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Card sorting for remote research: identifying useful data and new learnings

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Abstract: This paper presents proceedings and structure to conduct card sorting as part of research strategies, based on studies from Padovani, Tullis & Wood, Maurer & Warfel and Preece. The research proposes how to adapt card sorting appropriately to remote research working scenarios of the post-pandemic new century. This analytical study is based on two different information architecture structure research projects – an online learning search engine to help people find courses within enormous possibilities of learning subjects, and a co-living system, where people with similar interests gather and share living for communal learning experiences. Although the analysis is based on 2 real projects, this paper focuses mainly on card sorting procedures itself, without sharing too much information about the projects. The 2 projects helped to compare processes and results of representative user profiles and non-representative profiles to better understand the pain points, the advantages and disadvantages and the triggers to identify misleading information when conducting card sorting.
Keywords: UX, card sorting, usability, information architecture.

Card Sorting para pesquisa remota: identificando dados úteis e novos aprendizados

Resumo: *Este artigo apresenta procedimentos de como conduzir e estruturar um card sorting, como parte estratégica de pesquisas, com base em estudos de Padovani, Tullis & Wood, Maurer & Warfel e Preece. Essa pesquisa propõe como adaptar apropriadamente o Card Sorting para pesquisa remota no novo cenário pós-pandêmico de trabalho remoto. A análise apresentada é baseada em 2 projetos de pesquisa com estruturação de arquitetura de informação – um sistema de buscas online educacional para ajudar pessoas a encontrar cursos dentro da enorme possibilidade de áreas do conhecimento, e um sistema de habitação comunitária, onde pessoas de interesses similares se encontram e coabitam para compartilhar experiências. Apesar da análise ter base nesses 2 projetos reais, esse artigo foca principalmente no processo de Card Sorting em si, sem compartilhar muitos detalhes sobre os projetos citados. Os 2 projetos ajudaram a comparar processos e resultados de usuários representativos e não-representativos para melhor compreender dores, vantagens e desvantagens e gatilhos que identifiquem informação distorcida durante a execução do Card sorting.*

Palavras-chaves: *ux, card sorting, usabilidade, arquitetura de informação.*

1. Lockdown and a new century

As much as the 1st world War was the global event that marks the turning of the XIX century to the XX century – the century of technology, with fast growing technology development – the Covid-19 pandemic has been considered the new global event to mark the new turning to the XXI century, taking everyone to watch technology's limitation (Schwarcz 2020 and 2020).

The pandemic has been a disruption of structures world wide: political, commercial, mobility, fuel, real estate, financial and social. Nevertheless, our everyday cross-channel technology helped people maintain social connections and elevate the sense of telepresence (Renzi et al. 2020). The new worldwide scenario has opened new possibilities of businesses and services, and some companies took the opportunity to bet on new entrepreneurship and also upgrade things that already existed – such as conference call services, social media and online collaborative tools.

The lockdown around the globe evinced how integrated devices are into our daily routine. Multi-channel interactions, more common to generations Y and Z, crossed over to older generations through the lockdowns of 2020, as the connection to the outer world has been possible only by digital technology, in isolation times (Renzi et al. 2020). Devices became windows to reach out experiences outside homes, through video calls, static images, sounds of human voice (and nature) and environments with a sense of getting closer to the other side. The digital portable devices around us all took our perception to a new sense of things (Sande et al. 2017). Many birthdays were celebrated through Zoom, with family and friends singing dysfunctionally, singles had wine together through Whatsapp, many friends celebrated with beers far apart through Google Meets, many students watched professors present classes and slides as if just across the room. The sense of being there, right next to a brother, a grandmother, a friend through a small digital screen enhanced the whole concept of telepresence (Renzi et al 2020).

Since technology has shown to evolve much faster than culture, society and laws, the year of 2020 has proven that even though we all have the technological means to keep on most of our work chores, companies struggled to move from face-to-face work to remote teams. Not because of lack of technological possibilities, but because of companies' culture, managers having problems adapting to new processes, workers not having a suitable working space at home, and provincial and federal laws setting geographical limitations for work. Not even full digital companies have escaped this paradigm, missing opportunities of hiring new highly experienced professionals from anywhere in the world, due to provincial tax limitations, not

being able to provide a local invoice or having problems with software licenses linked to specific locations.

Scientific conferences were affected too, as researchers could not fly to other countries nor cross provinces. Facing the unknown ahead, most got postponed to be reorganized and bring a better online response to the new transportation limitations. Nevertheless, a few conferences kept their in person status quo procedures up to a point of attendees canceling and asking for refunds.

The lockdown limitations to mobility (with different proportions depending on the country) have impacted research methods as no personal contact has been allowed for over 18 months.Trips to interview specific users of specific regions had to be canceled and other ways of connecting with them had to be adapted and improved.

In order to keep the quality of research, communication technology possibilities have to bring the best telepresence experience and bring the researcher closer to the users/participants and break the discomfort of sitting in front of a computer with home noises in the background. The new challenges of the XXI century and improvements of research tools surfaces new analysis of old established methods and this paper focuses on how to better adapt and properly execute card sorting for online interviews.

2. Card sorting

In any new digital project with the intention of user-centered design, having users part of the discovery and designing process is essential (Maurer 2002). The researcher carries the responsibility to observe and understand users' expectations and their thinking, in order to surface insights and interaction strategies and link with stakeholders's expectations and the MVP plan (Guimarães et al. 2019). The research process involves quantitative and qualitative diverse methods to discover, categorize, structure, and test new products, involving users in almost all phases. Unger and Chandler (2012), authors of the book "A Project Guide to UX design", points 5 steps of the user research phase:

- Define your primary users group – this involves to build a framework with descriptive basic types of users, bringing better focus in inviting participants
- Plan the users' involvement – this involves to select adequate techniques to increase users involvement with the process
- Apply the research
- Validate groups of users' characteristics – based on previous collected data analysis, will bring better understanding of their mental model.

- Generate users' requirements – these requirements are the features and functions to be integrated in the final system.

As one of many methods to bring users as part of the designing process, card sorting has often been used to help organize and categorize subjects, taxonomy and content within a system, based on users' needs and expectations. Nevertheless, Donna Spencer (2009) in her book "Card Sorting: Designing Usable Categories", points to a deeper use of card sorting: it is best understood not as a collaborative method for creating navigation, but rather as a tool that helps understand the people we are designing for.

Throughout more than 10 years, of actively playing the roles of professor and researcher, I've seen Card sorting being commonly used in projects for planning the structure and navigation for websites and intranet, determining menu groups and subgroups, and identifying potential categories for a knowledge-base structure. But it can also be an important research process to structure online help, create classification schemes, identify steps in a process, and as Spencer would add: figure out the structure of a book. Santa Rosa & Moraes (2012) add a few observation and operational aspects to it: identify taxonomy from users' perspective, identify difficult items to classify, identify information that may appear in more than one group, understand how different audiences categorize content and perceive how each user profile access content.

Regardless of not commonly expressed in many papers, card sorting can help understand how people think about certain topics and organize content groups based on their own life experiences and expectations. Observing the users' perspective and how they process their thinking to choose where to better position cards in an information structure richer than the final organized structure.

Going through different authors' descriptions (Padovani et al, Spencer, Santa Rosa and Moraes, Tullis and Wood), the most basic simple way to describe card sorting is to give people a set of cards with the written content on each one of them. In possession of the cards, people sort the cards into piles according to what's similar and describe the groups they make.

Warfel and Maurer (2004), describe the advantages and disadvantages of using card sorting for research:

- Advantages
- Simple – Card sorts are easy for the organizer and the participants.
- Cheap – Typically the cost is a stack of cards, sticky notes, a pen or labels.
- Quick to execute – You can perform several sorts in a short period of time, providing a significant amount of data.

- Established – The technique has been used for over 10 years.
- Involves users – Because the information structure is based on real user input.
- Provides a good foundation – It does provide a good foundation for the structure of a site or product.
- Disadvantages
- Does not consider users' tasks – Card sorting is an inherently content-centric technique. If used without considering users' tasks, it may lead to an information structure that is not usable.
- Results may vary – The card sort may provide results that may vary widely.
- Analysis can be time consuming – The sorting is quick, but the analysis of the data can be difficult and time consuming.
- May capture "surface" characteristics only – Participants may not consider what the content is about or how they would use it to complete a task.

2.1 Structure

Padovani and Ribeiro (2013) describe the card sorting process as consisting of writing information or functions on cards and asking participants (individually) to group them as they feel it makes sense semantically. The researcher then analyzes the groups composition, looking for patterns that would direct to one final organization. The authors present the process in 3 phases: planning, card arrangement, and elicitation.

2.1.1 PLANNING

The planning phase determines the scope and broadness of content to be written on the cards. It's also defined if the card sorting will be closed, with top categories previously defined, or open, with no preset categories. When using the closed (top-down) version, the preset categories cards should be already aligned on top of the board and in a different color from the rest of the cards. On the other hand, the open (bottom-up) version has all cards in the same color and no preset positions on the board.

Participants representing characteristics of final users are selected in this phase. Tullis & Wood (2008) suggest inviting 15 participants to have 90% of similar individual results and a maximum of 10% of responses off the pattern. The authors add that when having 20 participants, 92% of similarities will show, gradually increasing. The structures derived from sample sizes above 30 are very similar to those derived from the full set of 168 participants, while smaller sample sizes are increasingly different. The authors'

results indicate that having 20-30 participants for card sorting brings the highest percentage of similar pattern results.

According to Warfel & Maurer, card sorting may be performed individually or in groups. When proceeding individually, the authors suggest 7-10 participants for good sampling. When proceeding in groups, five groups of three participants per group (a total of 15 participants) would work best. In any case, the most important aspect of selecting participants is that they come from and are representative of your user group.

2.1.2 CARD-ARRANGEMENT

The Card-arrangement is the phase where participants organize the content cards on a board. Cybis et al. (2007) suggest to shuffle the cards upfront so that participants receive cards in random order. The sessions are individual and the orientation is to distribute the content cards by semantic similarity. On close (top-down) card sorting, the participants distribute the cards among the preset main categories. In open (bottom-up) sessions, the participants pile the content cards in as many groups as they want. Padovani suggests adding blank cards, in case participants feel the need to include content that is missing from the participant's perspective. Whenever content is not clear to users, they can alter the name of the card according to their perspective and expectations (Maurer & Warfel, 2004).

After the groups of cards are ready, the researcher can ask for participants to rearrange each group and put the content cards in order within each group. The final organized set of cards should be registered by photograph, drawing, list, etc.

2.1.3 ELICITATION

Padovani and Ribeiro (2013) point out that the elicitation phase is not obligatory for card sorting. In this phase, the researcher asks participants to explain why they chose to group the cards the way they did and what was the logic of their organization. This information is considered important by the author to clarify doubts while unifying the structures produced by the participants and should be recorded.

2.2 Analysis

The analysis of the structures can be done through informal or formal processes. According to Padovani (2013) and Tullis & Albert (2004), the informal process can be applied when the amount of cards is small and easier to observe grouping patterns of content. Tullis & Albert (ibidem) point out that when using closed (top-down) sessions, the goal is to see if participants arranged the cards in a similar way as predicted by researchers, and it

possible to calculate the percentage of users who made a similar pattern with the predicted grouping.

For the formal process, Tullis & Albert (ibidem) suggests making a perceived distance matrix for every pair of cards within the same group. The intersection of cards in the same groups has value zero and when cards are in different groups, has a value of one. The summation of values generates the perceived distance matrix.

Padovani adds the cluster hierarchy analysis to see the proximity of content, where a tree (dendrogram) is made from semantic proximity of content cards (fig. 1). The cards that merge first are the ones with the most similarities.

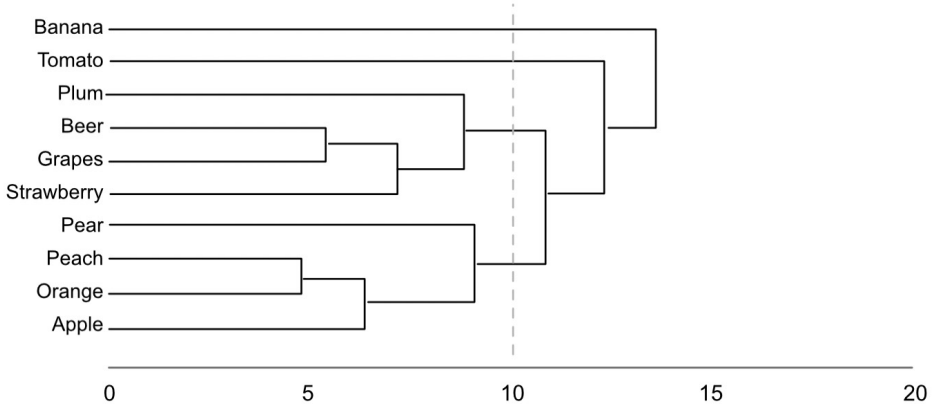

FIGURA 1. Example of dendrogram tree based on Padovani's research

Although the phases and types of analysis presented by these authors focus on grouping cards by similarities, card sorting is often used to map within each group (created by participants) the hierarchy of importance. For each group of semantic similarity, the cards are organized top-down from most important to least important, based on users' interests and personal experience. This hierarchical organization of sub-categories helps to understand what are the contents more important and more often used for users.

Maurer and Warfel (2004) present a more visual approach in the analysis process, where on smaller numbers of cards, it is possible to see patterns through similar groupings and labeling by simply laying the groups out on a table. The authors suggest inserting the results in a spreadsheet and if any label was changed, it must be recorded and included with the old nomenclature in parentheses. They argue that at this point the research does not have a final answer, but insights and ideas.

It is important to note that areas of divergence also provide useful information regarding content that participants haven't understood well or that could belong to more than one group as well as alternative paths.

Padovani adds that card sorting can be adapted to various scenarios and describes an adaptation of card sorting to help organize information on package design, showing that the research technique can be used in both digital and physical projects. In her adaptation, she uses the card sorting proceedings to help organize information in a toothpaste package, having users insert content stickers throughout the package based on their cultural conventions and personal experience on where each piece of information should be allocated on the toothpaste package.

Although card sorting presents many advantages, unsystematic observation over 10 years of teaching interaction and UX showed me that card sorting can be difficult to understand and harder to apply without experienced guidance. Analyzing the processes and results of given assignments, it would bring to my attention that many students would not understand how to properly apply card sorting with users, leading to many distorted structures (which also led to new learnings for them). My years of experience teaching students and sharing notes with fellow researchers have shown me that many times the technique procedures can be superficial and misunderstood. I expect that the presented proposal for remote research can clarify many doubts and help pinpoint misleading information.

3. Card sorting for remote research

Many companies offer tools for online card sorting, with self-served research instructions, where the users go through the pre-set cards and place each one under pre-set categories (closed card sorting), or create groups from scratch by themselves (open card sorting). The tree testing process or the prioritization matrix structure is commonly offered for self-served sessions, instead of having a researcher together to guide and bring questions. There are also interview session options, but are not associated with card sorting research.

Nevertheless, when searching for guiding procedures to better understand the research process using online tools, official usability sites, such as digital.gov and Interaction Design Foundation, have more detailed guidance on in-person card sorting using physical cards, but not the remote version. The Interaction Design Foundation has a step-by-step card sorting guide prepared by Donna Spencer (https://www.interaction-design.org/literature/topics/card-sorting#card-sorting-faqs) focused on the in-person method. But the remote version is added to their FAQ section, focusing on advantages of remote card sorting over in-person:

1. Digital tools automatically collect and analyze data quickly and with the ability to generate statistical reports and visual representations of the data.

2. It easily handles more cards and participants than physical sorting, which is often limited by physical space and materials.

3. It eliminates the need for physical materials, and rental space, and to transcribe results from physical cards. Also, it reduces time spent on set-up and managing the session.

4. Participants might feel more at ease in their own environment, leading to more genuine responses. They can also complete the task at their convenience.

5. Digital card sorting is more environmentally friendly as it reduces the need for paper-based materials.

Digital.gov shares a case experience (Jan 6, 2022) with digital tools for card sorting and tree testing, but the online article mainly focuses on preparing the Github tool but there is no guidance (https://digital.gov/2022/01/06/open-source-information-architecture-design-using-the-tools-you-have-to-conduct-card-sorting-and-tree-testing/).

Articles from app companies focus mostly on selling the advantages of using their tools and the descriptions of each feature, without guidance. Optimal Workshop (https://www.optimalworkshop.com/blog/online-card-sorting-the-comprehensive-guide), result number one for remote card sorting search, presents steps of the remote version with no guidance (but full of links to many services they provide), as many other companies:

1. Define the cards: Depending on what you're testing, add the items (cards) to your study. If you were testing the navigation menu of a hotel website, your cards might be things like "Home", "Book a room", "Our facilities" and "Contact us".

2. Work out whether to run a closed or open sort: Determine whether you'll set the groups for participants to sort cards into (closed) or leave it up to them (open). You may also opt for a mix, where you create some categories but leave the option open for participants to create their own.

3. Recruit your participants: Whether using a participant recruitment service or by recruiting through your own channels, send out invites to your online card sort.

4. Wait for the data: Once you've sent out your invites, all that's left to do is wait for the data to come in and then analyze the results.

Therefore, despite the fact that there has been software to conduct the method through online channels for years, there isn't substantial information regarding the remote process of the method itself, which prevents me from citing references with deeper remote card sorting guidance in this paper. The fundamentals of card sorting, presented by the various authors

cited here, are related to in-person sessions and physical materials, which are more relevant to this experiment.

Recently the NN Group has released a video explaining the remote process of card sorting. The video presented by Katie Sherwin, shows the process in 4 steps:

1. Choose the topics: the presenter presents nomenclature tips to better make distinguished options and not bias

2. Choose the card sorting software: the presenter classifies the existing software into 2 types - specialized tools and do-it-yourself tools. The video mostly focuses on quantitative analysis, where when using a professional tool, it calculates automatically, and when done by do-it-yourself, there are tutorials online to help make the calculations.

3. Recruit participants that reflect the users that will use the product. The participants should share their screens in order to follow their actions, and camera on to see their facial expressions. The presenter follows the overall instructions to participants to organize the cards in groups.

4. Thank the participant for helping with the research. It is encouraged to offer a compensation to participants, such as a gift card, to each participant.

Aside from the brief mention of professional tools to organize results by statistics, the presenter does not explain how to analyze the results in detail.

The most known apps to help conduct card sorting remotely are OptimalSort, Maze, UserZoom, Userlytics, UXTweak, UserTesting, UserBit, Kardsort, etc. But, to better mimic the card + pen traditional idea, I have preferred to use tools (referred as Do-it-yourself by NN Group) with focus on collaborative work, such as Miro, Mural, and Whimsical. In all these 3 options, participants can interact and build together groups of content with semantic similarities over a blank board. It is possible for users to create stickers, insert and edit words, change color and drag-and-move everything around the board to organize the content cards in different categories.

When the pandemic hit the world in 2020 and in-person offices had to shift towards remote work, research had to adapt accordingly. The experience of having previously remote working for multinational companies with co-workers spread around the globe helped me change strategies when sudden lockdowns and strict curfew mobility laws took place. The new prospect of research processes led me, not only to adapt techniques but also to look into methods (Renzi and Agner 2023) with different analytical lenses. This paper intends to presentcard sorting from an analytical lens perspective and bring new learnings to the research method.

For analytical observation, I used Miro and Mural for 2 projects with very distinct themes: online learning and co-living travel experiences. In both projects, it was important to proceed with closed card sorting sessions – pre-organize categories topics.

In the online learning project, the objective was to understand users' natural mental model of organizing learning subjects and areas of knowledge, in order to structure the whole system for easy information foraging and course selection. For the co-living project, the objective was to understand how users organize the diverse thematic possibilities to facilitate users' search (and create) co-living pods based on themes and personal interests.

The card sorting sessions were part of the discovery and structure phases for both projects and included over 30 participants. The sessions were all remote and the selected participants were from British Columbia, Ontario, California, Pennsylvania, Rio de Janeiro, São Paulo, and Pernambuco. The sessions were conducted in English and Portuguese, following participants' preferences. The selection of participants was based on cultural background, educational level and travel experiences, social group and age range (mostly from Gen Z, Y and X), representing the previously mapped persona profiles for each project – Gen Z, Y, X, and boomers are categories of generations, based on age range with similar characteristics, respectively born within the periods of 1997 - 2012, 1981 - 1997, 1965 - 1980 and 1955 - 1964.

On both projects, preceding research (market trends, surveys and interviews) was conducted to map users' mental models connected to the projects' concepts and create personas to represent their direct audience. Netnography through social media, benchmarking, and analysis of information architecture of similar projects were also applied to better organize the card sorting sessions. From these preceding researches, it was possible to see cultural conventions regarding content, organization, nomenclatures, and the set of characteristics and preferences to help structure the card sorting proceedings.

Each participant was contacted individually through either email, LinkedIn messaging, or Facebook messenger, using stakeholders' chain of contacts up to the 3rd level (Renzi and Freitas 2015). After acceptance, video-call meeting invitations were sent individually. The meetings were scheduled according to each participant's best convenience, due to diverse timezones and personal schedules.

3.1 Structure of the cards

The online scenario brought new requirements and new structure, in order to keep the research flow easy for participants. Starting as a closed card

sorting (based on precedent structure research), the top categories were organized as heads of columns and the cards to be distributed were set on the right side of the blank board. This would help visually structure the explanation to users following the western storytelling structure (from left to right, from top to bottom) – applied similarly in a prioritization matrix research in the same year (Renzi and Agner 2023). Starting with an overall view of the board without details of the cards' subjects, followed by presenting the top categories, the blank middle space, and the 1st side section of cards on the side (there were a total of 3-4 sections of cards).

Showing only parts of the board related to the instructions helped to avoid distractions from users – who often browse the whole space foraging information. The order of the top categories was organized following cultural conventions, to keep the closest semantic association near each other (Mathematics, Computer, and Engineering in the educational organization - fig. 1), to better help users understand the organization of the columns and allocate cards considered to belong to more than one category.

FIGURE 1. Closed Card Sorting example from online learning search engine project

Documented scientific descriptions of in-person card sorting sessions present open sessions with all cards displayed randomly, and closed sessions with a pre-set main categories randomly organized, while the rest of the cards would be randomly spread for participants to get a "raw" starting point.

For this adaptation proposal, the cards were not displayed randomly: instead of laying down all card possibilities at once for users to organize, the cards were arranged in 3-4 columns that would be presented gradually during the card sorting sessions (Fig.2 shows items from 3 sections mapped with different colors: yellow, green and blue). On these 3-4 columns, the first section group encompassed names/items easier to allocate below the top categories (based on previous market patterns research). Using easier choices in the first section helped users to familiarize themselves with the process – the easier choices displayed were based on previous understanding of cultural conventions.

The second column presented a majority of items easy to allocate, with a few items that could raise multiple interpretation possibilities. For instance, the research related to categorization of subjects by areas of knowledge

showed psychology with diverse interpretations from different users and often associated with more than one category: humanities, social sciences, and health.

Presenting at least one item that could lead to multiple interpretations in the second section caused users to rethink the structure and raise questions to themselves. Often users reorganized items previously set and sometimes even edited some of the top categories. Presenting the second section made users take a step back and take a second look at the overall scenario.

The third column would bring more items that can lead to different interpretations for discussion and so forth. As an example, while using card sorting to help categorize areas of knowledge in education, the item Hobbies was presented in the third section, which raised important structural discussions for the final result, leading it to become a top category (fig.2).

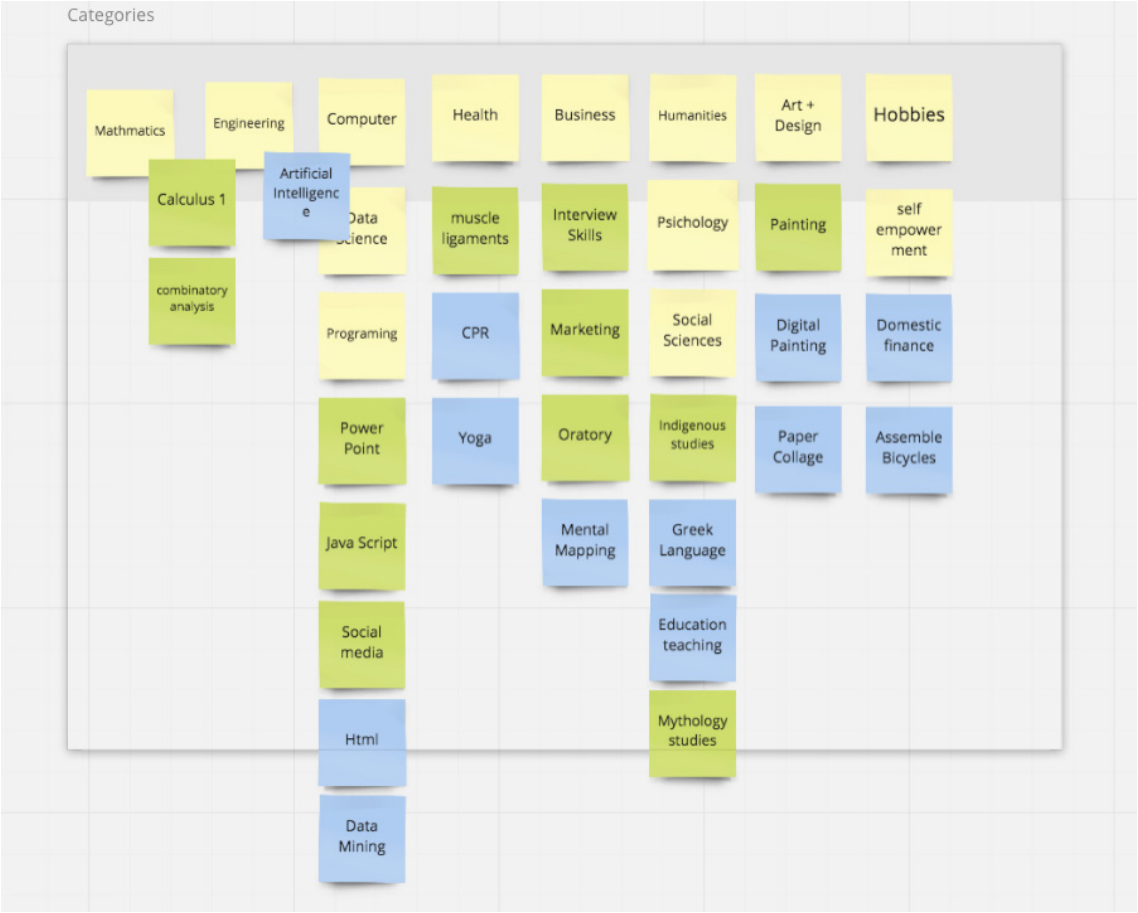

FIGURE 2. Example of cards arrangement from one of the research sessions, mixing cards from sections 1, 2 and 3.

It was important to emphasize to users that the top categories were a starting point and they could rearrange them. A reminder worked better from the second section forward, as new items bring new questions.

For a better understanding of users' mental model, the whole process should be done together, either by users having the autonomy to place the cards themselves or with the researcher placing the cards following users' instructions (for baby boomer participants it is easier to have the researcher interact with the board following instructions). For the card sorting sessions exemplified here both ways were experimented. The important part is to understand why and how users are connecting their sense of things (Sande et al. 2017) to organize the cards.

During the recorded sessions, questions and pondering together have shown to be helpful in making users express their way of thinking regarding their card positioning choices. If the researcher has experience with interviewing, the session can be taken to a deeper level of investigation.

After placing all items from all 3-4 columns, users were asked to take a broader look at the whole scenario and see if there should be any change to the structure. Going through each column with participants showed to help users focus in the face of an overwhelming number of placed cards. If during the session the user showed doubt about a specific item, this should be revisited to make sure the card organizing decision is final.

The analysis of results should go beyond the comparison of results and search for patterns, which could bring a superficial and close analysis. The recorded conversations are very important to understanding how users think, why choices are made, information search strategies, and users' semantic connections, and see the patterns that are not visible by just looking at the cards on the board (fig. 3).

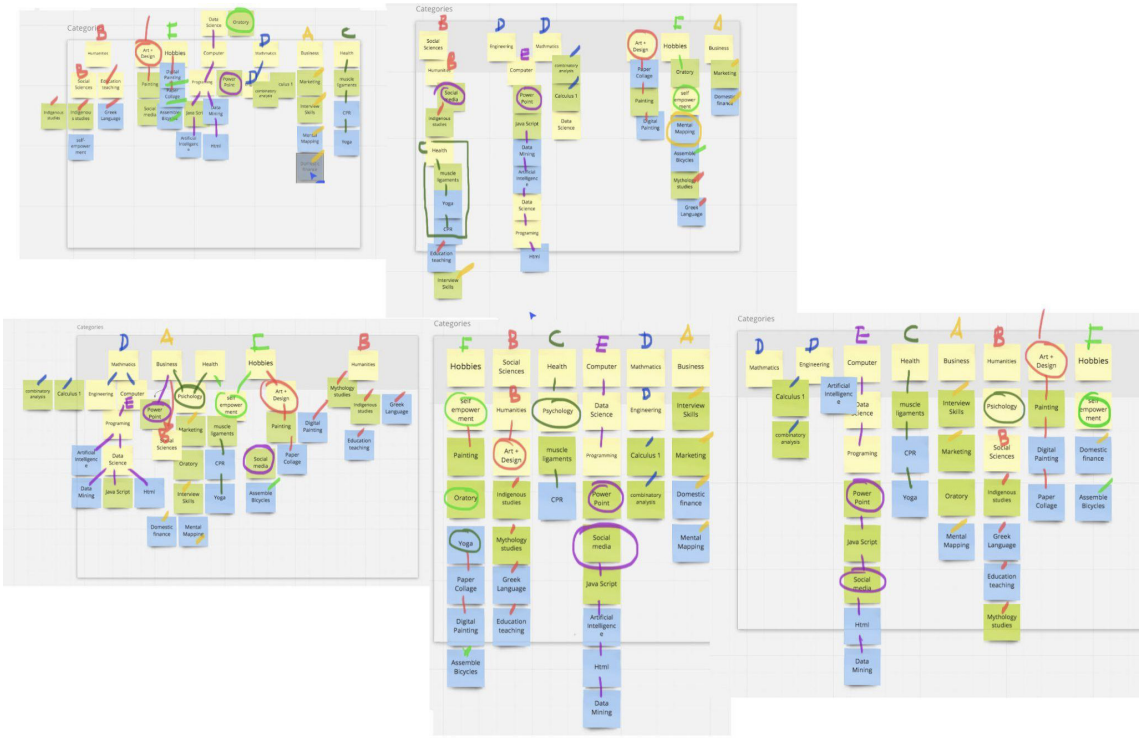

FIGURE 3. Sketching over the boards to help understand patterns and connections

Conclusion

The 3-column structure (fig. 4) for the online card sorting process showed to be very helpful to take users to think slower and gradually through their decisions. When card sorting sessions have all cards displayed at once, users often get confused with so many choices, leading to possibilities of misleading results. This becomes more urgent for online sessions because of the limited space of desktop/laptop screens while video conferencing with users. Browsing the cards by group section helps narrow down the attention and users take one step at a time. The researcher can go through the cards one by one asking where it should go – this process brought more openness for think-aloud discussions. The main disadvantage of this approach does not relate to the method itself, but to the budge side: 1-hour online interview sessions take much longer to organize and perform than do-it-yourself sessions, which also leads to a more expensive research cost on a credit basis payment service type.

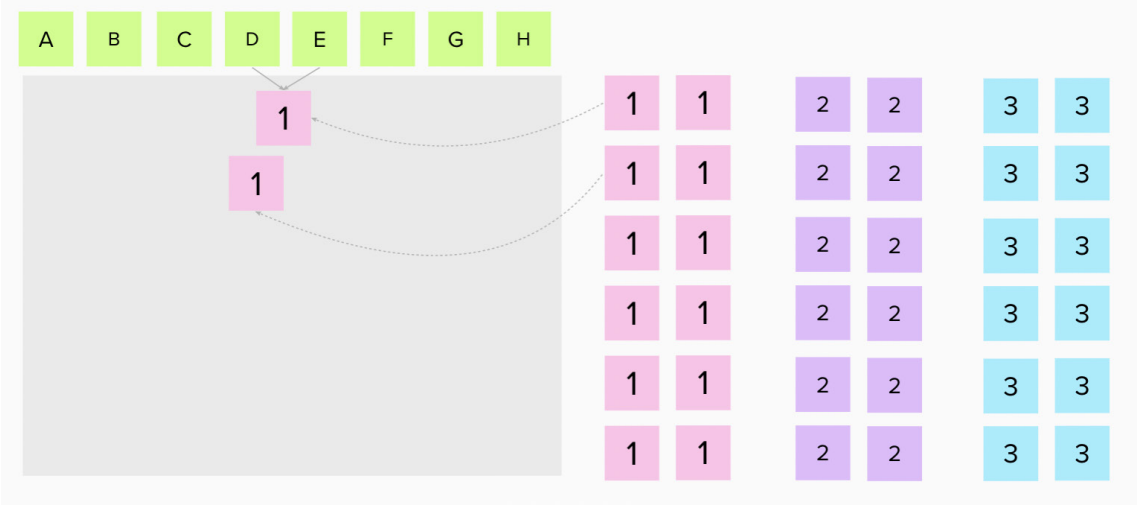

FIGURE 4. Example of Cards arrangement using Mural board

The organization of cards in the 3-4 sections has to be strategic and previous research about the market panorama, benchmarking, netnography, and cultural convention are essential to make good choices of which cards should start in which column:

- The Column 1 should encompass 100% of card options that are easier for users to relate to specific themes;
- the Column 2 should present 60-80% of easy choices and a few cards that could bring doubts about where to allocate and raise discussion;
- the section 3 should have only 30-50% of easy card options and is the space to explore the most difficult choices for deepest discussions.

If there is a need to include a 4th section, it should be considered as an extension of the 3rd.

The organization into columns and the conduction of the process as a cooperative evaluation (Teixeira e Moraes 2004) – similar process of think-aloud protocol, where participants verbalize their actions and thoughts while going through an interactive digital product, but the participants are encouraged to be collaborators and co-designers in the evaluation rather than just a subject –, makes the whole card sorting session a conduit to talk about decisions, understanding, affordance and structure perception, which are much more valuable information than just organizing cards under categories.

During any research process, researchers have to be aware of users that are not interested in contributing, or are easily directed by others with stronger leadership, or are too imposing to others in group sessions, or simply did not understand the whole goal of the research session. Interviews, surveys, think-aloud protocols, observations, and many research methods have to

be structured to help identify the data that could mislead conclusions and distort information.

Traditional card sorting has shown to be difficult sometimes to identify misleading information, leading to difficulties recognizing patterns and distorted data – sometimes originating from a simple misunderstanding of how the categories works, an overwhelming number of options, or the start position of cards. Previous experiments have presented a significant percentage of users misunderstanding how to organize the cards, guiding to information that could completely mislead a project informational structure.

The process of dividing cards in columns and participatory thinking during the sessions have shown to help identify the low percentage of users who don't understand the whole goal of card sorting and evince distorted data. All misleading responses have been identified while going through the first and second sections, where 90% of easier cards are located. The identification of misleads are often related to: (1) allocating easier cards from section 1 to many different categories at the same time, (2) allocating cards to too many different categories with no semantic relation, (3) users trying to make choices from business point of view or coding point of view, instead of their own experiences, (4) users trying to guess what researchers wants to hear, (5) self-contradiction during choice explanations, (6) users spending too much time discussing cards that were presented as a starting point and ice breaker.

A few examples to illustrate these situations: (1) a user with lots of entrepreneurship experience distributed cards throughout co-living experience themes thinking as a business partner, instead of a user looking for a place to have an experience. Her choices would distribute cards through the whole possibilities of categories, such as inserting yoga in health & wellness, Travel, Career & Business, Sports & Outdoors, Hobbies, Eco & social causes, and Culture & Identity; (2) a user making card placing decisions based on stories and experiences that would not be his own, without considering how he himself would look for the themes at hand, leading martial arts card to be placed under sporadic theme columns (health, sports, career/business, culture/identity, lifestyle, faith); (3) a referred participant was completely outside of the personas spectrum and tried to organize themes, but had no interest in travel, community events, shared experiences nor shared living, leading to confusing arrangements.

It is very important to collect information about cultural conventions and market trends of the specific theme or business before starting a card sorting preparation, as it will help select the topics to be organized and separate them into sections properly. From previous panorama knowledge, the

researcher will know which subjects are more commonly agreed and which are the ones that may surface discussion.

It is also important to have mapped out the users' mental model, or personas, prior to a card sorting, therefore the researcher can invite people that specifically fit the profile. This previous mapping can be mostly done by interviews, surveys, flow-task observation, and market research.

Although remote card sorting research using video conference apps allows a broader reach without need of geographical mobility, it is harder to conduct it with older generations (baby boomers) and people that are less technology savvy. On the other hand, older Gen Z, Gen Y, and Gen X are mostly knowledgeable of interaction channels on a daily basis, as mapped by Renzi at al. (2020), and are easier to schedule and conduct the sessions.

Nevertheless, the choice of online instrument to prepare the card sorting can be challenging as some choices (Miro and Mural apps) require that users are previously registered, which can demote the agility of the process before it starts. A significant number of participants showed confusion with the registration process and annoyance with the requirement. If the research is conducted with employees within the same company, the registration should be easy to accomplish. If the participants are not part of the same system, an alternative solution to minimize registering annoyance can be the researcher sharing the screen while video conferencing and placing the cards, following the participants' instructions (in fact this process helps with keeping the focus of participants and open discussions).

The card sorting should strategically be included as part of a research plan together with other methods that will collect users' information, validate, and push deeper the findings. Depending on the complexity of the project, card sorting can be combined with priority matrix, interviews, prototype structuring and testing, etc. In the examples used for this paper, the projects used to test remote card sorting had previous market research, surveys, and interviews, to better understand the users' mental model and cultural conventions. The card sorting sessions, in both projects, were combined with prioritization matrix and interview.

I expect that future research projects will bring new opportunities to test further this proposal and will bring more experimentation for discussion

References

CYBIS, W.; BETIO, A. H.; Fau ST, R.: **Ergonomia e usabilidade: conhecimentos, métodos e aplicações.** São Paulo: Novatec Editora, 2007.

GOLDSTEIN, L.; FAIED, M.; MCHARG, S. **Open-source information architecture design: using the tools you have to conduct card sorting and tree testing.** Digital.gov. <https://digital.gov/2022/01/06/open-source-information-architecture-design-using-the-tools-you-have-to-conduct-card-sorting-and-tree-testing/>

GUIMARÃES, M; ZISMAN, R.; RENZI, A.B.: **Pharmaceutical Online Store Project: Usability, Affordances and Expectations. In: Advances in Human Factors and Systems Interaction**, Proceedings of the AHFE 2019 International Conference on Human Factors and Systems Interaction, July 24-28, Washington D.C., USA. (2019).

KUNIAVSKY, M.: **Observing the user experience.** Morgan Kaufmann, San Francisco (2003).

MAURER, D. **What is usability**. Step two design KMC columns. Australia (2004).

MAURER, D.; WARFEL, T.: **Card sorting: a definitive guide**. Disponível online em: http://cuttingedgecourse.com/CIS360/CardSortingGuide.pdf (2004).

OPTIMALWORKSHOP. **Online card sorting: the comprehensive guide**. <https://www.optimalworkshop.com/blog/online-card-sorting-the-comprehensive-guide>

PADOVANI, S.; RIBEIRO, M. A.: **Card sorting: adaptação da técnica para aplicação ao design de sistemas de informação não digitais.** v. 10 | n. 3, p. 293 – 312, São Paulo (2013).

RENZI, A.B.; AGNER, L. **Prioritization matrix to highlight business opportunities.** In: Marcus, A., Rosenzweig, E., Soares, M.M. (eds) Design, User Experience, and Usability. HCII 2023. Lecture Notes in Computer Science, vol 14030. Springer, Cham. https://doi.org/10.1007/978-3-031-35699-5_4

RENZI, A. B.; MEIRA, C.; RIBEIRO, A.C.; CORREIA, M.; BITTENCOURT, M.; SOUZA, J.; LANNA, K.: **User experience journey with multiple devices and telepresence during quarantine.** In: Revista Ergodesign,p. 80-95. Rio de Janeiro (2020).

RENZI, A.B.; FREITAS, S. **Delphi method for future scenario construction**. In: Procedia Manufacturing, Volume 3, 2015, Pages 5785-5791, ISSN 2351-9789, https://doi.org/10.1016/j.promfg.2015.07.826.

SANDE, A., RENZI, A.B., SCHNAIDER, S.: **Experience, Usability and Sense of Things**. In: Design, User Experience, and Usability: Designing Pleasurable Experiences. DUXU 2017. Lecture Notes in Computer Science, vol 10289. Springer, p.77-86. Vancouver (2017).

SANTA ROSA, G.; MORAES, A. de.: **Design Participativo.** Rio Books, Rio de Janeiro (2012).

SHERWIN, K. **Remote card sorting**. NN group website <https://www.nngroup.com/videos/remote-card-sorting/>

SPENCER, D. **Card Sorting: Designing Usable Categories.** Rosenfeld Media. New York, (2009).

SPENCER, D. **What is Card Sorting?** Interaction Design Foundation website <https://www.interaction-design.org/literature/topics/card-sorting#card-sorting-faqs>

TEIXEIRA, E., MORAES, A de.: **Avaliação cooperativa da interface de sites hipermídias focados na "banda larga".** In: Congresso Internacional de Ergonomia e Usabilidade, Design de Interfaces e Interação Humano-Computador, 3., Rio de Janeiro (2004).

TULLIS, T.; WOOD, L. **How Many Users Are Enough for a Card-Sorting Study?.** In: Usability professionals associations (UPA) 2004 conference. Mineapolis, MN (2004).

UNGER, R.; CHANDLER, C. **A project guide to UX Design.** New Riders, 2nd ed. Berkley, (2012).

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DOI: https://www.doi.org/10.12957/arcosdesign.2025.82958

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