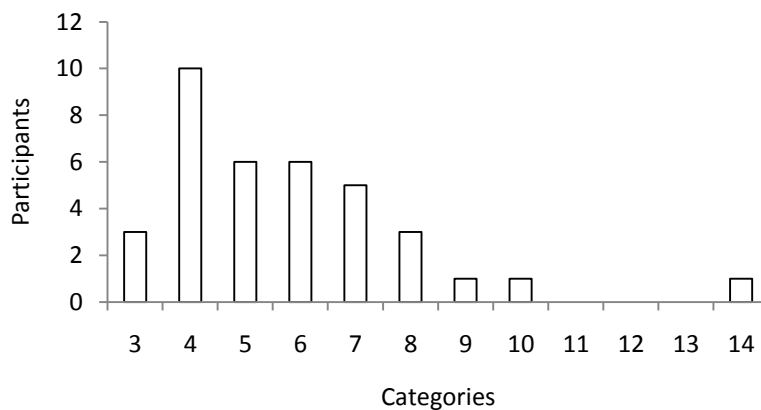
Figure 1. The number of participants per number of categories in their categorization.

In the open sort two professionals and four laymen did not create a categorization based on text types. These participants used the subject of the text blocks to make a categorization. This categorization is not usable to answer whether there are other usable categorizations for research. It appears that selecting by text type is not the first type of categorization that some users create. Examples of categories used by these participants are 'Clock' and 'Calling'.

One of the professionals used a different kind of categorization based on text types. He created a categorization based on the tone of the message of the block: "I have thought on several formats, but ultimately opted for these three categories: active instructive, passive instructive and (neutral)

informative." In the comments he has added: "The text blocks are often quite forcing and final (do this then that happens / this is what happens anyway), I labeled these as active instructive. Other texts are more passive (if you want this, you can do that), these are labeled as passive instructive. Informative texts are rarely a forcing tone, so I labeled as neutral. Then I added a final category created: info / passive. These pieces contain both (neutral) information and passive instructions to follow." So this final category has been added to enable the participant to place some text blocks in two categories. An example from one of these text blocks is: "A simple passcode is a four-digit number. To increase security, turn off Simple Passcode and use a longer passcode with a combination of numbers, letters, punctuation, and special characters." This is an interesting alternative categorization from textual perspective; this categorization offers an alternative to the categorizations based on text type. From the perspective of this study this categorization is not a type of categorization that was sought; this is not a categorization based on declarative information.

Alternative categorizations created by participants
All other participants created a categorization with the definition of text type as used in this research. These participants created many different categorizations. Some of the categorizations were similar to the categorization from literature and practice, while others were completely different. The highlights of the different categorizations created by the participants are the following; in these descriptions the wording of the participants is kept:

The following categorization created by a layman uses fewer categories than the constructed categorization from literature. In this categorization the 'pointers' appear to be a combination of the purpose and advice categories. The other categories appear not to be as easily mapped onto the categorization from literature.

- Pointers: These describe how the device and certain functions should be used.
- Possible functions: These describe the options of usage. These parts will not describe how the functions should be used; only possibilities are described.
- Objective information: These give factual information about the device.
- Limitations: These describe what is not possible with the device.

The following categorization created by a professional, a technical writer, is interesting because it provides a point of view from the user of the manual. It appears that the 'instructions for use' category is, when the contents are considered, very similar to the advice category from the literature review. The items from the advice category are often placed into a category with a similar name to instructions. This means that the blocks designated as advice appear to the participants as instructions which would place them in the procedural information category in the universal categorization.

- The category 'Extra information' is not necessary for the normal use of the device, but it is important enough to add to the instructions for the user.
- The category 'Instructions for use' consists of descriptions of the tasks that the user can execute. The use of the imperative mood is an indication for this category.
- The category 'Explanation of options' gives the user information to make a choice for a certain option.

- The category 'Functions of the device' gives information about the functions of the device, not about what the user can do with them. The verb 'can' is an indication for this category.
- The category 'Solving problems' tells the user about how potential problems can be solved.

The following categorization created by a layman appears to be created from a technical point of view. The categories are described as functions from a computer program.

- Definition: a = b
- Conditional explanation: if a then thingsHappen()
- Conditional explanation of action: if youWant(a) then doThis()
- Explanation of an action: doThis()
- (Explanation of a) feature
- Statement: not-feature-related statement of fact
- Explanation

Dendrogram analysis of the open sort

From the open sort data two dendrograms were created; the first is of the professionals, with those who used a non text type based categorization omitted. The second dendrogram uses the data of the laymen. When the items were placed together in the categorization by more than 50% of the participants, these items are considered to be in the same group. In the dendrograms this is made visible with a visual clue to indicate each group.

Dendrogram analysis, professionals

In the dendrogram of the professionals the best matching text blocks are placed into the same group by 77% of the participants. This is the first combination of the text blocks in Figure 2. The second combination is at 69% of the cases, the third at 62% and the fourth at 54%. This leads to a total of twenty groups with four of them with more than one item. In Figure 2 these groups are indicated by the green and white bars. All blocks from each of the groups are available in English in appendix 7.
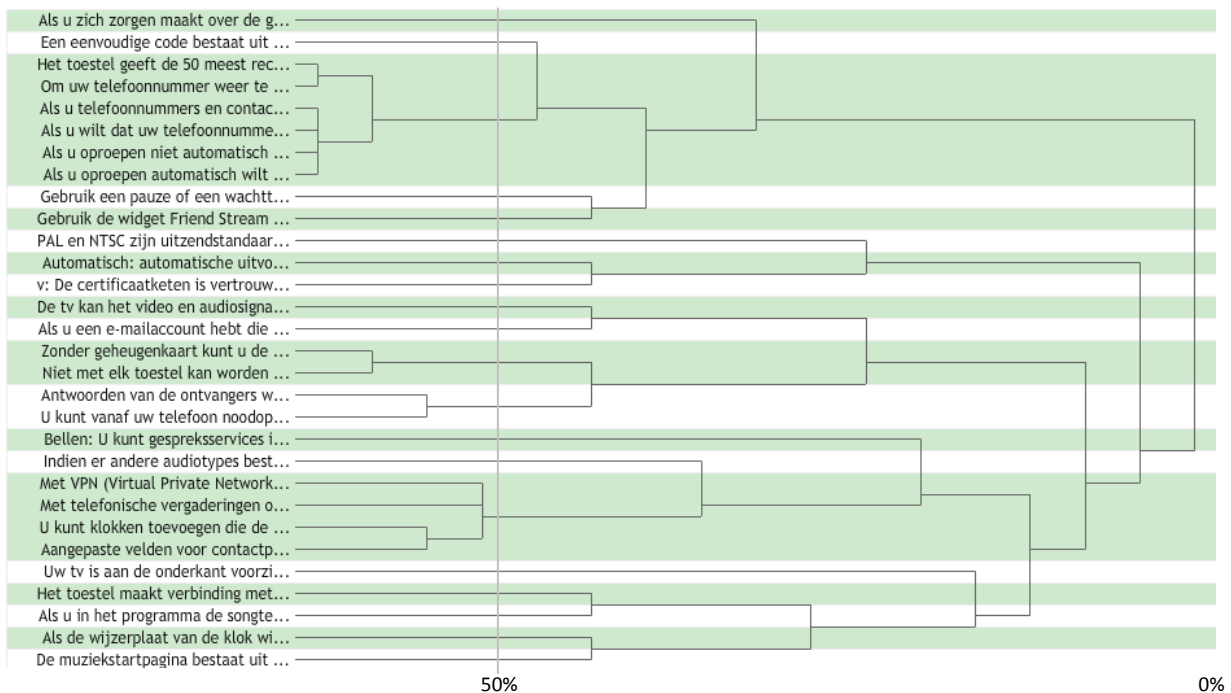

Figure 2. Dendrogram of the professionals who created a categorization based on text type (N=12).

These groups are discussed one by one from top to bottom in the following paragraphs.

In this first group each of the text blocks have the same sentence structure. When this is considered, it appears that the first text block actually consists of two information types. The first part of the sentence contains conditions and the second part contains instructions. Each of these text blocks consist of, as one of the participants put it, a conditional explanation for an action: if you want this, you will have to do that. The other users usually call this group the instructions. Most of the items from this group are placed into the advice category by the researcher, but not all. This group will therefore be referred to as conditional instructions.

In the second group both information blocks describe a possible state of a feature not working. This group is called limitations, disclaimer or conditions when discerned as a separate group. These two blocks are also placed into the background information and system specification groups. This group will be referred to as limitations.

The text blocks in the third group describe the behavior of the device under certain conditions. This group is never separately discerned by the participants. Every time these two text blocks were added into the same group, it had a name like background descriptions, limitations or system specifications. This group will be referred to as conditional working.

In the fourth group each of the blocks shows the purpose of the device or function. The first block: "VPN (virtual private network) provides secure access over the Internet to private networks, such as the network at your company or school." is grouped into the terminology category by the researcher; whereas most participants placed it in a purpose-like group. This can be explained because it is possible that the participants interpreted the text block as the description of the use or purpose of VPN rather than the definition of the term VPN. The groups containing these information blocks are defined by the participants as functions and possibilities. This group will be referred to as possibilities.

Summarized it appears that the following groups can be discerned in the open card sort of the professionals: conditional instructions, limitations, conditional working and possibilities. This categorization shows similarities to the proposed universal categorization. The conditional instructions appear to be similar to the advice category partially due to the items placed in this category and partially because the description of conditional instructions mentions the structure that fits in the advice category: when you want this; do that. The conditional working group appears to be similar to the internal working category; both items in this group were placed into the internal working category by the researcher. This sub-set however contains both the working and a condition when this behavior can be observed. The possibilities group contains mostly items placed into the purpose category by the researcher. This is not peculiar since possibilities indicate types of functionality. The limitations group does not fit with the proposed categorization; it appears that the participants acknowledge, in contrast to the researcher, the difference between things that can be done or possibilities and things that cannot be done or limitations. In the proposed categorization both these types of items are be placed in the internal working category.

Dendrogram analysis, laymen
In the dendrogram of the laymen the highest matching text blocks are placed into the same group by all participants. This is the first combination of two text blocks in Figure 3. The second combination of

two is at 94%, the third at 75%, the fourth at 63% and the fifth at 56%. This leads to a total of fifteen groups with seven of them with more than one item. All blocks from each of the groups are available in English in appendix 8.
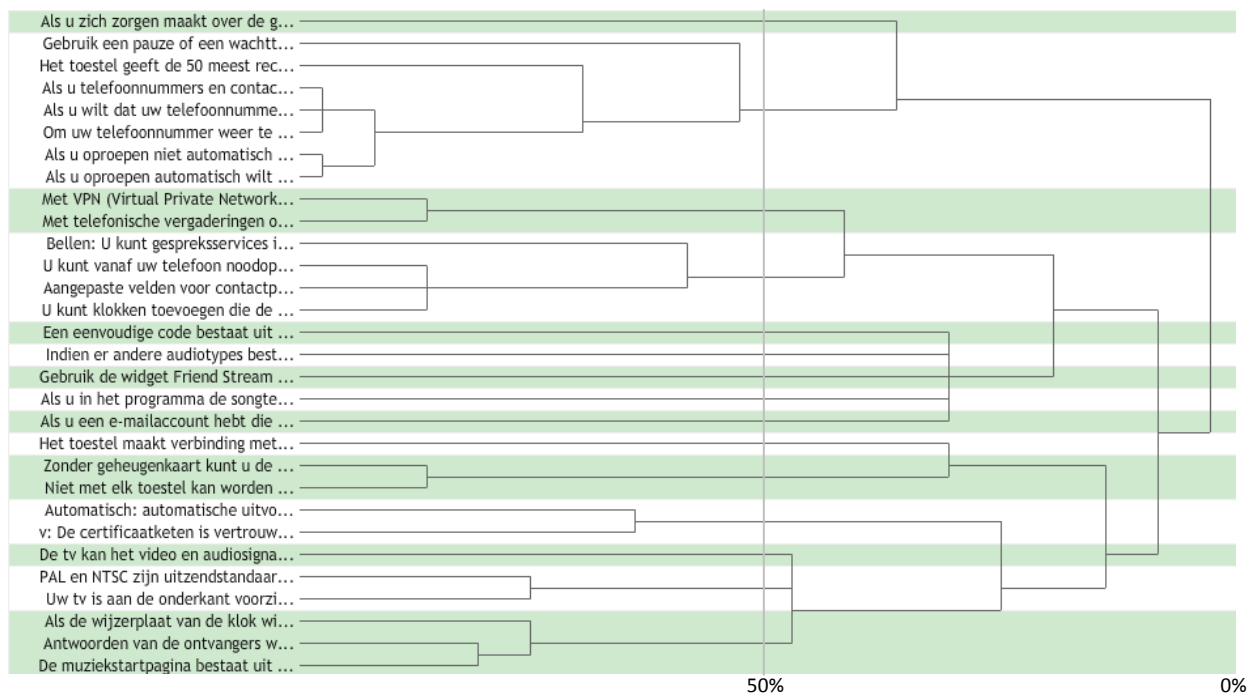

Figure 3. Dendrogram of the laymen who created a categorization based on text type (N=15).

These groups are discussed one by one from top to bottom in the following paragraphs.

This first group of the laymen is similar to the first group of the professionals. The only difference is that the block "Use a pause or a wait to separate additional numbers, for example a password or extension, from a main phone number. After dialing the main phone number, your BlackBerry® device either pauses before dialing the additional numbers." is included. This block does not fit as well in the sentence structure as detailed by the professionals. It does however give a condition and an action, only in this block the condition is preceded by the action. This group is described in the following ways: instructions, informative, product information, advice, conditional instructions, explanations and options. It appears that the laymen use a broader spectrum of titles than the professionals. This group will be called the same as the similar group from the professionals. This means this group will be referred to as conditional instructions.

The second group consists entirely of blocks from the fourth group of the professionals; not all blocks are included. The group of the professionals consisted of the possibilities of the device. The laymen named the groups that included these two pieces of information: features, functions, and non-product specific information. This group will be referred to as features.

This third group is partially the same as the fourth group of the professionals; two of the blocks are the same with two different additions. One of these additions if from the third group of the professionals, this was the block "You can make emergency calls from your phone even if you don't have a SIM card installed or your SIM card has been blocked." This could be interpreted as a possibility so this is not a peculiar choice. The other addition is different for both groups. The laymen

placed these blocks into categories with the names options or possibilities. This group will be referred to as possibilities.

The fourth group consists of blocks that describe a limitation of the device. An example of a block of this group is: "Without a memory card you can't use the camera, nor can you play or download music files and video clips." This group is created both by laymen and professionals. This is exactly the same group as the second group of the professionals. Professionals and laymen even used the same names for this group: limitations or disclaimer. This group will therefore be referred to as limitations.

The fifth group contained for example: "v: The certificate chain is trusted and valid, and the revocation status of the certificate chain is good." The name of the group used for these cases is explanation of a term. This is in line with the terminology category in which these terms were placed by the researcher. This group will therefore be referred to as terminology.

The information blocks from the sixth group are always part of a larger group with a title that translates to variations of specifications. An example of a block from this group is "Your TV is equipped with a Kensington security slot on the bottom of the TV." This group will therefore be referred to as specifications.

The seventh group contains for example the following two blocks: "If the clock face is white, it's daytime in that city. If the clock face is black, it's nighttime." and "Replies from any of the recipients are sent only to you, not to the other people you texted." These blocks are designated as internal working and topology. This group does not fit on a category from the proposed universal categorization. When a participant placed all the information blocks of the seventh group together, the group name was product description, explanations, internal working, factual information or exploratory information. These blocks are never defined as a separate group; they are always part of a larger group. This group will be referred to as explanations.

Summarized it appears that the following groups can be discerned in the open card sort of the laymen: conditional instructions, features, possibilities, limitations, terminology, specifications and explanations. This categorization contains three of the same groups as the categorization of the open card sort by the professionals: conditional instructions, possibilities and limitations. The same conclusions can be drawn for conditional instructions and limitations as were drawn with the professionals. Most of the laymen however split the possibilities group of the professionals in two: features and possibilities. These two groups are very similar in types of information and would both fit in the purpose category of the proposed universal categorization. The terminology group of the laymen is the same as the terminology group of the universal categorization. The last two groups of the laymen do not fit the universal proposed categorization. The items from these groups are always part of a larger group and there was no majority of participants for these larger groups. So it appears that it was hard for the participants to create a meaningful categorization; no two categorizations were equal. The open sort resulted in a categorization that is partially in line with the proposed categorization, but there are some notable differences.

5.3. Results of the closed sort

This paragraph contains the results of the closed sort analysis. First the peculiarities per information type are highlighted and thereafter a summary of the comments of the participants is presented. The complete summary of the data is available in table 6.

Advice

The items grouped into the advice category appear to be the clearest. The only item that was grouped in the advice category by the researcher but not by a clear majority of the laymen is "To display your phone number when you make calls, change the Restrict My Identity field to Never." 32% of the laymen placed this item in the topology category. This can be explained by the word 'display'; since the topology category deals with the interface of a device, a block with the word display in it can easily be associated with this category.

Purpose

Purpose proved to be the most unclear category; the only item that a majority of participants of both groups placed in this category is "When different audio types exist in an input signal, this function allows you to select the audio type you want." These following three items were placed in the advice category by the professionals while the laymen did not have a clear preference: "You can add clocks to show the time in other major cities and time zones around the world.", "Use a pause or a wait to separate additional numbers, for example a password or extension, from a main phone number. After dialing the main phone number, your BlackBerry® device either pauses before dialing the additional numbers." and "Use the Friend Stream widget so you can easily update your status and view other people's status updates right on the Home screen." These items illustrate that the fuzzy distinction between purpose and advice poses a problem to the participants. More about these reported problems can be found on the next page in the comments by the participants. "Custom contact fields can store information that you want to remember about a contact, for example, you might want to add a custom contact field named Sports team or Favorite color." was an item that was hard to place for all participants. Of the professionals, 43% placed this in the purpose category, but the remaining participants were divided. The final item from the purpose category: "With a conference or multiparty call, you can have a joint conversation with two or more persons." was placed into the purpose category by 53% of the laymen, whereas the professionals did not have a clear preference.

Internal working

Items grouped into the internal working category appear to be clear. The professionals placed five of the six items designated as internal working into this category and the laymen placed four of the six in the internal working category. The two blocks that do not fit as clearly are the "If your email account uses a BlackBerry® Enterprise Server, your administrator might be able to track the location of your BlackBerry device. For more information, contact your administrator." and "You can make emergency calls from your phone even if you don't have a SIM card installed or your SIM card has been blocked." The first block is placed in the internal working category by most professionals, whereas the laymen place this block mostly in the advice category. The 'For more information, contact your administrator'-part of this block could be the cause of this discrepancy. Neither group clearly places the second block in the internal working category. Of the professionals, 71% placed it in the advice category, while 47% of the laymen placed it in the internal working category. While the professionals, in contrast to the researcher, seemed to have a clear preference to place this block in the advice category, the laymen appear to be divided.

Topology

The topology category is the only category into which an item was placed unanimously by all professionals; they all placed "The music home screen has two parts, the upper part contains locally

stored audio content, and the lower part shows online audio content. When online content is not available, the lower part shows local content." in the topology category. This makes this item the only item which was placed in one category by all professionals. The next two items are not clear: "The song's lyrics also appear, if you've added them to the song in iTunes." and "iPhone displays the 50 most recent messages in the conversation. To see earlier messages, scroll to the top and tap Load Earlier Messages."; both are spread out over the categories by the professionals. Of the laymen however, 53% placed these in the topology category. The placement of these items by the professionals can be explained by the second part of each of those items; the first of the two is also placed in the internal working category and the second is also placed in the advice category. The last item that was designated as topology is "Depending on your BlackBerry® device model, the camera or video camera might not be supported or some camera or video camera features might not be available." This item was mostly placed in the internal working category by both groups of participants. This item provides information about a feature that is not available. That makes it hard to place in the current categorization.

Terminology

When analyzing the items that were grouped into the terminology category by the researcher, a peculiar finding is that the laymen are more in line with the researcher than the professionals. The majority placed four of the selected terminology blocks in the terminology category. The professionals place only one of the blocks in the terminology category. This block that appears to be clearly terminology is the block: "v: The certificate chain is trusted and valid, and the revocation status of the certificate chain is good." The two blocks that both the majority of laymen and majority of professionals did not place in the terminology category are: "A simple passcode is a four-digit number. To increase security, turn off Simple Passcode and use a longer passcode with a combination of numbers, letters, punctuation, and special characters." and "Call: Set up call services such as voicemail, call forwarding, call waiting, and caller ID." Both groups of participants want to place the item about the simple passcode in the advice category. This can be explained; the second part 'to increase security' can be interpreted as an advice to use the longer passcode. The 'Call' item is not as clear; most of the participants placed it in the advice or purpose category.

Comments made by the participants

Over one third of the participants reported they did not have a problem with the categorization. The remarks of the other participants about the closed sort can be summarized by a remark from one of the participants who stated the categories have fuzzy boundaries.

Five participants reported that the distinction between internal working and topology was not clear. This is not apparent from the analysis of the items, as the internal working and topology categories have just one switched item per participant group. Four participants reported difficulty with the distinction between the advice category and other categories. Three of them reported the combination of the advice category with one other category: one internal working, one purpose and one topology, and one participant reported combination of advice, purpose and topology.

Four of the professionals reported the terminology as the most difficult to categorize and eight of the laymen reported topology as the most difficult category. This result for the professionals is in line with sort results; the items designated as terminology were placed in various categories. The most reported difficult category of the laymen cannot be seen in the sort result. Items designated as

topology were placed in the topology category. During the closed sort the purpose category proved to be more difficult; this was the second most reported difficult category. Few participants reported the advice category as most difficult category. It was the least chosen as most difficult category: only one professional chose this category and no layman. For more details see figure 4.

Table 6

Closed sort, percentage items per category for each group of participants

|		Professionals (N=14)					Laymen (N=19)					All participants (N=33)				
		Advice	Purpose	Internal working	Topology	Terminology	Advice	Purpose	Internal working	Topology	Terminology	Advice	Purpose	Internal working	Topology	Terminology
Advice	Als u telefoonnummers (...)	57	29		14		58	11	11	21		58	18	6	18	
	Als u wilt dat uw (...)	64	21		14		58	21		21		61	21		18	
	Om uw telefoonnummer (...)	57	29		14		47	11	11	32		52	18	6	24	
	Als u oproepen niet (...)	64	14	7	14		63	11		26		64	12	3	21	
	Als u oproepen automatisch (...)	64	29		7		58	11	11	21		61	18	6	15	
	Als u zich zorgen maakt (...)	93	7				89	11				91	9			
Purpose	Indien er andere audiotypes (...)	7	71	21			5	58	32	5		6	64	27	3	
	U kunt klokken toevoegen (...)	50	21	7	21		21	16	26	37		33	18	18	30	
	Aangepaste velden voor (...)	21	43	14	21		32	37	5	26		27	39	9	24	
	Gebruik een pauze of een (...)	79	7	14			47	16	26	11		61	12	21	6	
	Gebruik de widget Friend (...)	79	14		7		26	47	5	21		48	33	3	15	
	Met telefonische vergaderingen (...)	29	36	14	14	7	26	53	11		11	27	45	12	6	9
Internal Working	De tv kan het video en (...)	21		64	14		16	5	58	11	11	18	3	61	12	6
	Het toestel maakt verbinding (...)	14	7	79			5		68	21	5	9	3	73	12	3
	Antwoorden van de ontvangers (...)	21		57	21		11	5	63	21		15	3	61	21	
	Als u een e-mailaccount hebt (...)	14	14	57	14		68		26		5	45	6	39	6	3
	U kunt vanaf uw telefoon (...)	71		14	14		16	16	47	21		39	9	33	18	
	Zonder geheugenkaart kunt u (...)	36		64			11	16	53	21		21	9	58	12	
Topology	Uw tv is aan de onderkant (...)		7	21	71				16	68	16		3	18	70	9
	Als de wijzerplaat van de klok (...)		7	21	71			21	11	63	5		15	15	67	3
	Als u in het programma de (...)	7	7	36	50		11	11	26	53		9	9	30	52	
	Het toestel geeft de 50 meest (...)	43	7	14	36		16	5	26	53		27	6	21	45	
	Niet met elk toestel kan (...)	14		64	21		11		53	32	5	12		58	27	3
	De muziekstartpagina bestaat (...)				100			11	16	74			6	9	85	
Terminology	Automatisch: automatische (...)	21		21	7	50	5	11	16	5	63	12	6	18	6	58
	Met VPN (Virtual Private (...)	14	50	7	7	21		26	5		68	6	36	6	3	48
	Een eenvoudige code bestaat (...)	57	14	7	21		47	5	11	26	11	52	9	9	24	6
	PAL en NTSC zijn (...)			36	14	50			16		84			24	6	70
	v: De certificaatketen is (...)	7		29		64		5	11	11	74	3	3	18	6	70
	Bellen: U kunt gespreksservices (...)	21	29	7	21	21	37	26	5	21	11	30	27	6	21	15
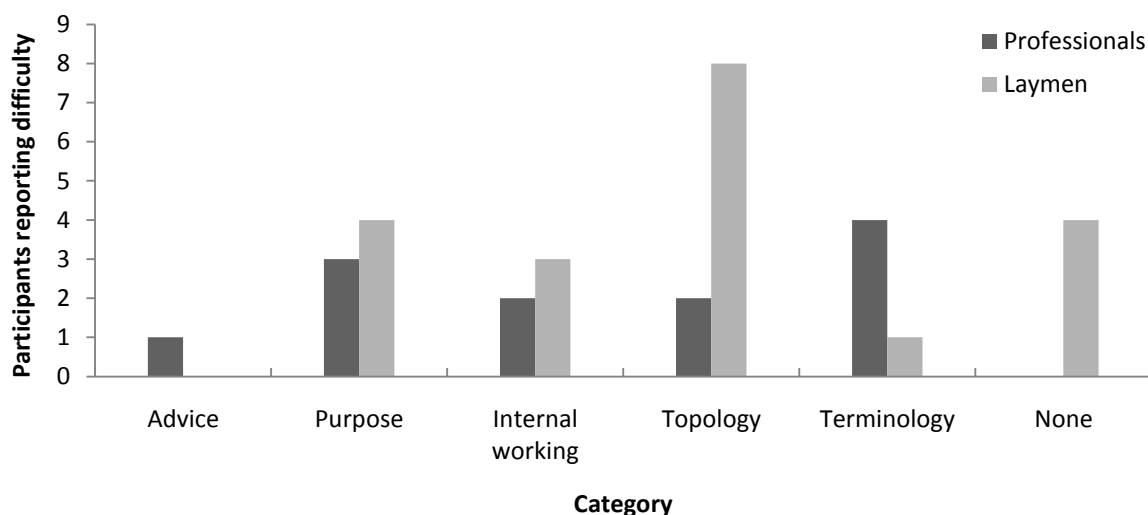
Figure 4. Reported difficult categories per participant group

5.4. Conclusion

The open sort yielded no general categorization. The open sort resulted in a few alternative categories. These categories could be researched to determine whether these categorizations have a higher usability then the proposed universal categorization.

From the closed sort it can be concluded that the categorization is a step in the right direction, though there are unfortunately still a number of items that do not fit exactly in one of the categories. This could be due to the chosen blocks; when these contain multiple types of information, they are difficult to categorize. This is especially apparent in blocks designated as terminology, which were spread out over the different categories by professional participants. This is probably due to the text blocks chosen for the terminology category. Some of these contained traces of different information types which made categorizing these blocks difficult. Another problem with the proposed universal categorization is that, although the laymen are inconsistent in their placement of items designated as purpose, the professionals placed half of these items in the advice category. Due to this apparent overlap between the purpose and advice categories, the proposed evolution of the universal categorization is: use (a combination of advice and purpose), internal working, topology and terminology. For definitions see table 7 below.

Table 7

The modified categorization incorporating the results of the closed sort

Name	Definition
Use	Information about when or why the procedure could be used
Terminology	Information that defines the terms used in the manual
Internal working	Information about the internal working of the product
Topology	Information about the parts of the subject, where they are located and how they are connected
Comparison	Information in which a part of the subject is compared to another system

6. Conclusion

Previous research in the field of declarative information used no single definition or implementation. This makes previous research difficult to compare. To make future research easier to compare, this research aimed to create a universal categorization of declarative information. This chapter summarizes the most important results of this research. The sub-questions are first discussed and these answers lead to an answer of the research question.

Research question:

- What is the most usable categorization of declarative information for research?

Sub-questions:

- What categorization can be derived from previous research on declarative information?
- What additional categories can be derived from current manuals to complete this categorization?
- How do professionals and laymen categorize declarative information?
- Are professionals and laymen able to use the categorization derived from literature and practice?

6.1. What categorization can be derived from previous research?

The answer for the first sub-question is straightforward. In previous research various definitions and implementations of parts of declarative information were used. The categorization derived from literature is the result of the combination of all found definitions of declarative information. Through grouping similar implementations of declarative information one categorization was created. The categorization derived from literature consists of six categories of declarative information: terminology, internal working, topology, comparison, purpose, and advice.

6.2. What additions can be derived from practice?

The categorization from literature was used as a basis for content analysis. A sample of information from current manuals was annotated and placed into the categories of the categorization from literature. Although almost one fifth of the information pieces was placed in the terminology category, this type of information has not received much attention in research. Research and practice appear to be not in tune with each other. All types of declarative information were encountered infrequently compared to the procedural pieces of information, which accounted for almost fifty percent of the blocks. However, the comparison with practice did not lead to the creation of additional categories; no new types of declarative information were found. So the category from literature did not receive any additions from practice.

6.3. How do the participants categorize declarative information?

The participants were asked to perform an open card sort. In this card sort they were asked to categorize blocks of information from the real-life manuals used in the content analysis. The blocks selected were from five of the six categories; the comparison category was not used because there only one block of this specific category was found in the content analysis. The participants were instructed to create any categorization for the blocks of information based on text type. No participant created the exact categorization derived from literature. Not all participants created a categorization based on text types; some, for example, created categorizations based on the subject

or tone of the text. When the participants did use text types to create a categorization, various alternative categorizations could be discerned. These categorizations need to be studied further to determine whether they are viable alternatives to the proposed universal categorization.

6.4.   Can the participants use the new categorization?

The categorization can partially be used by participants. The participants were asked to complete a closed card sort with the categories derived from literature. The blocks of information were the same blocks as used in the open card sort. As expected, because internal working is the most intuitive type of information, participants usually placed the items designated as internal working in the internal working category. However, the participants did have difficulty distinguishing the items designated as purpose and advice. The professionals combined the items designated as purpose and advice in the advice category. The categorization was not clear enough for the laymen to place the purpose items. These items were spread out among the choices except the terminology category. The purpose category appears therefore to be unclear. Since the professionals place these items in the advice category a combined advice and purpose category named 'use' was created. This is in line with the utilization information as used in the research by Karreman (2004) and the pointers category of one of the categorizations of the open sort. The items designated as terminology were hard to place; the professionals placed these items in various categories. This could be due to the chosen blocks of information. Because these blocks came from real-life manuals, these blocks contained traces of other information types. When these blocks are chosen smaller or especially created for research this problem might disappear. The closed card sort study led to the following categorization: terminology, internal working, comparison, topology and use.

6.5.   What is the most usable categorization of declarative information?

In instructional text research (Mirel, 1991) and in particular in declarative information research (Karreman, Ummelen, & Steehouder, 2005), many different definitions and implementations of information types were used. To improve comparability, a categorization of declarative information was needed (Karreman, Ummelen, & Steehouder, 2005). This research has yielded a proposed categorization of declarative information. To ensure each angle was covered in the categorization, it was based on four sources: literature, practice, professionals and laymen. The final proposed universal categorization is: use, terminology, internal working, topology and comparison (In table 8 the definitions for these categories are provided).

Table 8

Proposed Categories of declarative information

Name	Definition
Use	Information about when or why the procedure could be used
Terminology	Information that defines the terms used in the manual
Internal working	Information about the internal working of the product
Topology	Information about the parts of the subject, where they are located and how they are connected
Comparison	Information in which a part of the subject is compared to another system

7. Discussion

In the literature research a categorization was created based on the definitions and implementations available from literature. From these definitions there probably are possibilities to create other categorizations. Since the current modified universal categorization appears to be a good categorization, it is not deemed necessary to explore this option for declarative information research.

The information block size might not have been optimal. To ensure that all raters used the same blocks of information, the blocks were defined by layout; this should help the raters to consistently categorize information in a real-life manual. The catch is that when manuals are written, authors do not have to think about the categories of information that should be used. So a small piece of text could contain a mixture of various types of information. When a manual is constructed for research however, it is possible to create text blocks that fit the different information categories. It can therefore be assumed that the categorization can be more easily used to create a manual than to annotate a real-life manual. The proposed universal categorization should be very useful to create manuals for research.

During the sort studies the chosen blocks of information were a source of problems; from the closed sort it appeared that some blocks contained a mix of information types. This problem did not surface in the pretest, but manifested itself clearly after analysis of the complete results. To prevent this problem in future research, it is advisable to create blocks as small as possible, under the condition that they remain interpretable without context. This should help to properly categorize all blocks of information. Another solution to this problem is to allow the participants to add single items to multiple categories to improve the consistency when categorizing existing items. However when manuals are created for research it is important to create information pieces per category to be able to accurately determine the effects of each type.

8. Recommendations

The issues raised lead to a number of recommendations for future research. It is recommended to confirm the findings of previous research by replacing their categorizations with the universal categorization proposed here, that is to confirm whether their results can be reproduced when the research is conducted using the equivalent category from this categorization. The proposed universal categorization should be used to create more comparable results when researching the effects of different types of information in manuals.

During the study the information block size was a source of problems. To prevent negative effects of the information block size in future research, the blocks should be kept as small as possible, under the condition that they remain interpretable without context. This should prevent the blocks from containing more than one type of information.

The final universal categorization differs from the categorization derived from literature in the aspect that it groups the purpose and advice categories together. To confirm that this modification does indeed yield a more usable categorization, it has to be tested. For now the results of this study point to the modified universal categorization as the better option.

To confirm that this categorization is usable by technical writers the usability of the proposed universal categorization has to be tested.

Some interesting alternative categories were created by participants of the open card sort study. To determine whether these categorizations would be a viable alternative to the created universal categorization, they would have to be considered in a follow-up study. Among the categorizations suggested, there might be categorizations that are better suited for specific purposes. For example when creating a new manual for a product, it might be useful to take into account the different views of information that readers have instead of using text types to guide the choice of information. For research on the topic of declarative information it is however advised to use the proposed universal categorization. This should improve the comparability of this research field.

There are also some recommendations to be made for the field of technical writing. For the creation of new manuals, the proposed categorization provides authors with the opportunity to evaluate whether the chosen types of information for the manuals can be improved. Technical writers could decide to add extra declarative information based on the definitions from the universal categorization or add extra declarative information to accomplish the associated effects as indicated in previous research. When the well defined text types are used in future research, technical writers will be able to make a more informed choice on which text types to use in their work.

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Appendices

Table of contents

Appendix 1: Manuals of the corpus

	Manufacturer	Total pages	Usable pages	Product name
Audio	Harman Kardon	69	67	AVR 7550HD
	Onkyo	76	74	TX-SR608
	Philips	20	20	MC235B
	Rotel	54	50	RSX1560
	Sony	136	127	STR-DN1010
Set-top box	Humax	92	90	HD-FOX T2
	Sagem	40	35	DSI86 HD Freesat
	SKY Box	80	71	Sky+ Box
	TechniSat	112	104	Technisat HDFS
	TVonics	32	27	MFR-300
	Virgin	24	22	V+ HD box
Telephone	Apple	244	225	iPhone iOS4
	RIM	277	265	Blackberry Torch 9800
	HTC	188	177	Wildfire
	LG	182	176	GD570
	Motorola	70	63	Droid2
	Sony-Ericsson	100	86	X10
Television	LG	210	191	47LX9500 INFINIA
	Loewe	118	107	Individual 46 Selection LED 200
	Panasonic	76	68	TC-P65VT25
	Philips	64	56	42PFL7695H/12
	Samsung	72	69	LE46A959D1M
	Sony	135	117	KDE55XBR950
	Mean	107,43	99,43	

Appendix 2: Annotator instruction

This document is written to provide the annotators with a guide to categorize the declarative information. This document provides the procedure to annotate the information in the manuals and detailed descriptions of each category to aid a consistent annotation process.

Procedure

The pages of the manuals that have to be analyzed are selected in the following way. The most recent manuals of the biggest manufacturers in the different fields with manuals which are available online are selected. From each of those manuals ten pages are randomly chosen. To maximize the amount of usable information on the ten pages some of the pages will be omitted from the random sample. The title pages, table of contents, and index will not be used in the analysis and will be omitted from the ten randomly chosen pages. The pages will be selected with a random sequential drawing from random.org. In the random sequence generator there will be no duplicate numbers and a range can be set from which the numbers are selected. The text will be analyzed per block of information. The blocks of information are defined by the layout of the manual, in the form of bullet points, blank lines and returns, unless there are more types of information available in the block; then each of those types of information is annotated.

Available categories

The information found in the manuals has to be placed in one of the defined categories, since new categories can arise from the manuals; each found block of information should be classified.

Table 1: Categories used to classify information in manuals

Category	Name	Definition
Procedural	Procedural	Information about actions, conditions and results of the actions
Motivational	Motivational	Information to comfort the user
Declarative	Terminology	Information about names of parts and functions of the product
Declarative	Internal working	Information about the internal working of the product
Declarative	Topology	Information about the parts of the subject, where they are located and how they are connected
Declarative	Comparison	Information in which a part of the subject is compared to another system
Declarative	Purpose	Information about the purpose and goal of the current procedure
Declarative	Advice	Information about when it is a good idea to use the procedure
Unidentified	Uncategorizable	Information that does not fit in another category

Procedural information

This category is formed to filter out all procedural information.

Procedural information is the information that consists of actions, reactions from the system or device, and the conditions for the actions.

Motivational information

This category is created to filter out all motivational information.

The motivational information is the information designed to encourage the user to follow the procedure, to remove any fear that the user might experience, and to assure the user that they have made the right decision.

Terminology

This is the first category of declarative information. This is also the first piece of declarative information about the product. This is the category that contains the information that defines the terms used in the manual. This type of information provides the user with information about **what** the product is.

Internal working

This is the second category of declarative information. This is also the second type of declarative information about the product. This is the category that contains the information about the internal working of the product. This type of information provides the user with information about **how** the product works.

Topology

This is the third category of declarative information. This is the third and final type of declarative information about the product. This is the category that contains the information about the parts of the product, where they are located and how they are connected.

Comparison

This is the fourth category of declarative information. This is the category that contains the information in which a part of the subject of the manual is compared to another known situation. This type of information contains information on both the product and surroundings or external entities.

Purpose

This is the fifth category of declarative information. This is the category that contains the information about the purpose and goal of the current procedure. This type of information answers the question of the user about the reason **why** the product or function or procedure should be used. This type of information contains information on both the product and surroundings or external entities.

Advice

This is the sixth category of declarative information. This is the category that contains the information about when it is a good idea to use the procedure. The text must show the part is optional; this can or cannot be used by the user. This type of information answers the question of the user about **when** the product or function can be used. This type of information contains information on both the product and surroundings or external entities.

Uncategorizable information

This category exists to filter out every piece of information that cannot be classified with the model derived from literature. The pieces of information that are placed in this category have to be analyzed separately to define extra categories or to alter the current categories, to establish a watertight model.

Pictures

Most of the pictures are topology; they are used to illustrate the topology. Just a few of the pictures with visible steps are procedural.

Appendix 3: Number of blocks per type of information per manual

Name	Audio					Set-top box						Telephone						Television						Total	Mean	Ratio
	Harman Kardon	Onkyo	Philips	Rotel	Sony	Humax	Sagem	SKY Box	TechniSat	TVonics	Virgin	Apple	RIM	HTC	LG	Motorola	Sony-Ericsson	LG	Loewe	Panasonic	Philips	Samsung	Sony			
Procedural	109	75	51	41	93	29	32	55	40	46	69	58	130	57	41	87	123	65	56	84	88	61	51	1541	67	49,7%
Motivational			7	1						1	4				1	1								15	0,65	0,5%
Terminology	14	17	7	33	6	60	9		4	7	7	16	5	25	23	23	21	26	56	39	44	93	22	557	24,2	18,0%
Internal working	17	22	7	61	17	2	8	18	2	3	15	24	11	5	5	10	10	13	11	4	4	25	10	304	13,2	9,8%
Topology	16	43	21	36	12	7	3	10	25	11	4	14	1	6	1	17	13	19	19	11	18	12	6	325	14,1	10,5%
Comparison								1																1	0,04	0,0%
Purpose	10	9	4	1	6	4	4	7	7	9	12	10	12	11	6	7	5	4	1	4	7	18	14	172	7,48	5,6%
Advice							1	2			2		12	5		2								24	1,04	0,8%
Uncategorizable	2	21	1	7		5	14	2	11	1	5	17	2	9	2	1	3	2	13	26	1	2	12	159	6,91	5,1%
Total blocks	168	187	98	180	134	107	71	95	89	78	118	139	173	118	79	148	175	129	156	168	162	211	115	3098	135	

Appendix 4: Analysis of the uncategorizable information

Name	Audio					Set-top box						Telephone						Television						Total	Mean	Ratio
	Harman Kardon	Onkyo	Philips	Rotel	Sony	Humax	Sagem	SKY Box	TechniSat	TVonics	Virgin	Apple	RIM	HTC	LG	Motorola	Sony-Ericsson	LG	Loewe	Panasonic	Philips	Samsung	Sony			
Internal reference		21					1	2	12	1	5	16	2	9		1	2	2	13	26	1	2	11	127	5,52	79,4%
External reference						2						1												3	0,13	1,9%
Warranty information							13									2								15	0,65	9,4%
Legislation	2																							2	0,09	1,3%
Disclaimer			1			1											1							3	0,13	1,9%
Trademark info																							1	1	0,04	0,6%
Company history				7																				7	0,3	4,4%
RC codepages						2																		2	0,09	1,3%
Total nr of blocks	2	21	1	7	0	5	14	2	12	1	5	17	2	9	2	1	3	2	13	26	1	2	12	160		

Appendix 5: Information blocks used in the sort research

The used Dutch information blocks with their equivalent English information blocks in parenthesis both extracted from real-life manuals.

Terminology	Internal working	Topology	Purpose	Advice
Automatisch: automatische uitvoer in de volgorde HE-AAC > Dolby Digital+ > Dolby Digital > MPEG. (Auto: Automatically outputs in the order HE-AAC > Dolby Digital+ > Dolby Digital > MPEG.)	De tv kan het video en audiosignaal gelijktijdig ontvangen als u een HDMI-kabel gebruikt. (The TV can receive video and audio signals simultaneously when using an HDMI cable.)	Uw tv is aan de onderkant voorzien van een opening voor een Kensington-beveiligingsslot. (Your TV is equipped with a Kensington security slot on the bottom of the TV.)	Indien er andere audiotypes bestaan in een invoersignaal, staat deze functie u toe om het gewenste audiotype te selecteren. (When different audio types exist in an input signal, this function allows you to select the audio type you want.)	Als u telefoonnummers en contactpersonen op gebruiksfrequentie wilt sorteren, wijzigt u het veld Telefoonlijstweergave in Meest gebruikt. (To sort phone numbers or contacts by frequency of use, change the Phone List View field to Most Used.)
Met VPN (Virtual Private Network) kunt u via het internet beveiligde toegang tot privénetwerken krijgen, zoals het netwerk van uw bedrijf of school. (VPN (virtual private network) provides secure access over the Internet to private networks, such as the network at your company or school.)	Het toestel maakt verbinding met het internet zodra u Mail, Safari, YouTube, Aandelen, Kaarten, Weer, de App Store of de Muziek Store opent. (iPhone connects to the Internet whenever you use Mail, Safari, YouTube, Stocks, Maps, Weather, the App Store, or the iTunes Store.)	Als de wijzerplaat van de klok wit is, is het dag in de desbetreffende stad. Als de wijzerplaat van de klok zwart is, is het nacht in de desbetreffende stad. (If the clock face is white, it's daytime in that city. If the clock face is black, it's nighttime.)	U kunt klokken toevoegen die de tijd in andere grote steden over de hele wereld weergeven. (You can add clocks to show the time in other major cities and time zones around the world.)	Als u wilt dat uw telefoonnummer afhankelijk van het netwerk wordt verborgen of weergegeven, wijzigt u het veld Mijn identiteit beperken in Netwerkafhankelijk. (To allow your wireless network to decide whether to hide or display your phone number, change the Restrict My Identity field to Network Determined.)
Een eenvoudige code bestaat uit vier cijfers. U kunt de beveiliging verhogen door 'Eenvoudige code' uit te schakelen en een langere code te gebruiken die bestaat uit een combinatie van cijfers, letters, interpunctietekens en speciale tekens. (A simple passcode is a four-digit number. To increase security, turn off Simple Passcode and use a longer passcode with a combination of numbers, letters, punctuation, and special characters.)	Antwoorden van de ontvangers worden alleen naar u gestuurd, niet naar de andere personen aan wie u het bericht hebt gestuurd. (Replies from any of the recipients are sent only to you, not to the other people you texted.)	Als u in het programma de songtekst aan een nummer hebt toegevoegd, wordt deze ook weergegeven. (The song's lyrics also appear, if you've added them to the song in iTunes.)	Aangepaste velden voor contactpersonen kunnen gegevens bevatten die u wilt onthouden. U kunt bijvoorbeeld een aangepast veld met de naam Sportteam of Lievelingskleur maken. (Custom contact fields can store information that you want to remember about a contact, for example, you might want to add a custom contact field named Sports team or Favorite color.)	Om uw telefoonnummer weer te geven wanneer u belt, wijzigt u het veld Mijn identiteit beperken in Nooit. (To display your phone number when you make calls, change the Restrict My Identity field to Never.)

48

Terminology	Internal working	Topology	Purpose	Advice
PAL en NTSC zijn uitzendstandaarden voor televisies. De iPhone geeft NTSC 480p/PAL 576p weer wanneer deze via een componentkabel op de tv is aangesloten en NTSC 480i/PAL 576i wanneer een composietkabel wordt gebruikt. (NTSC and PAL are TV broadcast standards. iPhone displays NTSC 480p/PAL 576p when attached to a TV using a component cable, or NTSC 480i/PAL 576i using a composite cable.)	Als u een e-mailaccount hebt die gebruikmaakt van een Enterprise Server, kan uw beheerder mogelijk de locatie van uw toestel volgen. Neem voor meer informatie contact op met uw beheerder. (If your email account uses a BlackBerry® Enterprise Server, your administrator might be able to track the location of your BlackBerry device. For more information, contact your administrator.)	Het toestel geeft de 50 meest recente berichten in het gesprek weer. Als u oudere berichten wilt zien, scrolt u naar boven en tikt u op 'Laad eerdere berichten'. (iPhone displays the 50 most recent messages in the conversation. To see earlier messages, scroll to the top and tap Load Earlier Messages.)	Gebruik een pauze of een wachttijd om extra cijfers, bijvoorbeeld een wachtwoord of een toestelnummer, te scheiden van het telefoonnummer. Nadat het telefoonnummer is gekozen, zal uw toestel even pauzeren voordat de overige cijfers worden gekozen. (Use a pause or a wait to separate additional numbers, for example a password or extension, from a main phone number. After dialing the main phone number, your BlackBerry® device either pauses before dialing the additional numbers.)	Als u oproepen niet automatisch wilt beantwoorden wanneer u het toestel uit de houder haalt of wanneer u het toestel openschuift, wijzigt u het veld Oproepen automatisch beantwoorden in Nooit. (To stop answering calls automatically when you remove your device from the holster or when you open the slider, change the Auto Answer Calls field to Never.)
v: De certificaatketen is vertrouwd en geldig, en de intrekkingsstatus van de certificaatketen is goed. (v: The certificate chain is trusted and valid, and the revocation status of the certificate chain is good.)	U kunt vanaf uw telefoon noodoproepen plaatsen ook als u geen SIM-kaart hebt geplaatst of als deze is geblokkeerd. (You can make emergency calls from your phone even if you don't have a SIM card installed or your SIM card has been blocked.)	Niet met elk toestel kan worden gefotografeerd of gefilmd. Niet alle camera- en videofuncties zijn op elk model beschikbaar. (Depending on your BlackBerry® device model, the camera or video camera might not be supported or some camera or video camera features might not be available.)	Gebruik de widget Friend Stream zodat u uw status gemakkelijk kunt updaten en die van anderen direct in het beginscherm kunt bekijken. (Use the Friend Stream widget so you can easily update your status and view other people's status updates right on the Home screen.)	Als u oproepen automatisch wilt beëindigen wanneer u het toestel in de houder plaatst of wanneer u de dichtschuift, wijzigt u het veld Oproepen automatisch beëindigen in In houder, Dichtgeschoven of Beide. (To end calls automatically when you insert your device in the holster or when you close the slider, change the Auto End Calls field to Into Holster, Slide Close, or Both.)
Bellen: U kunt gespreksservices instellen, zoals voicemail, het doorschakelen van oproepen, gesprek in wachtstand en nummerweergave. (Call: Set up call services such as voicemail, call forwarding, call waiting, and caller ID.)	Zonder geheugenkaart kunt u de camera niet gebruiken en kunt u geen muziekbestanden of videoclips afspelen of downloaden. (Without a memory card you can't use the camera, nor can you play or download music files and video clips.)	De muziekstartpagina bestaat uit twee delen: het bovenste gedeelte bevat lokaal opgeslagen audio-inhoud en het onderste gedeelte bevat online audio-inhoud. Wanneer er geen online-inhoud beschikbaar is, wordt in het onderste deel lokale inhoud weergegeven. (The music home screen has two parts, the upper part contains locally stored audio content, and the lower part shows online audio content. When online content is not available, the lower part shows local content.)	Met telefonische vergaderingen of oproepen met meerdere partijen kunt u gelijktijdig spreken met twee of meer personen. (With a conference or multiparty call, you can have a joint conversation with two or more persons.)	Als u zich zorgen maakt over de grootte van de gegevensdownloads, controleert u de grootte van een MMS-bericht voordat u het downloadt. (If you are concerned about the size of your data downloads, check the multimedia message size first before you download it.)

Appendix 6: Instructions for the card sort participants

The participants received the instructions in Dutch. These instructions are provided below with the English translations in parenthesis.

The first part of the instructions

Bedankt voor uw interesse in dit onderzoek!
(Thank you for your interest in this research)

Instructies voor de deelnemers:
(Instructions for the participants:)

Het onderzoek duurt ongeveer een half uur. Het bestaat uit drie delen: twee sorteertaken en een paar korte vragen achteraf. Bij de sorteertaken wordt u gevraagd om korte stukjes tekst in categorieën in te delen.
(This research will take approximately on half an hour. It consists of three parts: Two sort tasks and a few short questions afterwards. At the sort tasks you will be asked to put short pieces of text in categories.)

Vanzelfsprekend zullen de resultaten anoniem verwerkt worden. Als u vragen heeft over dit onderzoek of als u meer informatie wilt, dan kunt u mij mailen op dit adres:
p.s.karsten@student.utwente.nl
(Naturally the results will be used anonymously. If you have any questions about this research or when you want to receive more information, you can send me an email at this address:
p.s.karsten@student.utwente.nl)

Als u andere mensen kent die tot de doelgroep van dit onderzoek behoren, dan zou ik het op prijs stellen als u deze pagina naar deze mensen doorstuurt.
(If you know any other persons who are part of the target group of this research, I would appreciate it when you forward this page to these people.)

Op basis van uw relatie met het vakgebied van instructieve teksten zou ik u willen vragen een van de volgende links te kiezen:
(On the basis of your relationship with the field of instructive texts I would like to ask you to select one of the links below:)

Bij voorbaat dank!
(Thanks in advance!)

Als u onderzoek naar teksten doet: <u>Kunt u hier klikken om naar het onderzoek te gaan.</u>
(If you conduct research in the field of texts: You can click here to go to the research.)

Als u technische communicatie schrijft: <u>Kunt u hier klikken om naar het onderzoek te gaan.</u>
(If you are a writer of technical communication: You can click here to go to the research.)

En als u andere werkzaamheden heeft dan bovenstaande, maar wel op het gebied van technische communicatie: <u>Kunt u hier klikken om naar het onderzoek te gaan.</u>

(And if you have another connection to the technical communication field: You can click here to go to the research.)

The instructions before the first sort task

Hiernaast staan dertig korte stukjes informatie uit verschillende handleidingen. Ik wil u vragen deze stukjes te sorteren en te categoriseren. Het is de bedoeling dat u de stukjes informatie die volgens u tot dezelfde informatiesoort behoren, bij elkaar groepeert.

(On the left side there are thirty small pieces of information from different manuals. I would like to ask you to sort and categorize these pieces of information. The purpose is for you to put the pieces of information that belong to the same information type in the same group.)

Klik op een tekstdeel en sleep deze naar het midden van het scherm. Doe dit voor ieder deel en groepeer op deze manier de delen die bij elkaar passen.

(Click on a text piece and drag it to the middle of the screen. Do this for every piece and group in this manner the pieces that fit together.)

Hierbij mag u zelf kiezen hoeveel van deze categorieën u maakt. U mag de indeling net zo lang veranderen totdat u vindt dat de indeling helemaal goed is. Hierbij is het de bedoeling dat u alle zinnen in een categorie plaatst.

(It is up to you to determine the number of categories. You can change the categorization until you are completely satisfied. You will have to place each sentence in a category.)

Kijk voor het indelen in categorieën naar het soort tekst van de tekstdelen en probeer op basis daarvan de indeling te maken. Geef de categorieën de naam van het teksttype wat er in de categorie ingedeeld is.

(When you categorize the text blocks, look at the type of text and try to use that as basis for the categorization. Give the categories the name of the text type that has been placed in the category.)

Plaats bij de opmerkingen een omschrijving van elke categorie en probeer ook bij elke categorie aan te geven wat het meest kenmerkende tekstdeel is. Tijdens het indelen kunt u eventuele opmerkingen over de indeling toevoegen door op "Opmerking toevoegen" te klikken. Deze opmerkingen zullen gebruikt worden bij de analyse.

(Add a description of each category in the remarks section and try to mark the most typical text block of each category. During the categorizing you can add remarks about the categorization by clicking "Opmerking toevoegen". These remarks will be used in the analysis.)

Alvast bedankt!
(Thanks in advance!)

The instructions before the second sort task

Nadat u zelf een indeling gecreëerd heeft, is het nu de bedoeling dat u de informatiedelen in de onderstaande indeling plaatst.

(After creating your own categorization, now you will have to put the information blocks in the categorization below.)

Hiernaast staan dezelfde dertig korte stukjes informatie van de vorige sorteertaak.
(The left side of the screen shows the same thirty pieces of information from the previous sort task.)

Klik op een tekstdeel en sleep deze naar een categorie. Doe dit voor ieder deel en groepeer op deze manier de delen die in de vijf categorieën passen.
(Click on a text block and drag it to a category. Do this for every block and group every piece in one of the five categories.)

Bij deze sorteertaak hoeft u geen opmerkingen te plaatsen.
(You do not have to place remarks with this sort task.)

Alvast bedankt!
(Thanks in advance!)

Appendix 7: Open sort categories of the professionals

These are the groups which were combined from the dendrogram, only groups which were created by more than 50% of the professionals are described below.

The first group contains the following blocks:

- iPhone displays the 50 most recent messages in the conversation. To see earlier messages, scroll to the top and tap Load Earlier Messages.
- To display your phone number when you make calls, change the Restrict My Identity field to Never.
- To sort phone numbers or contacts by frequency of use, change the Phone List View field to Most Used.
- To allow your wireless network to decide whether to hide or display your phone number, change the Restrict My Identity field to Network Determined.
- To stop answering calls automatically when you remove your device from the holster or when you open the slider, change the Auto Answer Calls field to Never.
- To end calls automatically when you insert your device in the holster or when you close the slider, change the Auto End Calls field to Into Holster, Slide Close, or Both.

The second group contains the following blocks:

- Without a memory card you can't use the camera, nor can you play or download music files and video clips.
- Depending on your BlackBerry® device model, the camera or video camera might not be supported or some camera or video camera features might not be available.

The third group contains the following blocks:

- Replies from any of the recipients are sent only to you, not to the other people you texted.
- You can make emergency calls from your phone even if you don't have a SIM card installed or your SIM card has been blocked.

The fourth group contains the following blocks:

- VPN (virtual private network) provides secure access over the Internet to private networks, such as the network at your company or school.
- With a conference or multiparty call, you can have a joint conversation with two or more persons.
- You can add clocks to show the time in other major cities and time zones around the world.
- Custom contact fields can store information that you want to remember about a contact, for example, you might want to add a custom contact field named Sports team or Favorite color.

Appendix 8: Open sort categories of the laymen

These are the groups which were combined from the dendrogram, only groups which were created by more than 50% of the laymen are described below.

The first group contains the following blocks:

- Use a pause or a wait to separate additional numbers, for example a password or extension, from a main phone number. After dialing the main phone number, your BlackBerry® device either pauses before dialing the additional numbers.
- iPhone displays the 50 most recent messages in the conversation. To see earlier messages, scroll to the top and tap Load Earlier Messages.
- To sort phone numbers or contacts by frequency of use, change the Phone List View field to Most Used.
- To allow your wireless network to decide whether to hide or display your phone number, change the Restrict My Identity field to Network Determined.
- To display your phone number when you make calls, change the Restrict My Identity field to Never.
- To stop answering calls automatically when you remove your device from the holster or when you open the slider, change the Auto Answer Calls field to Never.
- To end calls automatically when you insert your device in the holster or when you close the slider, change the Auto End Calls field to Into Holster, Slide Close, or Both.

The second group contains the following blocks:

- VPN (virtual private network) provides secure access over the Internet to private networks, such as the network at your company or school.
- With a conference or multiparty call, you can have a joint conversation with two or more persons.

The third group contains the following blocks:

- Call: Set up call services such as voicemail, call forwarding, call waiting, and caller ID.
- You can make emergency calls from your phone even if you don't have a SIM card installed or your SIM card has been blocked.
- Custom contact fields can store information that you want to remember about a contact, for example, you might want to add a custom contact field named Sports team or Favorite color.
- You can add clocks to show the time in other major cities and time zones around the world.

The fourth group contains the following blocks:

- Without a memory card you can't use the camera, nor can you play or download music files and video clips.
- Depending on your BlackBerry® device model, the camera or video camera might not be supported or some camera or video camera features might not be available.

The fifth group contains the following blocks:

- Auto: Automatically outputs in the order HE-AAC > Dolby Digital+ > Dolby Digital > MPEG.

- v: The certificate chain is trusted and valid, and the revocation status of the certificate chain is good.

The sixth group contains the following blocks:

- NTSC and PAL are TV broadcast standards. iPhone displays NTSC 480p/PAL 576p when attached to a TV using a component cable, or NTSC 480i/PAL 576i using a composite cable.
- Your TV is equipped with a Kensington security slot on the bottom of the TV.

The seventh group contains the following blocks:

- If the clock face is white, it's daytime in that city. If the clock face is black, it's nighttime.
- Replies from any of the recipients are sent only to you, not to the other people you texted.
- The music home screen has two parts, the upper part contains locally stored audio content, and the lower part shows online audio content. When online content is not available, the lower part shows local content.