CULTAR

A DESIGN OF A CULTURAL INFORMATION TARGETING SERVICE, EDUCATING HIGH SCHOOL STUDENTS.

Process Report

MSc. Service System Design 2016

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ABSTRACT

This report is about developing a targting service for high school students, in order to offer cultural data that educates while entertain the student. The service is based on a relational darabase, that use aggregates the cultural data abaout the student, through the use of aesthetic markers. The service is designed, to gather data about the students, without leaving any links that can be traced back to the student. The service system of the main library of Copenhagens, is investigated both the IT-infrastructure and the physical interfaces. Furthermore, the students are studied in order to understand their needs, and their behavior on the internet. The final design is never tested, which makes the final conclusion inconclusive.

LEADER

Disclaimer
The following document is about the design of a service, in order to target cultural material to student. The report, will not touch upon technical levels, such as database diagrams, uml or any psudo code. The abstraction level, will be held at a certain level, in order to make the reader, understand the content and the design of the service, not the backend system. Only stakeholder and shareholder, that are relevant to the study will be covered.

References and Citings.
The referencing style of the following report, is using the ieee standard reference style.

Cross Reference Example: Through the state of the art study, of advertisement targeting services(1.1.2 on page 10), such as Google and Facebook, a third data source is discovered. Google and Facebook are using cookies stored on t

Bibliography Reference Example: interests, to target cultural material towards the user. Services such as Mofibo[5], Spotify[6] and Netflix[7] are all storing and utilizing data about the user, to target material towards the user.

Illustration Reference Example: o approach the problem statement, a methodological model called Double Diamond Process[Ill. 1] is used.

Appendix Reference Example: or in the appendix (Appendix APP. 1).

List of Terms
Aesthetic Markers: *Objects, Words or events, that is used in a specific culture*
Cultural Interests: *An interests in a specific culture.*
Relational Database: *A database, where the data is linked together. The links are creating the relations between the data inside the database.*
Targeting Service: *A service that sends offers or information to a person, based on a computational analysis of the person.*

Made In Cooperation With the Main Library of Copenhagen.

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And all of the students i have collaborated with, throughout my studies at Aalborg University.

Table Of Content

MOTIVATION

The motivation of working with this specific project, is based on my interest and former work with use of big data, in service design. I believe, the next big thing in the future of services, are services that understands the users and their needs.
Throughout my bachelor, i have been working with Artificial intelligence, and developed an intelligent agent, that makes use of relations between the data stream in order to predict information. In this case a game was used, in order to show how the artificial intelligence could be implemented. Instead of just showing, how artificial intelligence can be used to improve games, i want to show how big data and artificial intelligence, can be used inside a service, to fit the users needs, and add value to the product by using artificial intelligence.

INTRODUCTION

The purpose of the following project, is to design a service for the main library of Copenhagen, able to target educational cultural offers towards high schools students, based on their cultural interests, combined with their study goals. The report is covering the studies of the service system in the Main library of Copenhagen, a brief analysis of the data available at from Danish high schools, and an investigation of the danish high schools students cultural interests, use of different medias, in order to find their cultural interests, and use of the library. In order to create a service for the high school student, several methods and models, of the service system design area, is implemented. Throughout the study a large reiteration was done, in order to fulfill the wishes of the library. The reiteration is explained in the develop chapter, since a confirmation of a concept, resulted in the large reiteration.
To define the problem statement a problem scope is used, since the problem is already defined beforehand, by the library of Copenhagen.

PROBLEM SCOPE

The following project is developed in cooperation with the digital development department of the libraries of Copenhagen. The Library department has developed a new strategy, where this project is deliver a solution, to challenges that the libraries of Copenhagen are facing, especially in approaching and engaging the youth in a digitalized world

The Strategy of Copenhagen's Libraries 2014 – 2019[1], is describing a new way of thinking a library. The core of the strategy is inspired by David R. Lankes [2] "*from places of knowledge access to places of knowledge creation*". Instead of maintaining the classical set of values of a library, where the library act as knowledge distributor, the library wants to act as a platform where the citizen creates their own knowledge. The library[1] wants to increase the use of the institution, by offering inspiration, discussion, guidance and informal education, to the citizens of Copenhagen. Through this new set of values, the library wants to increase the competences and general education of the Copenhagen citizens, by making them better in translating information to knowledge and acting as critical culture consumers. To achieve the goal of being an institution developing these competences of the citizens of Copenhagen, the library wants to integrate the user through various services that inspires the user, to thrive for more knowledge. To achieve the goal, of developing the Libraries of Copenhagen values, a set of challenges needs to be faced. The library strategy [1] defines specific focus groups, wherein to find challenges.

- **Schools and Youth Education:** The core challenges of the School and Youth educations, are to make the high school students become more critical to information, inspire them to read more, and make them culturally aware of their surroundings[1].

- **Children and Culture:** The challenges defined in this area, are about making the children conscious about cultural quality and make them curious in cultural material[1].

- **The Active Citizens:** The challenges in the area of the active citizens, are to inform the citizens about the possibilities of the libraries services and the possibility of cooperating with the library as an active citizens[1].

In addition to the specific groups the library is also defining 4 general focus areas:

- **Physical Library:** The challenges of the physical library, is to develop the physical space matching the users needs, and develop the digital communication in the physical space[1].

- **Digital Library:** Increase the digitalization of the library services, personalize the services and improve the web-page[1].

- **Outreaching Library:** Reach non-users of the library[1].

- **Competence and trust-based organization:** Develop the skills of the employees, to provide better services[1].

In cooperation with the development department, a problem area and focus group is defined in present project. The problem defined is based on the overall strategy of the library in "*developing the citizens as critical culture consumer*"[1] and the digital challenge of "*personalizing the digital library*"[1]. The library wants to target their users with cultural offers, based on the cultural interests of their users. Instead of targeting the users with offers about the same culture, as the users cultural interests, the library wants a service that targets offers about new cultures, related to the users current cultural interests.

The vision of the library is, to combine the relations of a high school student's cultural interests to the study goals of their education, in order to achieve a service that facilitates inspirational cultural information, relevant to their study. The goal of the service is to educate and prepare the student in being a better and critical citizen and student. This vision legitimates also the libraries values, as an institution distributing educational and cultural material, simply by combining the high school students culture with the high school students study goals. The problem statement is initial, and will develop based on discoveries during the research.

"HOW TO DESIGN A CULTURAL INFORMATION TARGETING SERVICE TO HIGH SCHOOL STUDENTS, COMBINING THE STUDENTS CULTURAL RELATIONS TO THE STUDY GOALS OF THEIR STUDY?"

APPROACH

1.1. Methodological approach

To approach the problem statement, a methodological model called Double Diamond Process[Ill. 1] is used. The model is defining the process of the project, and specifies the different phases of the process. As standard, the model is a waterfall model, which is not originally designed to be iterative. To use this process model in the project, arrows are added to the model, in order to make it possible reiterating during the project. The arrows in the model, are defining how the process can go forward and backward, in relation to the *Discover* and *Define* phase to the *Define* and *Develop* phase etc.

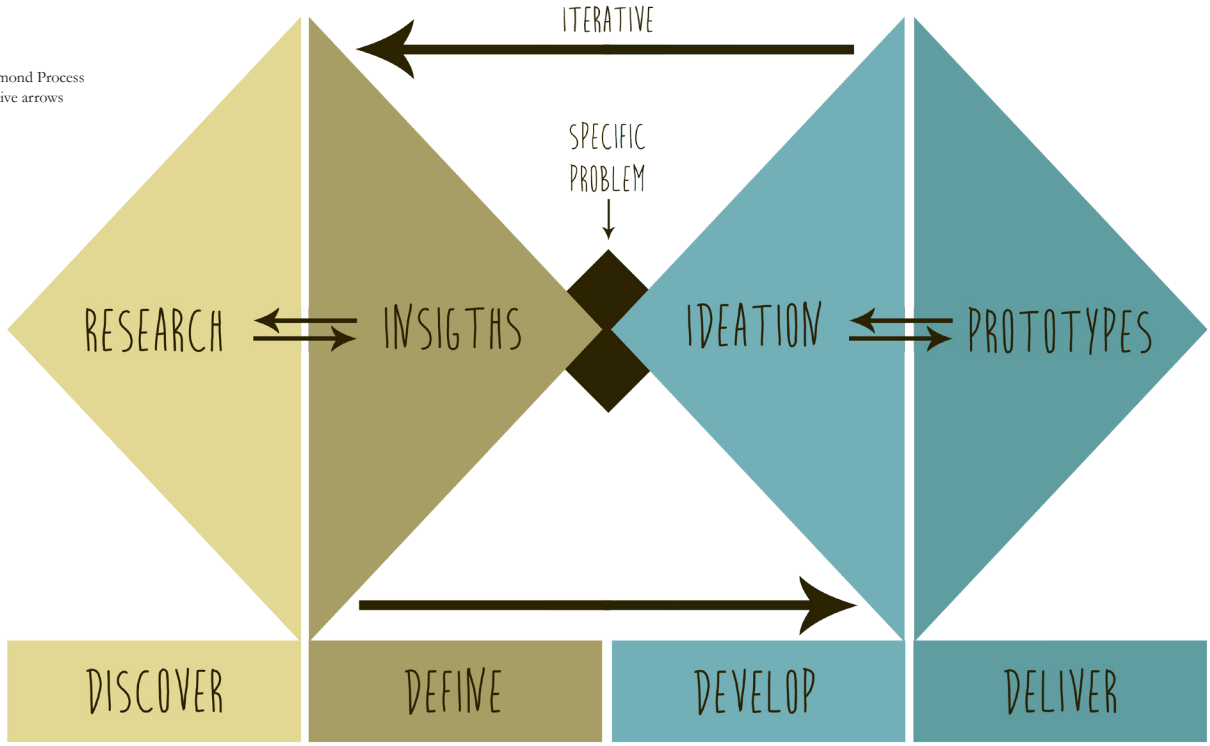
The model is divided into 4 sections:

Discover: The discover phase, is the research phase, where knowledge about *state of the art services*, the *existing library system* and *youth culture* is investigated. During this phase, an extensive desk and field study is carried out. This phase is typically very time consuming, due to the large amount of material, which can be investigated. It is therefore important to adjust and define the abstraction layer of the research.

Define: The discovery phase, leads to a large amount of data, that will be analyzed throughout the define phase, to achieve insights of the needs and behavior of segmented user groups. This results in some clear requirements, and a specified understanding of problems and challenges, needed to be taken into considerations during the design process.

Develop: To find different possible solutions to the challenges identified in the define phase, an ideation is carried out in the develop phase.

Deliver: The last phase is the deliver phase, where the final solution from the develop process, are assembled and specified.



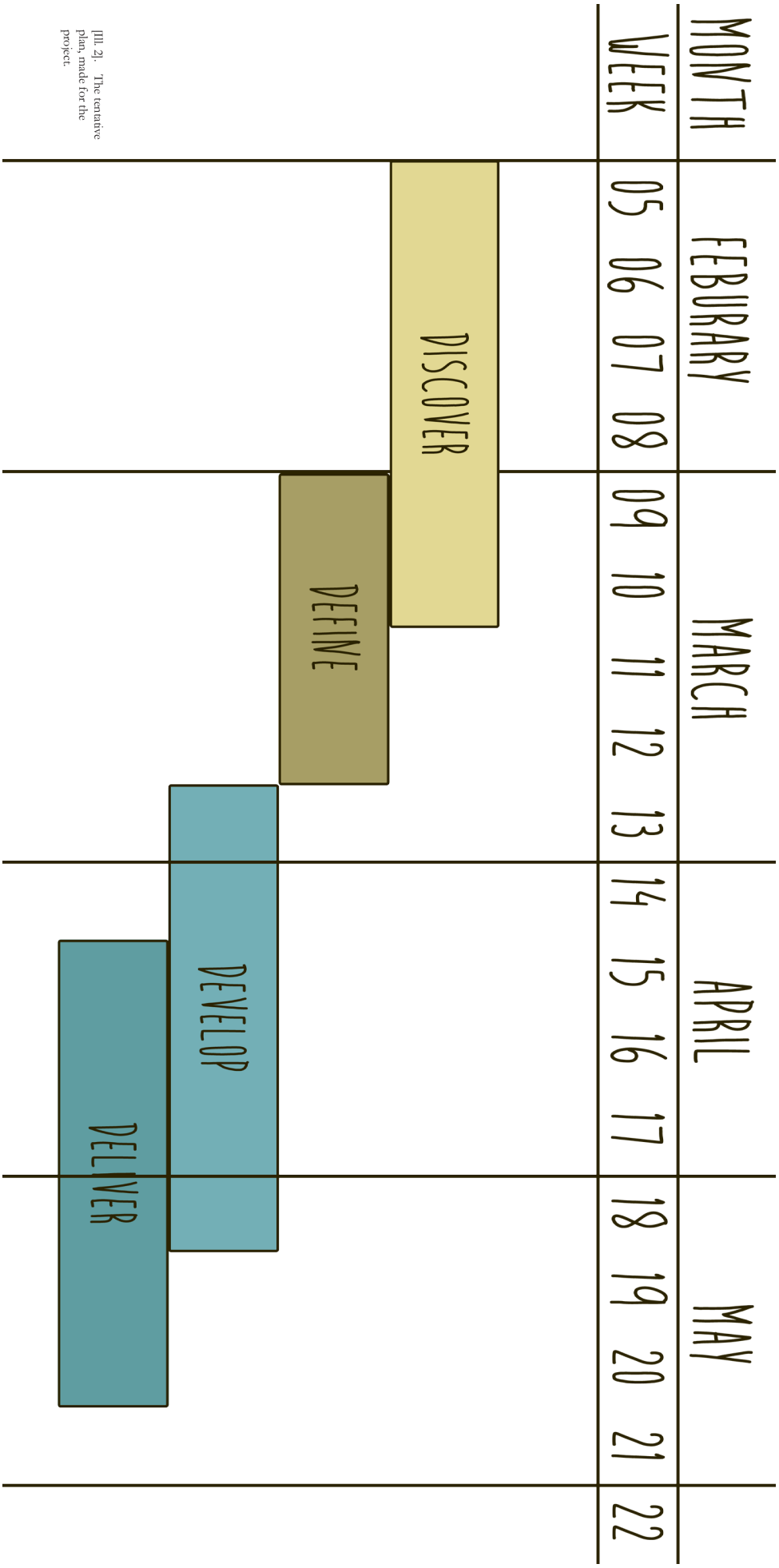
[Ill. 1]. Double Diamond Process Model, with the iterative arrows

1.2. TENTATIVE PLAN

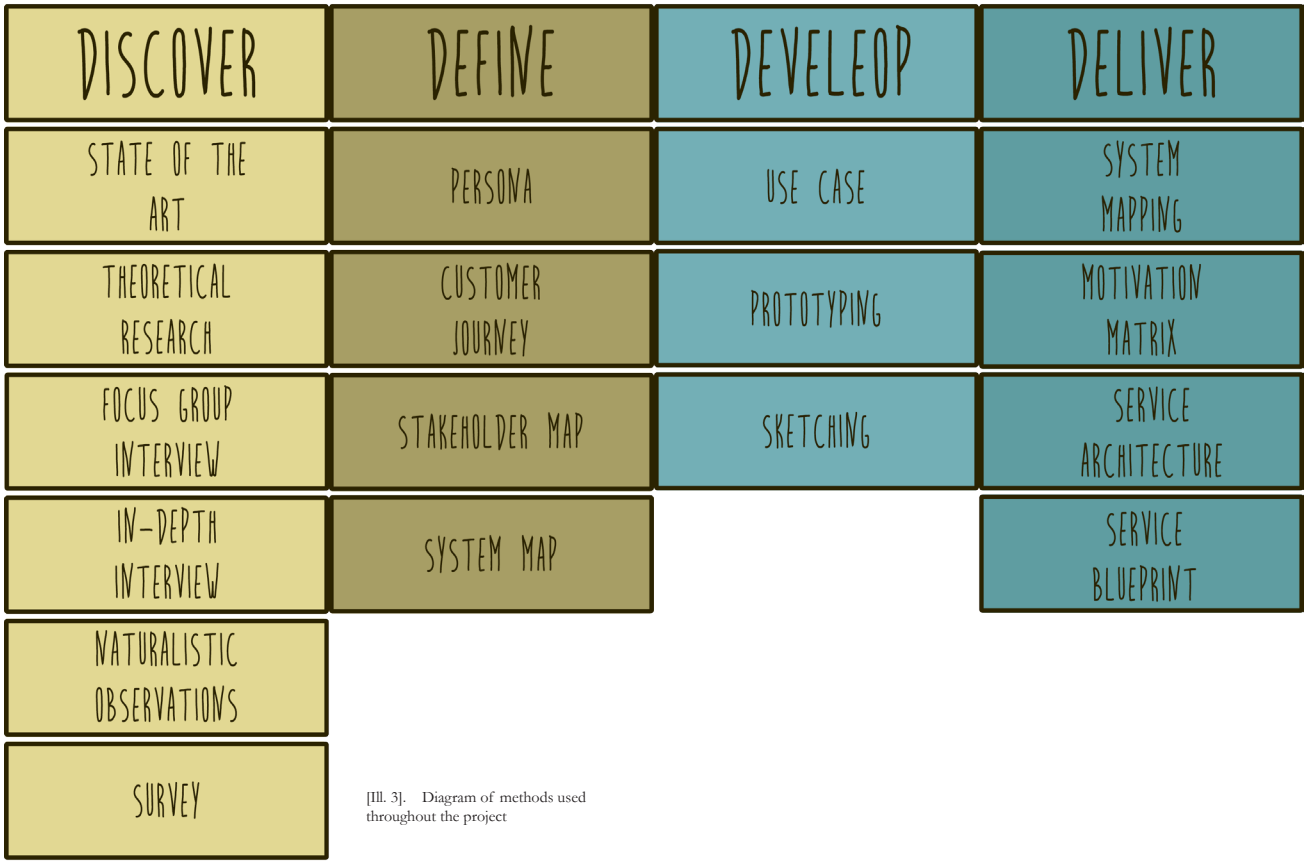
The tentative plan[Ill. 2] describes the length of the various phases defined in the Double Diamond Process(1.1 on page 5).

The discover phase is planned to be carried out over six weeks, between week 5 and week 10. The methods used throughout the discover phase, will be explained in the method chapter (1.3 on page 7)

In the end of the discover phase, the define phase will start. This phase will take all the research from the discover phase, and structure it, resulting in a specification of the problem, and a set of requirements to the design.
The Define Phase is planned to be carried out over four weeks. When the requirements are specified, the develop phase begin. This phase will be carried out during the deliver phase, to keep an agile approach, and test the prototype along the way. The phase is planned to be carried out over 6 weeks. The deliver phase is the final phase, where the design is refined and documented, making it possible to implement.
All methods during the process will be defined and explained in the next chapter.



[Ill. 2]. The tentative plan, made for the project



[Ill. 3]. Diagram of methods used throughout the project

1.3. METHODS

During each phase, several methods[Ill. 3] will be used to achieve the righteous information and knowledge needed. In this paragraph each method used, will briefly be explained, since the methods will be explained in depth, when used during the project.

The discover phase is about collecting and accounting knowledge and information. This entails both theoretical information, collected during desk research and anthropological information gathered through field research. The six methods, used during the discover phase are:

- **State of the Art Research([62]):** Research about state of the art solutions, within the area of the problem.
- **Theoretical Research:** Investigation of theories about areas that may be faced. The theoretical research, is providing knowledge about former projects or research, that may be beneficial to the project.
- **Focus Group Interview[63]:** Interview with a group of users, stakeholders or interests inside the system. The focus group structure, makes it possible for the participants, to elaborate on each others answers.
- **In-Depth Interview[63]:** An interview with one user, stakeholder, where it is possible for the interviewer, to make the subjects elaborate on their answers..
- **Naturalistic Observations:** An observation of the users or stakeholders in their natural environment. In this case it could be a student using the library online interface, or the librarian in the library.
- **Surveys[63]:** A survey, is a quantitative research method, where the participants get multiple choice questions. The answers can then be used in statistics, which can give a great picture of the users' needs. The method requires a huge number of participants, before any statistics are valid.

In the define phase, the discoveries from the discover phase, is narrowed down. During this phase, several models are used in order to communicate the analyzed findings from the research. Five mod-

els and methods is used, during this phase.

- **Persona[64]:** Persona is either a fictional or factual representation of the users. The persona are used for defining the different needs of the users. Each persona represents a group of the users.
- **Customer Journeys[64]:** A customer journey is a model presenting the users line of interaction during the existing service. Different customer journeys can be created, based on the different lines of interactions in a service, or different users of a service.
- **Stakeholder Map[64]:** A stakeholder map, is a model, presenting the different stakeholders and shareholders of a service and their effect on the service. This model is giving a picture of the affected stake- and shareholders in the service.
- **System Maps[64]:** A system map is defining the links between the different stakeholders, interfaces, touch-points and shareholders that are connected to the system.

To develop the new service, an ideation and conceptualization process must be carried out. To do so, several tools can be taken in use. In the present project few of the ideation and conceptualization tools will be taken in use, because it requires specific insight from the users perspective. The library system is very complex, and many stakeholders are affected, by a small change. The ideation is therefore done during many small meetings with several employees, from both the library and other shareholders. To communicate and ideate with the employees, these methods are used

- **Use Case[64]:** A use case of a service, deliver information about the different touch points, interacted with by the user, during the use of a service.
- **Service Prototype[64]:** The service prototype, is a method of testing the service concept. This can be done by making mock-ups of the service, presented with different techniques. After developing a low-fidelity mock-up of the service, a low-fidelity usability test can be carried out, in order to test the conceptual idea.
- **Sketching[64]:** Sketching is another way of communicating a concept. This is done through pictures or animation, making it possible to communicate the experience of the service, to the stakeholders.

The deliver phase is the phase where the project report, and product report are developed. It is also in this phase, where the design of the service is developed into models, to communicate the final service design. The deliver phase will consist of five different types of models, communicating the different layers of the service. The models used during the deliver phase are:

- **System Mapping[64]:** A system map is created, to make it visible what effect the new service might have on the original service, and eventually what new stakeholders that might be necessary in the service system.
- **Motivation Matrix[64]:** A motivation matrix is used to communicate the value exchange between the users, stakeholders and shareholders of the new service, and their motivation for joining the service.
- **Service Architecture[64]:** The model is showing the stakeholders, touch points, and the actions they are part of, inside the service system.
- **Service Blueprints[64]:** The service blueprint is communicating the final service, showing the interactions and actions inside the service over time.

All of the mentioned methods, is modified in a certain way to make them fit the purpose and content of the project. How the methods are used, is explained when carried out.

1. DISCOVER

To get a better understanding of the problem statement and find inspiration in where to start the investigation of the discovery phase, a study of the services, working within the field of the problem is carried out.

1.1. State of the art

In order to frame the problem statement defined, state of the art[62] services are investigated. The goal of investigating current services, is to understand the data, the material and the process of the different state of the art services on the market. The knowledge gathered is serving as foundation for a basic understanding, of the applicable mechanisms inside a targeting service. After the investigation of targeting services is carried out, cultural distributors are investigated. The cultural distributors are investigated, in order to understand what data is out there, and how cultural offers are delivered through other services.

1.1.1. Targeting services

Amongst the targeting services, streaming services are very interesting to investigate, since these services already make use of their users cultural interests, to target cultural material towards the user. Services such as Mofibo[5], Spotify[6] and Netflix[7] are all storing and utilizing data about the user, to target material towards the user.

Mofibo

Mofibo[5] is an eBook streaming service, making it possible to read all the offered books, for only 99 kr. a month. This is a service interested in earning money based on a minimal amount of material. This economic goal of Mofibo[4] means they constantly need to develop and improve their services. Mofibo is therefore utilizing the data of their users, to understand their needs. This is a key tool in the business, since Mofibo[3] is not paying the book owner, for the rights to the book, but pays every time a user is reading a book. It is therefore important to Mofibo, the users are reading the whole book, instead of just jumping between many books. By offering books targeting the user, based on the user's former readings, Mofibo is able to make their users read the whole books.

Spotify

Spotify[6] is utilizing data about their users in two ways, by target songs and by target advertisements, towards their users. The data used in targeting the user is, the user's taste in music, use of platform, time of use, registration data and geographical data. By targeting advertisements[18] towards the users, the value of the advertisement increases, because the advertisement is directed to real potential customers. In Addition to the advertisements, Spotify targets also music towards the users. The targeting of music towards their users, is basically a service offered to keep the users interested in the service. This targeting is done based on one's Facebook friends, interests on Facebook, the user's playlists and the user's history in listens.

Netflix

Netflix[7] is directing material based on former watched movies or TV shows, to keep the users interest. It is though not the most interesting part of Netflix targeting strategy, they are not only sending material to the user based on the user's preferences, they are actually creating material[10] based on the user's behavior. By obtaining knowledge about the type of platform used for streaming, and when the user stops, fast forwards or pause a TV show, they find patterns that helps to understand the needs of the user. These patterns are then used to refine the recipe of a movie or TV show. Instead of target already existing entertainment towards the user, they refine their material to fit their users even better.

1.1.2. Advertising

The services mentioned so far, are mainly targeting based on a specific type of media. However, other services which knows more about us, through our behavior on the Internet, exists. The two best known services are Google[12] and Facebook[13].

Google

Google[12] is the most used search engine in the world. With more than 3.5 billion searches every day, the search engine is one of the most visited web pages each day. When a search is made through Google, data about the search and the choice of result is stored, to one's Google account or cookies. This storage of data is used in advertisement targeting. In comparison to the streaming services, the content searched for at Google is everything, from vintage sunglasses and the size of a penguin egg to how the fabrication process of silk is carried out. Each of the searches, are saved in the history of the browsers, in ones Google account or at cookies at ones computer. At Google's privacy page[11], a large list of the data, stored by Google, is described. The data stored according to the page is as follows:

- Things you search for
- Websites that is visited
- Videos that is watched
- Ads that is clicked on
- Your placement
- Information about the platform
- IP-Address and Cookie data.

Facebook

Facebook[13] is a social media enabling the users to connect to each other. The connections are based on friendship requests, where people either accept or decline a friendship, like what others have written or join groups. Facebook is using the information the users give, to target advertisements and posts towards one's Facebook feed. The data used is based on almost every action on the webpage, including cookies of other webpages. The type of data stored by Facebook[14], can be divided into three different layers.

1. What you register at the profile. (name, age, marital status, parental status, friends, work etc.)
2. Actions and connections on Facebook. (likes, groups, posts, photos, links, clicks etc.)
3. Internet cookies.

1.1.3. CULTURE DISTRIBUTORS

To obtain knowledge about culture distributors, and frame the problem according to the distribution of cultural information, an investigation of the state of the art culture distributors of Denmark is carried out. Besides the library as a cultural distributor, there are many other actors, such as concert venues, cinemas, sport facilities, social clubs etc. To gain an overview of all these single actors, services that assembles the different cultural offers are often used, these services are also identified as civilizers. In the following chapter the state of the art civilizers of Denmark is investigated.

AOK.dk

AOK[16] – Alt Om København is a service owned by Berlingske Media, a Danish media bureau that operates the newspapers, Berlingske, BT and Weekendavisen, a couple of different web activities and the radio channel Radio24syv. AOK serves as a journalistic platform, where consumer enters the role as journalists. It is then up to these journalistic consumers, to add the different cultural distributors and events to the platform. When a cultural distributor is registered, it is then up to the consumers to review and grade the cultural actor. The core of the service is social innovation, making it possible for the users, to develop and add data to the web page. The web page has over 35.000 registered cultural actors, 3500 journalistic profiles and 700 reviews of current events.

IBYEN

IBYEN[15] is a part of Politiken, yet another media bureau in Denmark. In comparison to AOK, where the cultural consumers are the journalists of the platform, IBYEN is operated and edited by professional journalists from Politiken. All of the events and cultural actors added, are either added by journalists of Politiken, or drawn from other cultural platforms such as bordibyen.dk[65] (Booking service for restaurants), Billetnet [66] (Ticket sales service, managing all kinds of events that sells tickets), Kulturklik[67](A register of museums in Copenhagen Area, that manages events of the museums. Is a part of CPHMuseums), eBillet[68](Another ticket sales service), Kino[69]

(A cinema ticket sales, and journalistic platform) and Teaterbilletter [70](a theatre ticket platform). This platform can be considered as a more formal platform, since it is edited and operated by professional journalists and editors.

Kultunaut

Kultunaut[17] is a culture guide platform, developed in cooperation with public institutions. The culture calendar of Kultunaut is one of the largest in Denmark, with over 15.000 new events added to the schedule each month. Just as AOK, the cultural information is added by the users of the webpage. In contradiction to AOK, the users of the service adding cultural information, is not only the consumers, but also counties, municipalities, tourist organisations, associations, libraries, newspapers, Television, venues, theatres, culture houses, internet platforms and civilisers. In exchange for the data from the different users, Kultunaut[8] are delivering cultural data back to the users. The actors are thereby using the data from kultunaut to offer a schedule to their users, about what happens in the local area.

1.1.4. STATE OF THE ART ANALYSIS

By investigating the state of the art streaming services(1.1.1 on page 10), advertisement services(1.1.2 on page 10) and civilizers(1.1.3 on page 11), an understanding of which challenges that can be faced during this project are identified. The investigation of the state of the art services, has lead to some interesting discoveries about how to target the users. By using data from the user's behavior and interests; aggregated during the use session of the user; aggregated from the users cookies at the computer; and aggregated from the social medias account, of the user. Several methods are used in order to deliver as much value as possible. Such as the methods carried out by Mofibo and Netflix, only using the data gathered from the users, during the use session, in order to make their service more effective. Amongst, actions of the users, used by the service, are choice of title, and how far the user reads or watch the title. Spotify is using both external data(Facebook) and data of the use session, about the music listened to by the user, or favorite numbers.
Using data about the use session is interesting, since this kind of data, also can be aggregated, through the user's use of the library web page. By recording data, about choices of the users, insight about the users cultural interests might be gained. If the cultural interest of the user, is to be identified through data of the library, the user's needs to deliver data about their cultural interests. To understand if the users are using the library, to find cultural information, and by then delivers information about their cultural interests, an investigation of the high school students interactions with the library must be carried out. Furthermore a study in the it-system of the library must be carried out, to understand what data are accessible and if it is possible to link any third party profile(Social Media Profile) to ones library account. Through the state of the art study, of advertisement targeting services(1.1.2 on page 10), such as Google and Facebook, a third data source is discovered. Google and Facebook are using cookies stored on the computer, to understand the users interests. These cookies are stored locally on the users pc, and can store data about the users navigation and browsing history at the Internet. This extra data source might become relevant, in order to define the high school students cultural interests. An investigation about how the high school students are searching and maintaining their cultural interests must be made, in order to understand, if cultural data about students, can be aggregated through social media and cookies. The study in state of the art civilizers, showed that there is a huge amount of data accessible, to offer cultural information to the users. The accessible data provided by the civilizers are structured, making it possible to use directly in a service, without analyzing or sorting the data first. The use of the civilizers data, makes it possible to offer a wide range of different cultural offers, since the civilizers are storing data from a large amount of cultural distributors of Denmark. After investigating the several state of the art services, insight in how to target and deliver cultural data to consumers, is gained. This new insight is providing information about the investigation needed to be carried out. The two main areas, needed to be investigated is, the current library system, the students behavior, and the students use of the library. Furthermore a study in the high school, and an investigation of the data available from the library, is carried out.

1.2. THE LIBRARIES OF COPENHAGEN

After the study in state of the art services, an analysis of the current service system in the library, is to be carried out. The purpose of the analysis is to understand how the current system is structured, how a solution to the problem can be designed into the current system, and whether it is possible to adopt any of the mechanisms from the state of the art study.

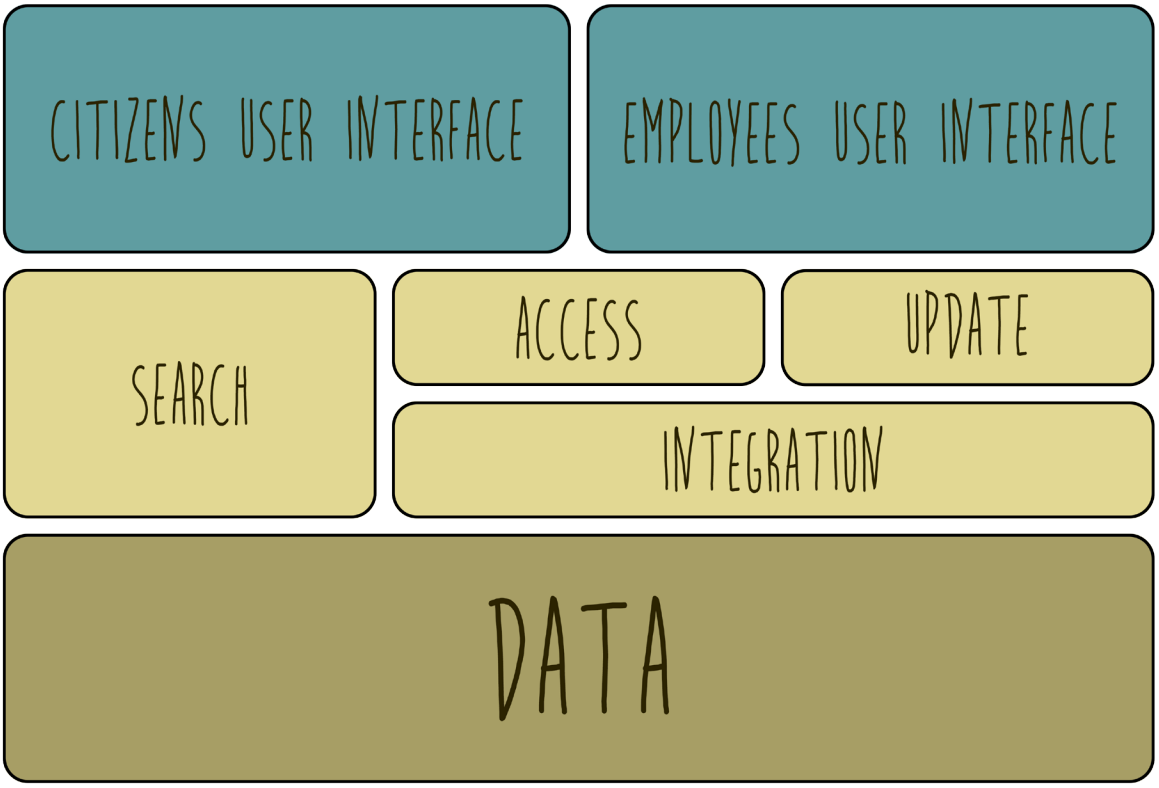
The Libraries of Copenhagen[19] consists of two kind of touch points, digital touch points and physical touch points. The digital touch points consists of a web page for the users of the library and a service for the employees of the library, while physical touch points consists of the library buildings and the librarians. The analysis is taking output in the digital interfaces, where the it-infrastructure is studied and defined. After the analysis of the digital interfaces, an analysis of the physical touch points will be carried out.

1.2.1. DIGITAL INTERFACES

The it-infrastructure of the entire library system is very large, and includes 34 user interfaces, 40 different services, and 18 databases. During this study only the most significant parts, that are connected to the Libraries of Copenhagen will be investigated. The diagram [Ill. 4] is showing a model of how these different parts of the IT-infrastructure are divided. The model is divided into three different layers, where the data layer is serving as the backbone of the total library system. To understand the other layers of the IT-Infrastructure, including the service layer(middle) and the interface layer(top), an understanding of the data is needed. The investigation is therefore starting with a detailed study of the data layer.

Data: DBC and The Data Well

All data about material, which can be found in any library of Denmark, is stored in a database provid-



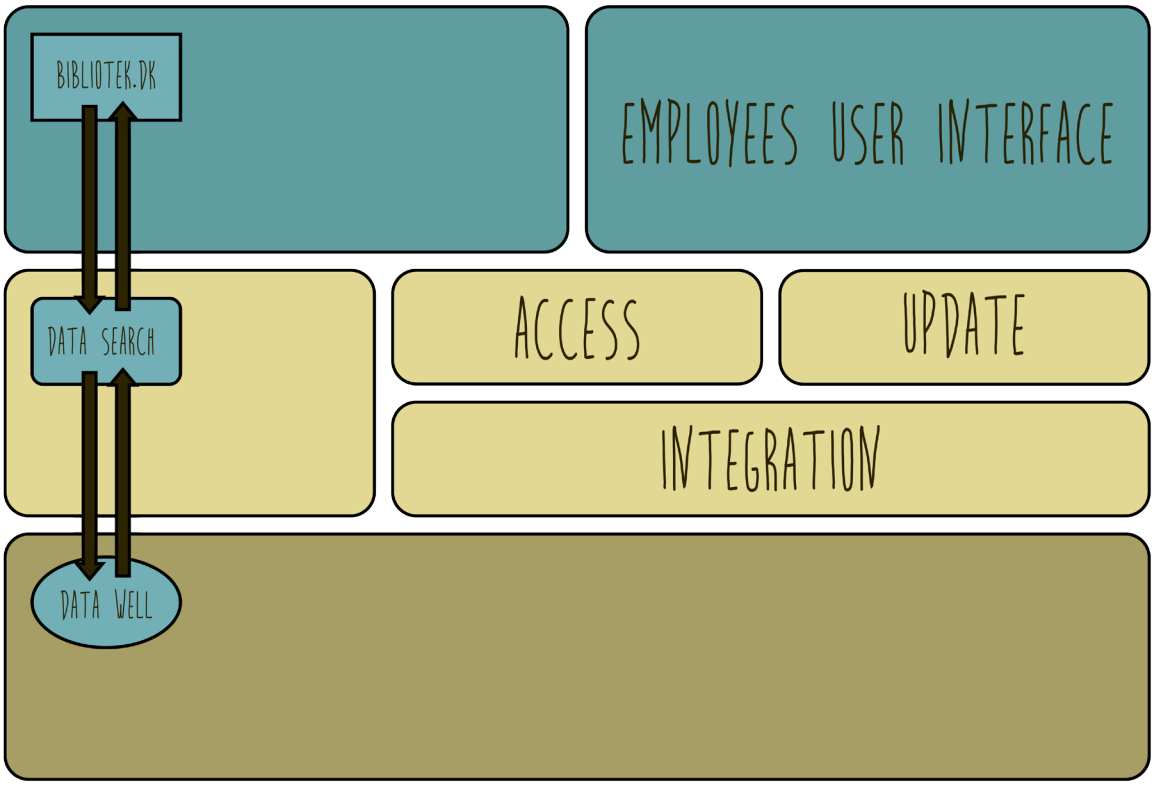
[Ill. 4]. The model illustrates the three layers in the IT-Infrastructure. **Data:** Data Well is storing data ranging from free material, licensed material, additional data, behavioral data, interlibrary loan and administrative data (digital purchases, inventory, loan, patrons etc.) **Search:** Web Services able of searching, filtering and distribute objects from the various data wells. **Access:** Components that secures easy and fast access to the provided materials of the library. **Update:** Web Services that automatically or manually update repositories in the data layer. **Integration:** Components, which ensures integration with other systems. Typically dedicated systems such as the library system. **User Interfaces for citizens:** Local directory websites, bibliotek.dk, netbibliotekerne and mobile interfaces.

ed by DBC[20][1], this database is known as, and will be referred to as the Data Well. The Data Well is a Content Management System, keeping track of data about material of the libraries.

The Data Well [21] [Ill. 5] is serving the Libraries of Copenhagen, as data provider, delivering information about each piece of material, when asked. The use of the Data Well will be elaborated later, during the analysis of the services of the library. It is not only the libraries of Denmark, which makes use of the Data Well, amongst other services making use of the Data Well are:
Filmstriben[22]
Faktalink[23]
Forfatterweb[24]
Litteratursiden[25]
Gyldendal[26]
Statsbiblioteket[27]
Condidact[28]
Clioonline[29]
eReolen[30]
e-Kurser[31]
Historisk Atlas[32]
1001 fortællinger[33]
Safari Tech Books[34]
Oxford Reference Online[35]
Biblo[36]
Filmcentralen[37]
UC Viden[38]
Credo Reference[39]
TURteori[40]
EBSCO[41]
Zinio[42]
PressReader[43]

The Data Well is also said to store data about the customers behavior, but when asking more into that specific data, only very little was accessible. DBC[44] is owned by KL (National Organisation of Municipalities), and managed by DDB(Danske Digitale Biblioteker)[45]. To make use of the Data

1 DBC is a company providing bibliographic and system infrastructures to libraries in Denmark



[Ill. 5]. The links between the layers of the IT-Infrastructure, describes how the communication between the structure is carried out.. When a user is assesses Bibliotek.kk.dk, the user assesses the interface layer. When the user searches for media, information is sent to the service layer. The service layer process the information, and asks for data from the bottom layer, the Data Well. Based on the search, information is sent back to the interface.

Well, the library uses the DDB-CMS[45] that provides services to libraries, through the use of the Data Well. To understand how and which services that are used by the libraries, the services delivered by DDB is investigated.

Services: DDB

Danish Digital Libraries (DDB)[45] is an organization that manages the cooperation between KL (National Organization of Municipalities), and the Culture Ministry [46]. The purpose of the organization is to strengthen the libraries accessibilities, by managing and distribute digital medias. DDB [45] is the organization that manages the IT-Infrastructure of the libraries, and develops the IT-Services of the library. DDB is the service owner of the services in the middle layer[Ill. 5]. The development department of Copenhagen's Libraries is a part of the board in DDB, and when a new service is developed for the libraries of Copenhagen, DDB is the recipient and manager. As stated earlier, the libraries makes use of the DDB-CMS[45][2] to gain access to services delivered by DDB. The DDB-CMS is serving as a package, which the libraries can subscribe to. The package deliver a ton of services to the library, which can be implemented to their user interface. The most visible and used service, amongst the many services delivered by the DDB, is the news feature, event calendar, and search and browsing service. Since these services seems to be of the most important ones in the library system, these services will be elaborated on.

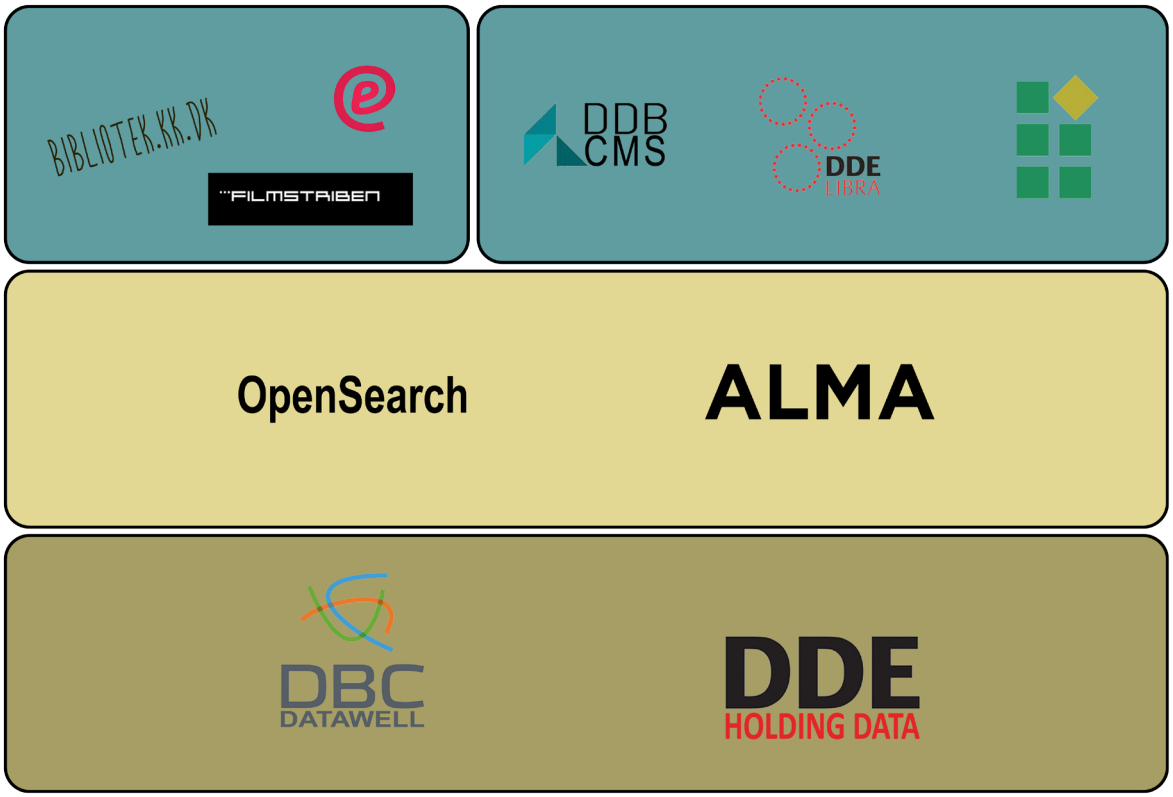
The event service is delivered as a Wordpress[3] framework to the library through the DDB-CMS. This framework makes it possible for the employees, to add data to an event calendar in Wordpress. All of the events in the calendar, is then added automatically to the event calendar at the web page. At the libraries of Copenhagen, each of the libraries are adding events, and the digital development department is then editing and managing the calendar. The news service is just as the event calendar, a framework that is managed by the libraries themselves. The service is directly edited in Wordpress based on a Wordpress template. DDB is only responsible for updating and developing eventual larger changes and functions of the news and event service.

In contrast to the news and event service, the browsing and search service is edited, managed and developed by DDB. Both of the services makes use of the Data Well from DBC, in order to deliver answers based on the user of the service needs. The search service is named OpenSearch[47], and works as a link between the citizens user interface and the Data Well and makes it possible for the user to access and receive the data of the Data Well. The browsing service is complementing the OpenSearch service, by making it possible to go through all of the results on a list, delivered by the OpenSearch Service. To understand how the services are operated through the citizens user interface, the interface is analyzed.

Citizens UI: Bibliotek.kk.dk

The citizens user interface of the library, is the webpage Bibliotek.kk.dk[2] [Ill. 6], which is connecting the users of the library, to the digital services, provided by DDB. Bibliotek.kk.dk is based on a series of specific services developed by DDB[45], services that makes it possible to login, search, present and borrow material from the library. These services developed by DDB[45] are delivered as an API to all Danish libraries who are using the DDB-CMS, which connects all the libraries to the DBC Data Well. The web page is the main digital touch point of the library, and the only digital platform to the user, when searching and borrowing material from the library. To find the right material, the user types into a search bar the title/name of the item/subject the user want to find. This search is working as a call into the Data Well, where information about materials related to the search word is returned. The information about the materials is presented as a list, making it possible for the user to browse through the material. When the right material is found, the user clicks on the name or picture of the material and a webpage with information about the specific material appears. To borrow anything, the citizen needs to have a user account at the library. To get

2 CMS, is a Content Management System.
3 Wordpress Framework is a CMS facilitating functions of a webpage.



[Ill. 6]. The Model is showing the different interfaces, services and databases in the library's infrastructure. Some parts haven't been mentioned during the report, because they are of very little importance in correlation to a future targeting service. While others will be explained later in the report.
In the data layer of the model:

- **DBC Data Well**
- **DDE Holding Data**

In the services, two services are presented:

- **Open Search** which is a part of the DDB-CMS.
- **ALMA** which is the holding service from DDE Libra.

In the user interface layer, the citizens' interfaces are:

- **Webpage** of the library
- **e-Reolen** an online e-book service
- **Filmstriben** a movie streaming service.

The interfaces of the employees are

- **DDB-CMS**, which is the API making it possible to use the services on the webpage.
- **DDE-Libra**, the media management service.
- **IMS** the intelligent material system, that manages the physical material.

an account, the citizen is simply using its Nem-ID. After logging on to the profile, the user is now able to borrow material. The webpage is edited by the IT-development department of Copenhagen Libraries, where the webpage design is constantly tested and further developed or improved.

At the frontpage of the user interface, the event calendar and news feature are placed. These services are delivered directly to all of the users accessing the webpage. When the user clicks on one of the events or news, they are lead to a new page elaborating the content of the news or event. So far the services and interface mentioned, have been addressing the citizen. To manage the data delivered to the employees, another interface is used. This interface is called DDELibra([46]), and is known as the library system amongst the employees of the library.

Employees UI: DDELibra

The employees are mainly using one specific user interface called DDELibra[52], making it possible for the library employees, to look up data about the users and data about the library medias. The system is handling the transactions when a media is borrowed, and is then storing the data about the users. When library media is borrowed by the user, DDELibra pulls data about the media from the Data Well, checks whether the media already is borrowed, if it isn't borrowed, the media is connected to the user's account. DDELibra is also used to register new media by the employees. When a new media is bought by the library, the data about the media is manually registered by the employees of the library. When the media is registered, the data is sent to the Data Well. It is possible for the libraries, to access the data registered by other libraries, it is therefore only necessary to register media once in DDELibra, to digitalise the data for all libraries in Denmark. DDELibra is also providing a service to the libraries, that keeps

track of the physical medias. This service is called ALMA, and makes use of a database, which in this report, is called DDE Holding Data. The Holding Data is storing the information about who borrowed what, and for how long.

Results of: Digital Interface Study

During the study of the library's IT-infrastructure, a large amount of different interfaces, services and databases was identified. Because of this huge amount of different parts in the IT-infrastructure, a sorting of parts, perceived as relevant to the problem statement was needed. The purpose of investigating the digital interface and IT-Infrastructure of the library, is to understand how the current system is designed, and to identify the elements of the system.

In relation to the questions defined during the state of the art study, about the accessibility of data about the user of the interface. There are several ways data can be aggregated, during the user interaction with the web page. When searching for material, the user is typing words into the search bar. These words can reveal something about the user's interest. Furthermore it is possible to record the clicks of the user session, when the user is browsing through material which might be interesting to the user. This data reveal information about the users interests, the data can however also be biased, because the user might not know what to search for, or what she/he is clicking at. If such data is to be used, in order to understand the users cultural interests, the bias that can be created must be taken into consideration.

Another way data can be aggregated, is by using the data directly from the users library account. By using the data of the user account, it is possible to track the specific interests of the user, by linking the interaction data to the account. Furthermore it is possible to link the account with different social medias of the user, in order to understand the cultural interests of the users, based on a combination of social medias and user interactions. By logging on to an account, the machine knows who exactly is using the interface. Even information about the age of the user and the gender is available through the CPR-number. The current search and browsing service used in the interface, does not remember the history of, the searches or other activities on the online platform, or any other activities in relation to the library. The library does however store data about the user's behavior and loans. This data is unfortunately not available due to Danish privacy law. It is therefore at this point impossible to use the data linked to the user's library account.

So far, state of the art services have been investigated, and the digital interfaces, and IT-Infrastructure have been studied and analyzed. This system is based on the users ability of handling and using the search machine, to find the right material for the user. To target information and material to the user of the library, a librarian is used. In order to understand how the librarian is targeting, suggesting and delivering material based on the wishes and interests of the user, the librarian is studied.

1.2.2. Physical Interface

At the library the users are either making use of the digital interface, or the librarians. When the users assesses the librarian, the librarian works as a highly intelligent search engine, that understands the users' interests, needs and goals. The librarians serve the role as the interface of the library, able to analyze the user, and understand their needs. To understand how this process is carried out, a study about the librarian is made. To study the librarians, an interview with the librarians responsible for high school students is conducted.

Interview with the librarians

Since it still is unclear, what actions and tools the librarian use to analyze the students in fulfilling their needs and target information to them, the interview is designed as a semi-structured interview[63]. Doing so, gives the interviewer possibility to make the subject elaborate on their answers. The semi-structured interview form, makes it also possible to define questions, which makes the

subject reflect upon a topic in another context.
The environment chosen, to conduct the interview in, is the subjects own environment, since this is a relaxing space for the interview subject. The interview is planned to be about an hour. The purpose of the interview, is to understand the tasks that are carried out by the librarians at the Main Library of Copenhagen, to investigate what tools the librarians use, in order to understands the users needs, and how the librarian identifies and targets material to the student.

Result

The librarians have two functions, one general function that is to expedite and serve the users of the library, and an area specific task such as arranging exhibitions, art, lectures, events, courses etc. The interview is only covering the task of expediting the users of the library.
According to the librarians, their experience and knowledge combined with a very basic set of techniques are used, in order to serve the users of the library. By asking the user, about the users interests and experiences with different medias and topics, the librarian is able to understand the users urge. Two examples of the explained procedure is given by the librarians.

1. By valuating the user's interests based on their former read literature, the librarian suggests literature of the same author, literature from an author with the same writing style, or literature about the same topic. Since it is impossible for the librarians to remember all literature of the library, the librarian is highly trained in searching for books, using the user interface DDELibra.
2. The librarian asks the user what he/she is searching for. Instead of trying to fulfill all the parameters the user requires, the librarian analyzes the parameters in order to change some of them, while still keep the interest of the user.

If the librarian succeed in targeting a literature, to the user, the user tends to come back to the same librarian, in order to get more inspirational literature.
To identify a high school student, the librarians are asking directly into the students needs, and in which context they need the material. It is mainly in connection with larger school projects, the high school students are assessing the librarian. The librarians are using the high school educational goals, to understand the complexity of material that is needed for the student. Furthermore, the large projects themes are given to the librarians, before it is released to the student, in order to secure, that the librarians are ready to help the students.
When students are in need of non-educational material, the librarians are rarely used. According to the librarians, it may happen that high school students are using expedition for non-education material, but the librarian is just not identifying the user as a student. The librarians are therefore uncertain, whether students use the library to search for any material, outside the scope of educational use.

Analysis

It is clear that the librarian use their experience and knowledge about the material, in order to fulfill the users needs. This knowledge is according to the librarian difficult to explain directly, and is just a matter of the interaction between the user and the librarian. The best tool the librarians make use of, is their experience and knowledge, which is impossible to perceive and translate into a digital service. The method used by the librarians, is very close to the method used by the State of the Art services(1.1 on page 10), to target information to the users. The only difference, is that the state of the art services, uses an algorithm, while the librarians are trained people able to observe and question the users.

The fact that high school students, only consults librarians, if they are in need of material related to their study, is interesting to present project, since the outcome of the targeting service designed in present project, is to deliver cultural information to high school students, based on their study and cultural interests. Therefore it is difficult at this point, to tell whether students are using the library, for other purpose than study.

1.3.1. SUMMARY OF THE LIBRARY STUDY

So far, a study in relevant state of the art services(1.1 on page 10) have been carried out. Through the study, a brief and overall understanding of how different targeting services are using data from the user, to deliver material/products/services within the users interests. These services, makes use of three different types of data, Use Session data, Cookies and Social Media data.

After studying the related state of the art services related to the problem statement, an investigation of the already existing system was made. This investigation showed that the library system is a very large and very complicated system, most of the elements in the system was therefore filtered, and only the most important parts were investigated. The only user interface of the libraries of Copenhagen, is the web page Bibliotek.kk.dk. Through this interface it is possible to record the users actions and choices, just as the state of the art services are doing. Furthermore, it is possible to use cookies stored at the users computer, through the web-page. In relation to use social media data, it is possible to create the link between the user's library account and the user's social media accounts. This action is however, not legal at this point, since the library is not allowed to save data, that can be traced directly to the user. The manager of the services delivered through the library webpage is the organization DDB. This organization, is the obvious service taker, since this is already managing all of the user services.
By analyzing the physical touchpoint/interface discoveries, about how to analyze the users needs, were found. Two examples given by the librarians, shows that librarians are using tools to understand the user, closely related to the methods used by the state of the art services. The librarians use information from the high schools, to understand what kind of material that could be relevant to the student, both in project study periods and in general. An analysis of the study goals of the high school student needs to be investigated, in order to understand how to combine these goals, with the users cultural interest.
During the study of the library system, it became clear that a future solution to the problem statement, should make use of several layers of cultural information about the user, in order to target the user as precisely as possible. These layers of cultural information, can be a mix of data from the library, cookies from web services at the computer and/or social medias. It is though at this point difficult to define the specific layers, since knowledge about where the user is searching for new cultural information or maintains their already existing cultural relationships is lacking. An investigation of the users behavior and needs is therefore to be carried out.
Before investigating the user, the study goals of the high school student needs to be investigated, in order to understand how to combine these goals, with the users cultural interest. After investigating the Danish High School, a study about the high school students use of the library and how they search for new, and maintains existing, cultural relations, is carried out.

1.3. THE HIGH SCHOOL

According to the High Schools Order of Education[48], the high schools role is to equip the students, to take a higher education. In order to prepare the students in taking a higher education, lecture plans and curricula are published every year. The lecture plans, and curricula are divided into subject and level. It is then up to the individual high school teachers, to use and plan the lessons of their specific subject, so the curriculum and lecture plan is fulfilled. To make it possible for the student, to be prepared for each lesson, each teacher uploads the lesson plan to a kind of a communication platform. These communication platforms makes it possible for the student to interact with the teachers and other students of their own high school. The platforms serves also the role as a planning service, where the students are able to upload internal events, that can be added to the calender. The platforms are known as the intranet, and handles everything from events, lectures, schedules, hand ins and absence. In order to know which data, is saved at the platforms, an investigation of the different platforms is carried out.

1.3.2. LECTIO

Lectio[74] is the largest high school platform in Denmark, covering 3/4 of Danish high schools, delivering one platform, that handles Study Administration, Communications and Digital learning resources. The platform is a web based Online platform, making it possible to access everywhere. The server is constantly developed, managed and backed up by the Danish service provider[75] MaCom. This means, the high schools using the service, avoids extra expenses related to upgrades and service of the system. Lectio consists of six different modules, that can be added to the service, depending on the high school's needs. The modules offered are:

- Ground Module
- Student Module
- Study Module
- Exam Module
- Hour and Subject Module
- Censor Module

The Ground Module is the foundation of the service, including the most basic features. Using the ground module, it is possible to follow the latest schedule of a student, team, teacher, class or room. The service keeps track of the activities, making it possible to see the actual status of the subject. The teachers are able to create lectures in Lectio and add a description to it, using the ground package. The Student Module adds on features, making it possible for students, administration and teachers to follow the absence of a student. The module adds also a grading system, making it possible for the teachers to write in grades of the students, which afterwards is released to the students. The study module makes it possible to plan, manage and evaluate the curriculum of the studies. The module facilitates also a social platform, making it possible for students and teachers, to create groups across studies. The exam module provides features in relation to exams, such as planning of an exam, scheduling, reporting and managing study scripts and diplomas. The hour and subject module, is an administration module delivering features making it possible to manage the working hours of the teachers and allocate subjects between the teachers. The censor module, is facilitating services, making it possible to execute digital written exams. It is possible for the censor to grade the exam material through the platform.

Besides Lectio, Ludus from CSC[76] and First Class from Opentext[77] are used in some high schools. These platforms are though redundant to for this project, since all of the high schools in Copenhagen are using Lectio.

1.3.3. ANALYSIS OF THE HIGH SCHOOL

Throughout the study of high schools, discoveries about digital education platforms, were made. These platforms makes it possible for the teachers, to delegate the homework, and inform about themes and curriculum of the studies to their students. All of the communication is digitalized and personalized through Lectio. By using this data stored in Lectio, the cultural data[1] from the student can be combined with the curriculum and thereby the study goals of the students. To understand which data that can reveal information about the students cultural interest, an investigation of the student and their cultural interests are carried out.

1 Data gathered from social medias, cookies and user sessions, that tells something about the culture of the person.

1.4. HIGH SCHOOL STUDENTS AND THEIR CULTURE

To understand, what data that is produced by high school students, how students cultural relations are maintained, and how students cultures are defined, a study of the high school students and their culture is carried out. The study is carried out, partly as theoretical desk research, and partly as an interview with, and observations of, high school students. The theoretical research, is serving as a foundation based on former research, while the

interview is focusing at, how cultural interest are found by the students, and why and how the students use the library.

1.4.1. THEORETICAL RESEARCH

Youth culture was until the post-war not existing[49], because the youth at that time, just were a short transition between childhood and adulthood, where the youth were striving for establishment as an adult. During the post-war, the economy of USA, were increasing greatly, resulting in an increased economic freedom for families. The economic freedom, gave the youth the possibility to stay at home for a longer time, making the foundation for the youth, to study for a longer period of time. The transition between child and adult, were stretched into a long period, and a new middle stage were defined, the teenage stage. In this new stage, the teenager is able to create its own identity based on new norms and roles, clothing style and music taste.
Until 1990 it was easy to identify and define the mainstream culture and subcultures. The subcultures were defining themselves as counterpoint to the mainstream culture, while the mainstream culture were identified as the dominant culture and the commercial market. The subcultures identified themselves through the use of special aesthetic markers[49], such as a specific clothing style, music style, language etc. In the 80ies et was the punkers, discos, heavy rockers, 70ies – 60ies the hippies and flower-powers and in the 50ies the leather jackets.

The late Modern Youth Culture

Since the 1990ies, it has become more difficult to distinguish between youth subcultures and the youth mainstream culture, when looking at the aesthetic markers. An increased amount of new trends is popping up, in the shape of commercialized subcultures, along the revival of retro cultures. In comparison to the earlier self-identification through a culture, where the teenager either are following the prescriptions of the commercial market or a specific subculture, late modern teenagers are trying to identify their own unique expression, by mixing elements from different cultures. Former and current aesthetic markers, are mixed in infinite various ways, almost everything is allowed, as long the individual is expressing its own style. It has simply become mainstream to not be mainstream.

According to Anthony Giddens[59], individualization is one of the main features of the late modern society. As a teenager in the society, it is necessary to create a strong and recognizable identity, that expresses the idiosyncrasy of the individual. Niels Ulrik Sørensen[60] states that it is not possible as a youngster, to hide behind a predefined identity anymore. Even in subcultural communities, a unique identity of the individual is necessary. In relation to the statements of Niels Ulrik Sørensen, and Anthony Giddens, Thomas Ziehe[50] have through observations and studies, identified and defined three different reaction patterns of the late-modern human. The three patterns are called Subjectivism, Ontologism and Potensivism.

- **Subjectivism** means to be aware, of other people thoughts about one. It is not enough to know that you are sufficient, but the society needs to confirm your identity. In the late modern society, the individual needs to create an expressive identity, which results in a constant competition of getting others attention. This competition is a matter of expressions through using aesthetic markers of different cultures. It is not only about being a part of the culture, but to create an even stronger identity through the culture.

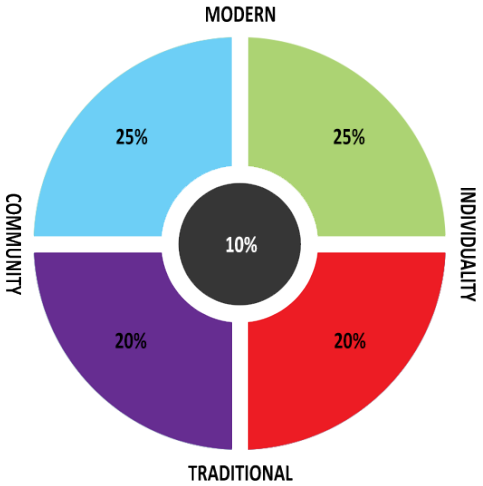
- **Ontologism** is defined as the search for a safe place to be, in a society under constant change. This is the reason behind the still existing sub-cultures such as the skater culture, hip-hop culture, punk culture etc. These sub cultures, are used by todays youngster as pointers and temporary safe, in the strive of something new. Ziehe is analysing the strive of something new, as a way of fleeing from the empty feeling and uncertainty, related to the individualism.

- **Potensivism** is about, feeling that you are living. It is the strive of the youth, to achieve a constant intensity. The person is fleeing from

everything that is about to get boring, in the search for more intensity.

The three reaction patterns defined by Ziehe[49], supports the theory of Henrik Friis Madsen[49], that the frequent change between the culture of a youngster, is a result of the constant search for new cultures, because it is hard to maintain an individual identity. The constant shift between different aesthetic and cultural communities, is an attempt in defining one's own lifestyle and identity, resulting in a constant demand of new intense experiences. Maffesoli([54]) and Giddens[49] are defining the former known youth cultures, into two new definitions of culture. The neo-tribe culture and the clean relationships. The neo-tribe is a definition covering the temporary communities created at a concert or football stadium by the fans, where people together are creating a temporary relationship, with specific norms, gestures, songs and clothing style, without necessarily having other relations than the one they are sharing. Giddens[49] defines the clean relationships as, relationships only build on benefits. As long the participants of a relationship profits from the relationship it will maintain, no matter the kind of relationship. The profits of a relationship, can be acknowledgment, an identity, love, intense experiences, feeling of community etc.

The whole theory about student's individualization and difficulty in defining themselves, is backed up by the Minerva model[Ill. 7][53], which as well claims that teenagers are undefinable. The teenage group is segmented in the 10% black mass in the middle.
In comparison to the history of the youth culture,



[Ill. 7]. The minerva model, is a model used to segment consumers.

the youth culture of the late modern society is much more complex. The late modern youth, have over a decade changed from identifying themselves through aesthetic markers of a specific culture, to individualize themselves through the use of many temporary relationships to neotribes and a mix of several aesthetic markers of different sub-cultures. The youth, is creating their solid relations, based on cost/benefit, where one should profit from the relation he/she is participating in. Besides the struggles in defining a recognizable identity, a demand of intensity in the life, resulting in constant shifts of relations.

The discoveries in the youth culture of today, is very interesting in perspective to the present project, since youth culture today isn't tied up on some defined cultures, but on several aesthetic markers, from different sub-cultures and neo-tribes. This means that aesthetic markers, are the only way to define a high school students constantly changing cultural expression. The service system needs to be designed, acting dynamically to the data gathered from the students, to make it possible for the service to find the constantly changing cultural relations between the users. The data used to target cultural offers towards the student, will be based on the aesthetic markers. At this point, it is not transparent where to detect the aesthetic markers of a student. To understand how the student is navigating within the cultures to obtain new aesthetic markers, qualitative studies of the student's behavior and needs, have to be carried out.

1.4.2. Interview with the students

To understand how students are searching for new aesthetic markers to adopt, and identify the data accessible from the user, an interview is carried out. The purpose of the interview, is to make the high school students reflect upon their behavior and method in adopting an aesthetic marker. However, not only the culture is studied during the interview with the students. To understand how students currently are using the library, both physically and digitally, questions about the students

use of the library is carried out. The results of the interview is used to, define requirements of the student, define the students use of the library and to define which data distributors that are available, in order to define the user's aesthetic markers.

Procedure

The interview is organized as a semi-structured interview[63], and the sampling is based on the convenience sampling method[63]. The convenience sampling is a non-probability sampling method, based on the "easiest way to find subjects". This sampling method is chosen, because any other sampling method, will require a huge selection of possible subjects. The interview is designed as a focus group interview[63], since it facilitates the possibility of communicating and reflecting between the students. To make the focus group subjects reflect upon their choice of aesthetics markers in cultures, an association game is used. The association game [Ill. 8] is designed as a card game with pictures of different aesthetic markers. The aesthetic markers on the pictures, will be based on pictures of real life items. The pictures will be spread out on a table, before the subjects are entering the room.

[Ill. 8]. Some of the pictures, designed to be used in the association game.

Before starting the interview, a briefing about the project, the purpose of the interview, and the subjects' rights, is carried out. After the briefing the subjects is asked to choose some of the pictures of things they like. When all of the subjects have chosen their pictures, they are asked to tell about the picture they have chosen, and why they chose it. After the students have explained the background of their choice, the subjects are asked a couple of questions about where they find the aesthetic markers shown on the pictures. The subjects are allowed to complement each other's answers. The subjects are afterwards asked what kind of events they attend, why they attend them, what they gain from it and if they feel they are a part of the event. After the first part of the interview is carried out, a small break is implemented to avoid fatigue amongst the subjects.

When the subjects are back after the break, a new game is introduced. This game is the Customer Journey Mapping Game[71][Ill. 9]. The game is designed as a tool, to define the customers' interactions in an already existing service.

[Ill. 9]. A picture of how customer journey mapping can be done.

The subjects is each, getting their own game, where they define their journey in the use of the library. When the user is done defining their journey throughout the library system, they are asked to elaborate their journey. The purpose of the elaboration, is to give the other subjects and the conductor a chance to comment on the journey. After the elaboration of the journey, the subjects are debriefed and asked if there are any questions or comments to the interview.

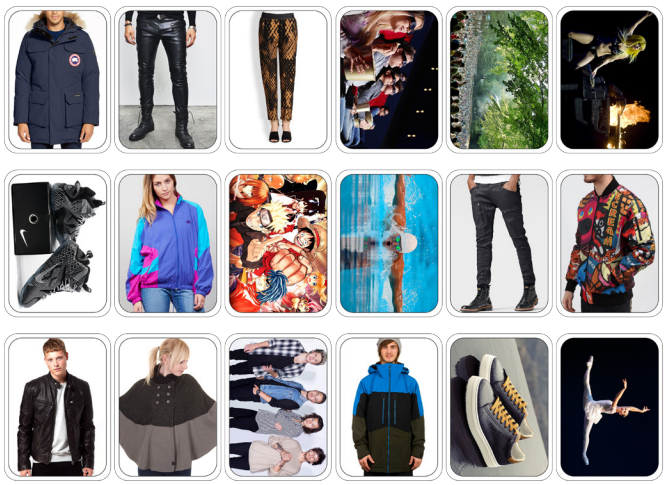
The planned interview were never conducted, because the students were not able to participate in interviews, due to time pressure. Several students were contacted, but non of the students, were able to find time in their schedule to participate in the interview. Instead of an interview, they requested for a survey or just questions written, that could be send to them. A survey was therefore carried.

From Interview to Survey

The interviews are changed into a Survey[63] with open questions, since the students are not

able to find time in their schedule to participate in an interview. To secure that some data about the high school students is gathered, the interview is transform into a survey, where it is possible for the students to elaborate on their answers. Since the primary purpose of the interview, is to study the student's relation to the library, and investigate how they achieve information about how they find aesthetic markers, the survey concentrates around those two areas. All questions are presented in Danish, to secure the students are able to fully understand the questions. First part of the survey is created to filter out participants not studying at a high school. If the subject of the survey answers no to the question about attending high school, the subject is sent to the end of the survey. If the subject however answers yes to the question, the subject is lead through the questionnaire.

The first part of the questionnaire is about the subjects use of the library. The questions are presented as closed questions, where the students gets the possibility of elaborating the answers. The purpose of making the students elaborate on their answer, is to get the same effect that would have been possible at an interview. After investigating the subjects use of the library, the subject is presented to a sequence of pictures[Ill. 10]. These

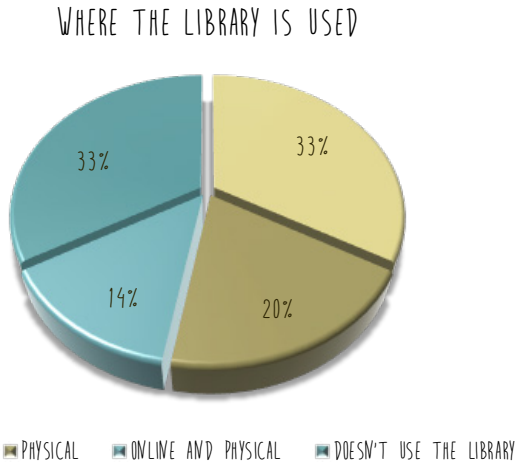


[Ill. 10]. Pictures presented to the users, through the survey.

pictures are presenting different aesthetic markers, and neo-tribes. The subject is asked to choose one or more pictures, and tell why they chose the picture. Afterwards, the subject is asked where they would find information about the object or event at the picture. The presentation of pictures is done three times, with three different sheets of pictures. The exercise, is thought as a digital translation of the original designed association game, designed to be carried out during an interview.
At the end of the survey, general questions about which medias and platforms the subject use, in order to search and access information about their cultural interests, are carried out. The survey can be found at the internet [51] or in the appendix (Appendix APP. 1).

The Result of the Survey

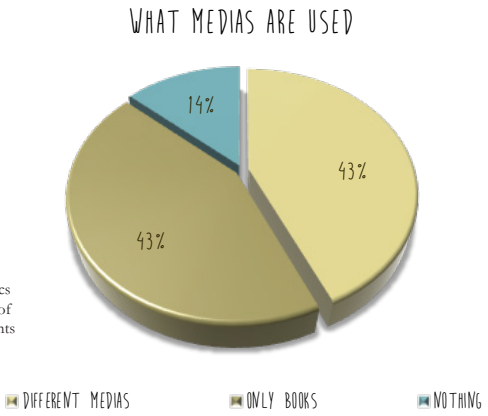
51 subjects participated in the survey, where 71 percent of the subjects are attending high school. Since the questions of the survey, are open and able for interpretation, only very little statistic calculations based on the results of the survey, is carried out.



[Ill. 11]. Statistics about where the library is used, by the students.

The results[Ill. 11] of the survey shows that 39% of the subjects, only are using the library for study purpose, while 28% are using the library for both school and leisure purpose. Only 19% of the students, are using the library, only for leisure purpose, while 14% do not use the library at all.

The students answers[Ill. 12] shows that 33% of the respondents, only are using the library Online. 20% are only using the library physical, while 33% are using the library both Online and physical. The students answers shows that 43% of the students are using different medias and 43% are only using books. Many of the students answers that they don't know many of the other medias offered



[Ill. 12]. Statistics about what kind of medias the students are usng.

by the library.
The second part of the survey is about how the students search for new cultural information. The results of the survey show that most of the students use Google or other Web pages to find information about new aesthetic markers. This is a recurring pattern during all the answers, of the students. Most of the participating students, states that they are using social medias, to be updated about aesthetic markers and neo-tribes.

Analysis

Few of the subjects of the survey, were not from Copenhagen. This is a clear result of an Online survey, where the sampling can't be controlled. This can be seen as a bias, since the structure of the library, in other cities of Denmark, might be different or not even exist. The total gathered information from all the students, is though still interesting, since the purpose of the survey is to investigate the student's information channels in relation to aesthetic markers and the students use of the library.

The discoveries obtained from the part about the students use of the library shows that 47% of the students are using the libraries for leisure reading. This discovery is interesting in comparison to the interview with the librarian, who never have helped a high school student, finding medias for leisure. This discovery shows, that a lot of data about the aesthetic markers can be derived from the students use of the library. The students needs however to use the Online platform facilitated by the library, to derive data about their search. 67% of the students are using the library for school purpose, which can have a large impact on the data derived from the students use of the library. Those data can diminish and disguise the identification of the students aesthetic markers, since most of the data might be permeated by school related activities and subjects. 66% of the students are using the already existing Online platform. Since most of the students are using the existing library platform, there are no reasons to define and develop a new touch point. Using the already existing web interface is a great way to gather data about the student, and deliver cultural offers.

The fact that the students are using Google or other websites when searching for new aesthetic markers, is crucial to the design of the targeting service, because it makes it possible to use Cookies, as a data layer in order to specify the aesthetic markers of a user. Furthermore, the students are expressing that they use both social medias, but also Lectio to maintain their neo-tribes and aesthetic markers, which makes it possible to link information from social medias, but also the already used Lectio, to the final service.

1.5. SUB CONCLUSION

During the discovery phase, state of the art services, the library, the high school and the student have been studied and analyzed.

The outcome of the investigation of the state of the art, was an overall understanding, of how services delivering targeted material to their users, are using data about their users. Three types of data were discovered through the study.

- The Use Session Data
- The Cookie Data
- The Social Media Data

Based on these three types of data, the library have been investigated in order to decide if it is possible to use and connect the data to the library. In addition a study of the user have been carried out, in order to understand, whether the data also contains information, about the aesthetic markers. It can be concluded that, the library is able to connect and make use of the data about the student, and the students are delivering information about their aesthetic markers, in order to get targeted

cultural offers related to their interests.

During the state of the art study, an investigation and identification of different data distributors about cultural information, was carried out. Through this study, three civilizers were identified.

- AOK - Alt Om København by Berlingske Tidende
- Ibyen - By Politiken
- Kultuanut

These three civilizers are unique in their own way, since they features different cultural offers, based on different cultural actors and editors. All of the civilizers would be of great use, in order to deliver a broad and large amount of offers to the student. The data from the civilizers, however only consists of events and geographical points. in addition to this data, another data provider, was identified through the study of the library. DBC is the data provider of digital information about different medias, to the Danish libraries. By combining the data from DBC with data from the three civilizers, a broad field of the cultural information in Copenhagen is covered.

During the investigation of the library, a digital and physical touch point was identified. The identification of these touch point, lead to an investigation of the whole IT-Infrastructure of the library, and an interview with the librarians. By investigating the libraries IT infrastructure, several stakeholders and shareholders of the existing system was identified. The stakeholders and shareholders of the existing system might be used in a potential service, since these different kinds of holders, already have a role inside the system. During the define chapter the stake- and shareholders impact and role will be defined. The interview with the librarians, revealed the way they target material to users, based on the background of the user. This target method, were very similar to the state of the art service method, however instead of analyzing tons of data, the librarian talks with the user. The methods used by the librarians is supporting the use of the, methods used by the state of the art services. The methods used by the state of the art services, seems to create a good foundation the design of a targeting service.

In order to combine the students aesthetic markers, with the study goals, data about the individuals study was needed. An investigation about the high schools and the data that can be derived from the high school was carried out. The investigation, showed that each high school student in Copenhagen, is making use of a Lectio profile. The profile is created by the High School, making it possible for the student to communicate with the teacher, upload reports and get updated through the student class schedule. In this system it is possible to gather data about the students study goals, by using data about their study subjects and study topics. By combining the data from Lectio, to the data derived from social medias, cookies and interaction data, it is possible to create relations between the cultural interest of the student, and their study.

A study of the student was carried out, to understand how to identify their cultural interests. The study showed that students does not identify themselves through a specific culture, but tries to individualize by using many aesthetic markers from different cultures. Creating a service which defines a specific culture of the student looking at their aesthetic markers are therefore impossible, instead the relation between the aesthetic markers can be used to constantly create new imaginary cultures that defines the student, at the moment the student is using the future service. During the study of students, an interview was planned but never carried out, due to the students lag of time. A survey was therefore designed, based on the interview, resulting in a survey, with many biases. The result of the survey though, gave material to use, in defining the potential users of a future service. These users are explained using persona in the define phase(2.3 on page 35), in order to understand the needs and behavior of the students.

2. DEFINE

To define the discoveries identified through the discovery phase, several methods and models will be used. The purpose of these methods and models is to give a clear understanding of how the current system is structured, and define the roles and connection between the different stake- and shareholders. In order to understand the needs and behavior of the students, persona are carried out. The outcome of define phase, is a requirement specification(2.5 on page 40) and a problem specification. To gain an overview of the different stakeholders and shareholders identified during the report, a stakeholder map is developed

2.1. STAKEHOLDER MAP

The stakeholder map[64], is a method used to identify and map stakeholders and shareholders in the system around a product or a service. In this case the stakeholder map, is used to map out the stake- and shareholders around the library. The stakeholder map is developed in cooperation with the digital development department of Copenhagens libraries, in order to ensure that all stakeholders relevant to this project, are taken into consideration.

The original stakeholder map generation method, is segmenting the stakeholder and shareholders into direct or indirect actors. This is done to visualize the relationship between the library and the stake- and shareholder.

- The indirect stakeholders[Ill. 13], are stakeholders/shareholders who indirectly is affected by the library or shareholders with interests in the library, without having direct communication with library itself.
- The direct stakeholders[Ill. 13] are stakeholders/shareholders who directly are affected by the library or shareholders with direct impact on the library.

In this case an extra segmentation is done. By segmenting the stake- and shareholders into professional and social, the relationship between the library and the stake- and shareholders are even better defined.

- The social stakeholder[Ill. 13] are stakeholders whose relations are based on social values. This kind of stakeholders, does only profit socially from the relationship to the library.
- The professional relationship[Ill. 13] is based on a commercial or economical relationship. This kind of stakeholder, does mainly profit economically from the relationship to the library.

To identify the different stake- and shareholders, primary the findings of the discovery phase is used, secondary other stakeholders are identified through a short brain storm, together with employees of the library.

2.1.1. RESULTS

The generation of the stakeholder map[Ill. 13], resulted in 8 indirect stakeholders and 9 direct stakeholders. 7 of the identified stakeholders are defined as social stakeholder, and 10 are defined as professional stakeholders.

Social Stakeholders

Direct

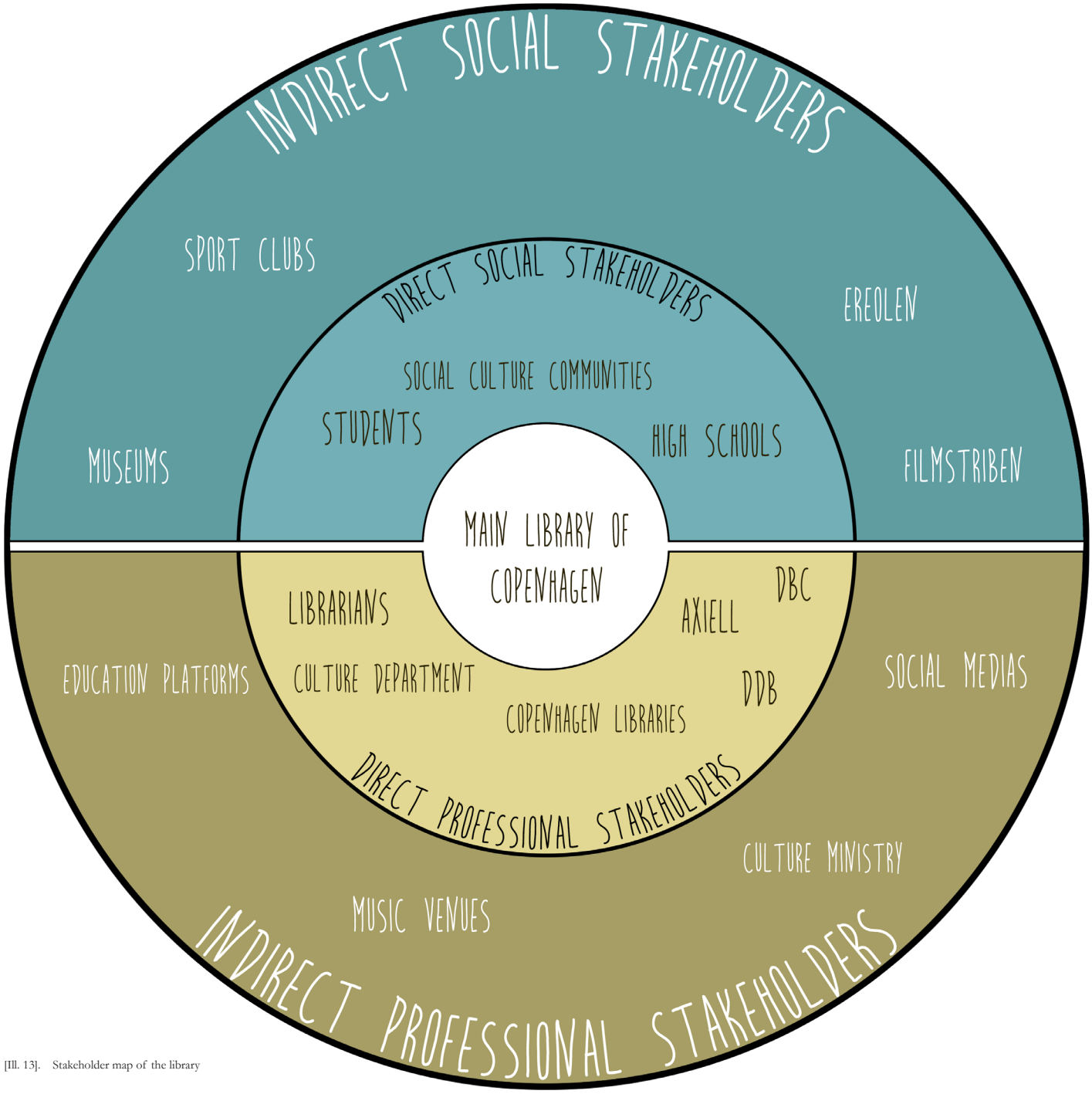
- **Students**: The student as a stakeholder is socially directly related to the library, because the student is using the library for social and educational reasons, without any economical interests.
- **High School**: The High Schools are socially directly related to the library, because the high school only informally are in contact with the library. The library and high school is sharing knowledge, without any formal relation.
- **Social Culture Communities**: The Social Culture Communities are stakeholders, which covers a lot of different small communities, such as urban gardens, film clubs, poet clubs, reading clubs etc. Many of these communities has a direct social relation to the library, because they are non-commercial and are hosting events for the library, in order to get more people interested in their specific field.

Indirect

- **Filmstriben**: The stakeholder is defined as an indirect social stakeholder to the library, be-

cause the service is a non-commercial service, delivered by the culture department. The service is affected by several direct stakeholders to the main library, but isn't directly related.

- **Museums**: The museums are indirect socially related to the library, because the museums are non-commercially organizations, that are indirectly affected by the library through cooperation with the culture department.
- **Sport Clubs**: The sport clubs are indirect socially related to the library, because the sport clubs are non-commercially organizations, that are indirectly affected by the library through cooperation with the culture department.
- **Ereolen**: The stakeholder is defined as an indirect social stakeholder to the library, because



[Ill. 13]. Stakeholder map of the library

the service is a non-commercial service, delivered by the culture department. The service is affected by several direct stakeholders to the main library, but isn't directly related.

- **Civilizers:** The different civilizers, are assembled into one category, despite both IBYEN and AOK, probably also is having some kind of economical bnefit from the relation with the library.

Professional Stakeholders

Direct

- **Librarians**: The relation of the stakeholder is identified as direct professional relation, because the librarian is paid by the library, to work for the library.
- **Culture Department**: The Culture Department of the government, is in direct communication with the main library of Copenhagen, through the development department.
- **Copenhagen Libraries**: The main library of Copenhagen, is in direct communication with the other libraries of Copenhagen, where they are developing the services of the libraries in cooperation.
- **Axiell**: Axiell[52] is the company delivering the DDELibra service.
- **DDB**: The service provider[46] of the library, designing and developing services for the library. DDB is also negotiating with suppliers of the library.
- **DBC**: Is[20] in direct contact with the library, as a data supplier to the library.

Indirect

- **Education Platforms:** This stakeholder is indirectly related to the library, through the Data Well and the students. Amongst educational platforms are services such as Lectio and Online Learning Services.
- **Music Venues:** The music venues are indirectly connected to the library, through the culture ministry. The venues indirect relation, is based on an economic value.
- **Culture Ministry:** The culture ministry is indirectly related to the library through the culture department.
- **Social Medias:** Social medias are related to the library through the students.

2.1.2. ANALYSIS OF THE STAKEHOLDER MAP

The result of the stakeholder map, is a clear and visual representation of the related stake- and shareholders of the library. These stakeholders, has their own unique relation to the library. Through indirect/direct segmentation of the stakeholders, it is made clear that the library is impacting a large network, through the many branches the library have through its direct stakeholders.

Many of the studied civilizers, are at this point already related to the library, the relation is just very weak since it is indirectly affected, through the users of the library. A direct relation to these stakeholders is necessary, in order to target cultural offers, based on their data. Since the sport clubs, music venues and museums are delivering data to the civilizers, it will also be possible to get data about them, without creating a new direct relation in a future design.

eReolen and Filmstriben are services, that were identified through the discovery phase, as services delivered by DBC. These services are digital libraries, that are delivered to citizens of a municipality who are subscribing to these services. The services are not directly connected to the library, but it is possible to search for online material, delivered by filmstriben and eReolen, which makes the two services relevant to the project. It is questionable, whether these services relation to the library, needs to be changed, in a future service design. A study about the relations between these services and the library is needed, in order to get the future link defined

To obtain data about the students study goals, the indirect relation between the educational platforms, and the library needs to be direct and better defined. At this point the education platforms are only related through the student, or through the Data Well. An investigation of the relations of the education platforms need to be carried out, in order to define the relations better between these different kinds of platforms and the library. After

defining the relations of the librarys stakeholders, a study in the specific relations needs to be carried out. In order to do so, a system map is generated.

2.2. SYSTEM MAP

The system map[64], is a method used to achieve an elaborated specification of the connections between the stakeholders of a system. This elaboration of connections, gives the designer insight, in the information, material, monetary and data flow.

The System Map of the library is based on the information gathered during the discover phase, and is confirmed by the development department of the library. In addition to the discoveries, several extra stake- and shareholders are added to the map. These additional stake- and shareholders are identified during the system map generation process, in cooperation with the library.

The System Map[Ill. 14] makes use of two types of connections:

- Black straight dotted connection, showing the data between the stakeholders.
- Blue lines bended connection, showing interactions and communications.

By using the two different types of lines, the relation between the stakeholder and touch-points is more explicit, and easier to distinguish between the digital and physical actors. Different colored "clouds" are surrounding the stakeholders and touch-points. These clouds are describing the types of stakeholders and touch-points.

2.2.1. RESULTS

In the system map[Ill. 14], 17 stakeholders and their relation to the current library system is defined. Amongst these stakeholders, two new stake- and shareholders are defined. The new stakeholders of the system is Employees Interface IMS and the Municipality of Copenhagen. The different stakeholder are categorized by the placement in the maps.

- In the bottom, the administrative stakeholders are placed. Amongst these are KL(National Organisation of Municipalities), the Copenhagen Libraries and the Culture Ministry. Some of these actors are also shareholders of the system. The relations of the stake-/shareholders in the "administration cloud" are mainly economical relations, or management/administrative relations.

- The middle brown "cloud", the physical user interfaces, are showing the relations of the stakeholders/touchpoints, the user is able to access physically. In this cloud, three actors are defined. The librarian, the library and the high school.

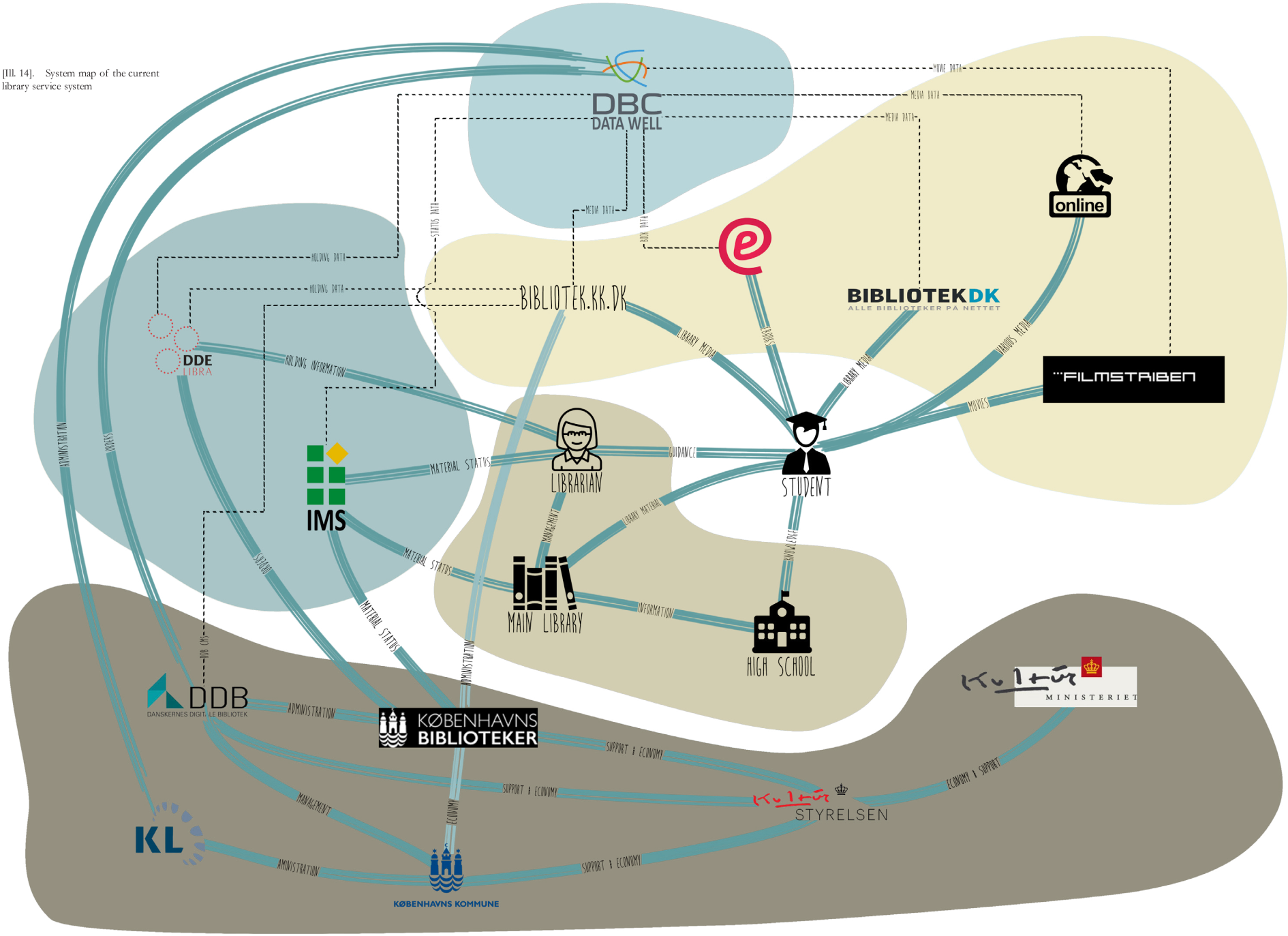
- The most left blue cloud is showing the professionals/employees user interfaces. These user interfaces are special, since they are controlling the IT-systems and material management.

- The most right sand cloud is describing the links and relations of the citizens users interfaces. The actors inside this cloud, are not only touch-points/interfaces of the library, but also external touch-points and shareholders.

- At last, and in the top of the system map. The data handlers are defined. Only one stakeholder is defined in this type of stakeholder, the DBC Data Well. This stakeholder is playing a central role, in the whole service infrastructure of the library services.

Generation the system map of the library was a

[Ill. 14]. System map of the current library service system



complicated task, since many of the roles in the system are very shallow. The work though is rewarding, since the outcome of the system map, is providing insight about the important stakeholders of the system. As defined in (1.2.1 on page 13), the current digital user interface of the library, is the web-page www.bibliotek.kk.dk. When looking at the relations of the web-page four connections, beside the one to the user, is defined. Three data connections and one interaction. The data connections between the web-page and the stakeholders are:

- **DDB:** The stakeholder is providing the DDB-CMS, making it possible to use the services developed and delivered by DDB.

- **DDELibra:** The stakeholder is handling the borrow data of the webpage, and delivers information about material stock to the webpage. This link, makes it possible to borrow material from the library, through the webpage.

- **DBC:** The stakeholder is providing and handling all information about materials of the library. The link between the webpage and DBC, is the provision of data to the webpage about library media.

The last related stakeholder to the webpage is the libraries of Copenhagen. The libraries of Copenhagen is the overall organization of all the libraries in Copenhagen. The webpage is covering all the different libraries at once, through the same interface. These libraries are therefore important to the system, since they are affected by changes in the interface. The libraries are delivering information about local events and news of the libraries, to the webpage.

2.2.2. ANALYSIS OF THE SYSTEM MAP

Based on the investigation of the library system, decisions of the future design can be made. During the study of stakeholders of the system, DDB is investigated. This stakeholder is the one stakeholder, who actually are defining and designing new library services. When one of these services are developed, it is added to the DDB-CMS, making it possible for the libraries who are a part of DDB, to use the newly developed service. DDB is therefore a key stakeholder in a future service, acting as the service owner.

Yet another key stakeholder is found and defined during the discover phase, the data manager DBC. DBC manages all data about the library material in Denmark, and is the provider of data to the services delivered by DDB. As a data supplier, DBC seems to be the most relevant option as service maintainer.

In the study about the stakeholders of the library, the educational platforms/services are almost invisible. These services are only related to the library through DBC. In order to make use of the data about the users of the educational platforms, and understand their individual study goals, a connection between the education platforms and the future targeting service is needed.

The two digital library services, eReolen and Filmstriben is currently not having any other relation to the library, than using the same database, the Data Well. These services could deliver data about the users preferences of aesthetics markers. This data, is though possible to aggregate through the cookies, meaning that a direct connection to these two service, is not needed.

Several stakeholders, of the current system is defined through the system map, and currently some of the stakeholders relation to the library, are almost not existing, while other of the stakeholders relations are very well defined. At this point, the relations of the library system, are defined based on the information, material or interaction delivered through them. To understand how they are used, in context of the current library service of the student, a customer journey is created. In order to carry out the customer journey method, information about the students use of the library is needed. Instead of creating journeys based on each of the studied students of the survey, personas are used presenting the types of users.

2.3. PERSONAS

The method of generating personas([64]) of a service customers or users, is a way to depict the types of persons that are using the service. A profile of each defined type is generated. These profiles can either be fictional, data of many users, or non-fictional, based on a specific person, who is decided by the researcher, to be representative of a specific group of users.

In this case, the personas are based on the end-service users. The reason for using this type of personas, is to also understand their needs of a future service, while investigating how they currently are using the services, delivered by the library. To generate the personas in this case, fictional personas are created. The reason for using fictional personas is, that most of the data and information available about the students from the discover phase(1 on page 9), is sparse and quantitative. By finding patterns and repetitions of the users behavioral treats and interests, the personas are defined.

2.3.1. RESULTS

Four different personas are identified using the persona method defining the user types of students. The four personas generated, are defined based on their use of the library.

The Leisure User

This persona[Ill. 15] is based on the high school students, who only are using the libraries to find books and movies. The persona is a girl, around 16 year old, who are adventurous and searches for new experience. When using the library, she loves to access the physical library. In the library, she finds inspiration when she walks along the shelfs, to find new interesting materials. When she finds media she is interested in, the material is taken down from the shelf, a few lines are read in it, and it is rated whether she wants to borrow it or not. If she wants to borrow the material, she accesses a computer, logs in to the computer system, and registers the media. It is only few materials at a time, she borrows, because it makes her go back to find more inspiration, when finished with the borrowed medias. The Leisure reader is using many different social medias to find new inspiration and maintain her cultural interests.

[Ill. 15]. an illustration of The Leisure User persona

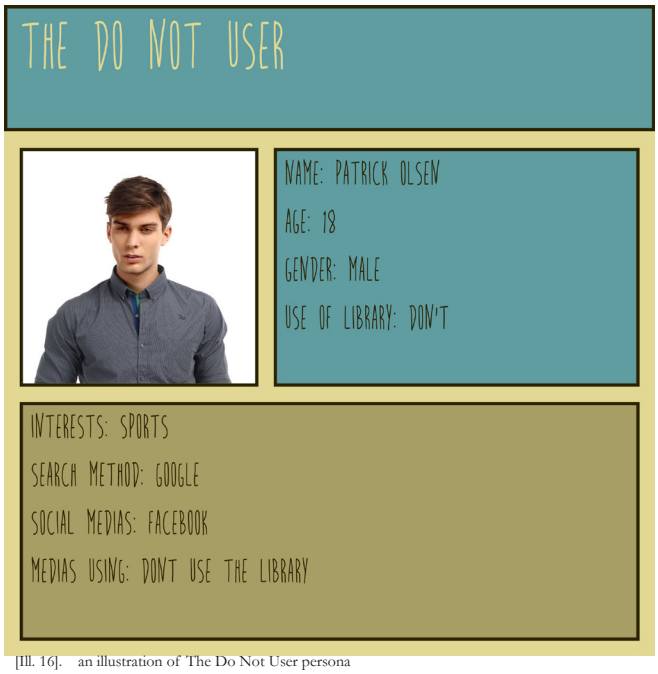
The Do Not User

This persona[Ill. 16] is based on the high school students, who do not use the library at all. The persona is a boy, around 18 year old, whose main interest is sports. When he wants information about any sport results or sport events, he uses specific websites to achieve the data he needs. He is mainly using facebook as a communication platform, to communicate with people who share the same cultural interests as him.

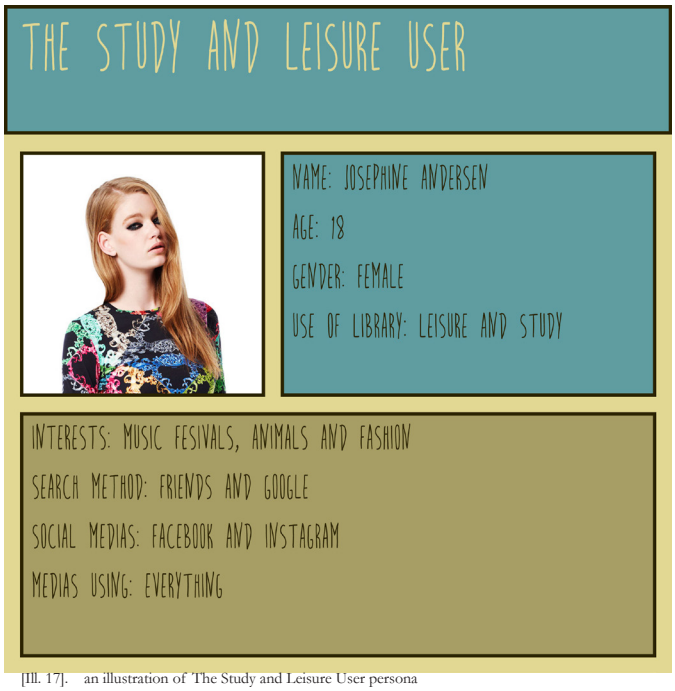
The Study and Leisure User

This persona[Ill. 17] is based on the high school student, using the library for both study and leisure purpose. The persona is a girl, around 18 years old, who is interested in music festivals, animals and fashion. When using the library she is either using the online platforms of the library, to search for interesting medias, or goes directly to the library to gain help from the librarians. When she is searching for new cultural information, she mainly uses Google or asks her friends. She states that interesting cultural information sometimes comes to her,

through the friends or through the social medias. She is mainly using Facebook and Instagram to maintain current cultural relationships.



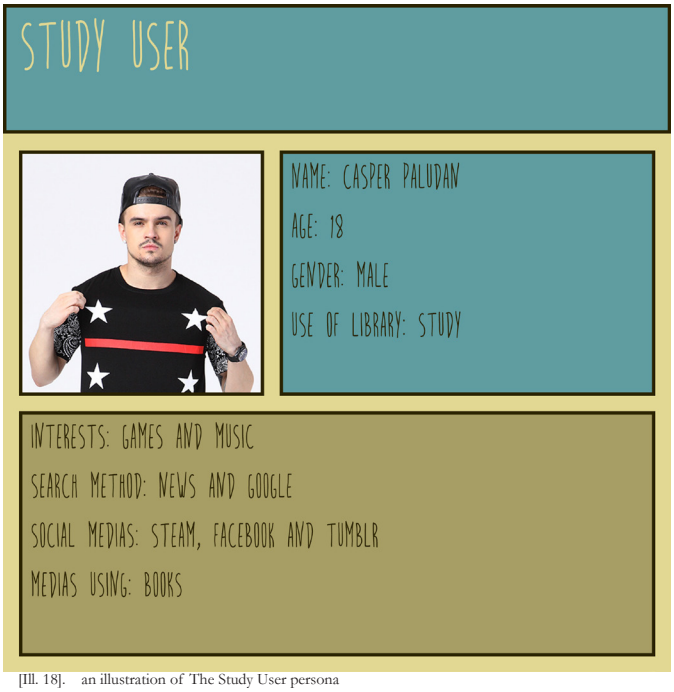
[Ill. 16]. an illustration of The Do Not User persona



[Ill. 17]. an illustration of The Study and Leisure User persona

The Study User

This persona[Ill. 18] is based on the high school student only using the library for study purposes. The persona is a boy, around 18 years old, who are interested in games and music. When using the library he is either researching the online interface, for relevant material that fits his study, or seeks help from the librarian. He is not using the library, for anything else than finding supporting material for the study, and it is mainly books he is searching for. The persona is searching for cultural information through Google or different news medias. When he maintains his cultural interests, he uses facebook, tumblr and steam.



[Ill. 18]. an illustration of The Study User persona

2.3.2. ANALYSIS OF PERSONAS

The outcome of the personas, are four different types of personas. These different kinds of personas, have their own uniques preferences when using the library, while one persona is into the physical space, other personas are trying to have as minimal interaction with the library as possible. No firm conclusion about why some of the personas, are not interested in using the library, can be carried out. It seems though, that the online medias have taken over the role as knowledge distributer, for some of the users. There is no direct pattern, in how the personas are using the library, there is however a finite state of ways, the students of the survey, describes how they use the library. In order to understand the several ways of interaction with the library, that is made, a study in

their line of interaction with the library service, is carried out. To investigate the lines of interactions, customer journey maps are generated. By using this method, touch points within the service, is also identified.

2.4. CUSTOMER JOURNEY MAP

The method, Customer Journey Map([64]), is a model that delivers an overview of the users points of interaction over time. The purpose of the customers journey, is to identify the steps done by the user through out the use of a product, or service. During the investigation of these steps, new touch-points can be identified.

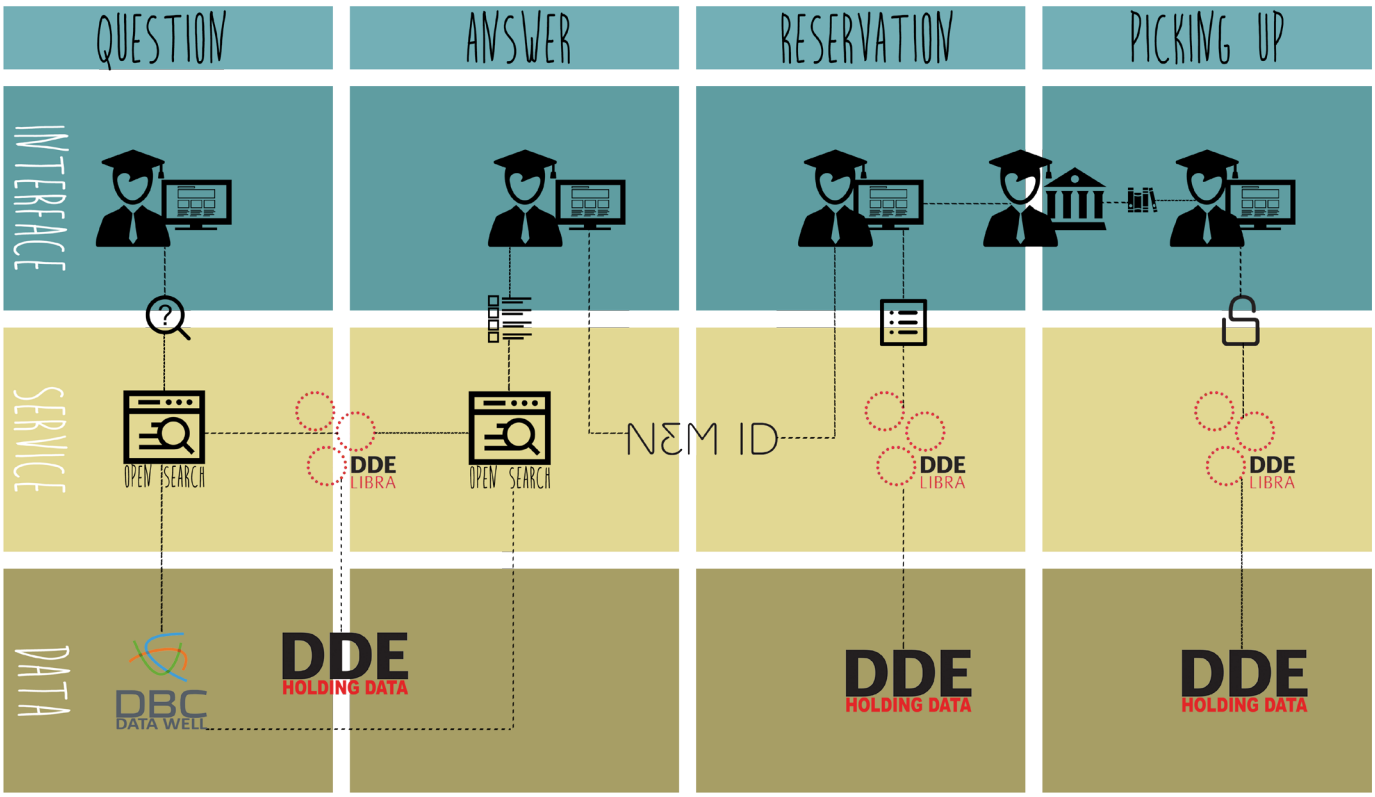
To develop the customer journey, of the students for the library service, a segmentation of the touch point throughout the journey is carried out. The segmentation is visualized through different layers, based on three categories[Ill. 19]. Data, Services and Touch points.

- The bottom layer, is the data layer. In this layer, the data providers, during the customer journey is defined.
- In the middle layer, the services accessed through a interface is defined.
- At the top layer, the interface of the journey is defined.

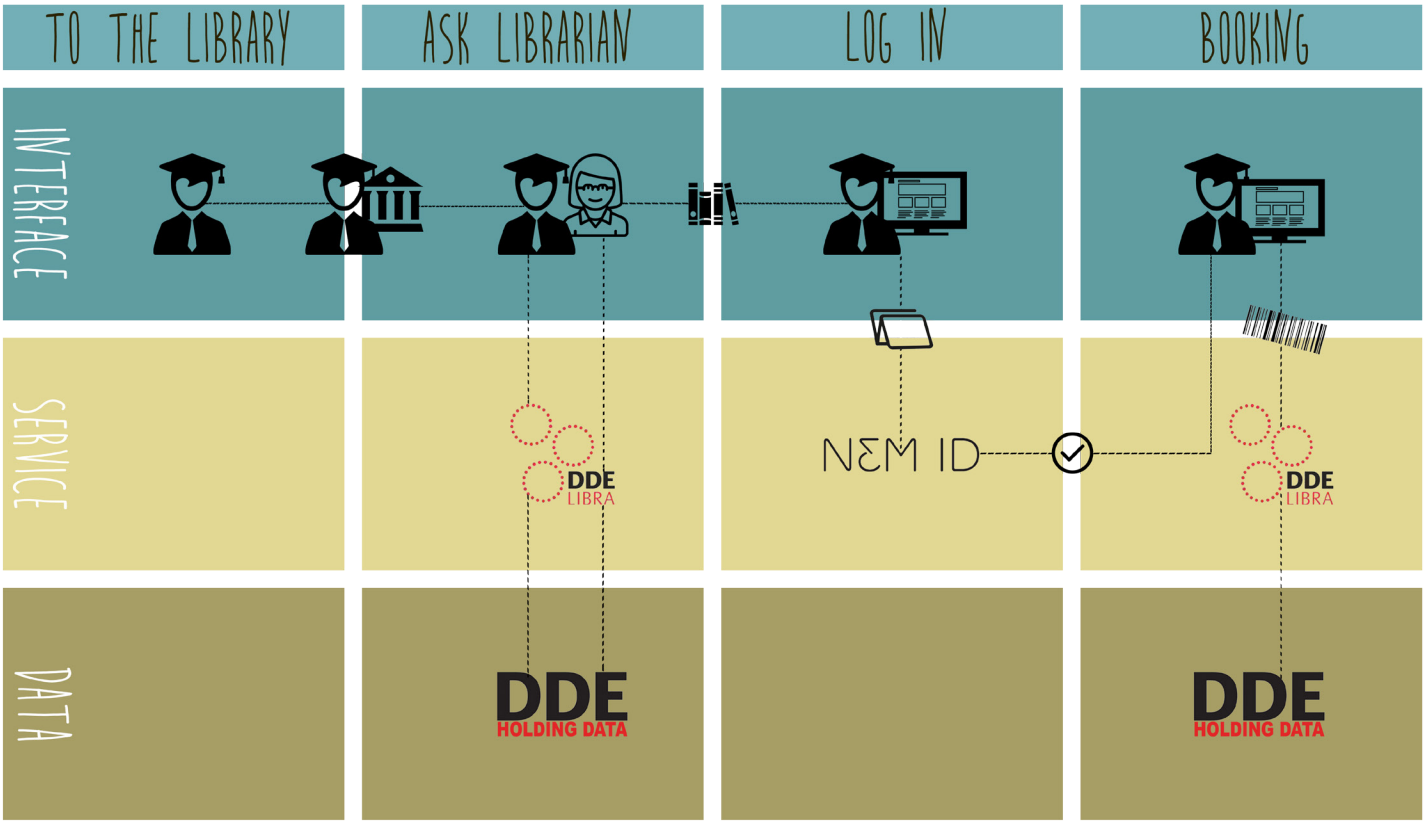
To define the different customer journeys, the data and information gathered through the survey is used. Furthermore, the journey is developed in cooperation with the development department, and the librarians of the library.

2.4.1. RESULTS

Based on the survey about the students, three different customer journey maps are developed. These three Customer Journey Maps, does not covers the specific journey of the personas, but covers the journey maps that is used by the personas. The personas, are using different journeys, based on their purpose and use of the library. The three customer journeys developed, to define the different kinds of interactions the user is having, in order to use the library service are:



[Ill. 19]. The customer journey 1 model



[Ill. 20]. The customer journey 2 model

1. A customer journey where the customer is using the internet to find and reserve the book, and only attend the physical library in order to pick up the media.

2. A customer journey where the customer is attending the physical library and accesses the librarian directly, to gain help.

3. A customer journey where the customer is attending the physical library, and seeks inspiration by browsing through the media at the library, and choose the media.

Customer Journey 1

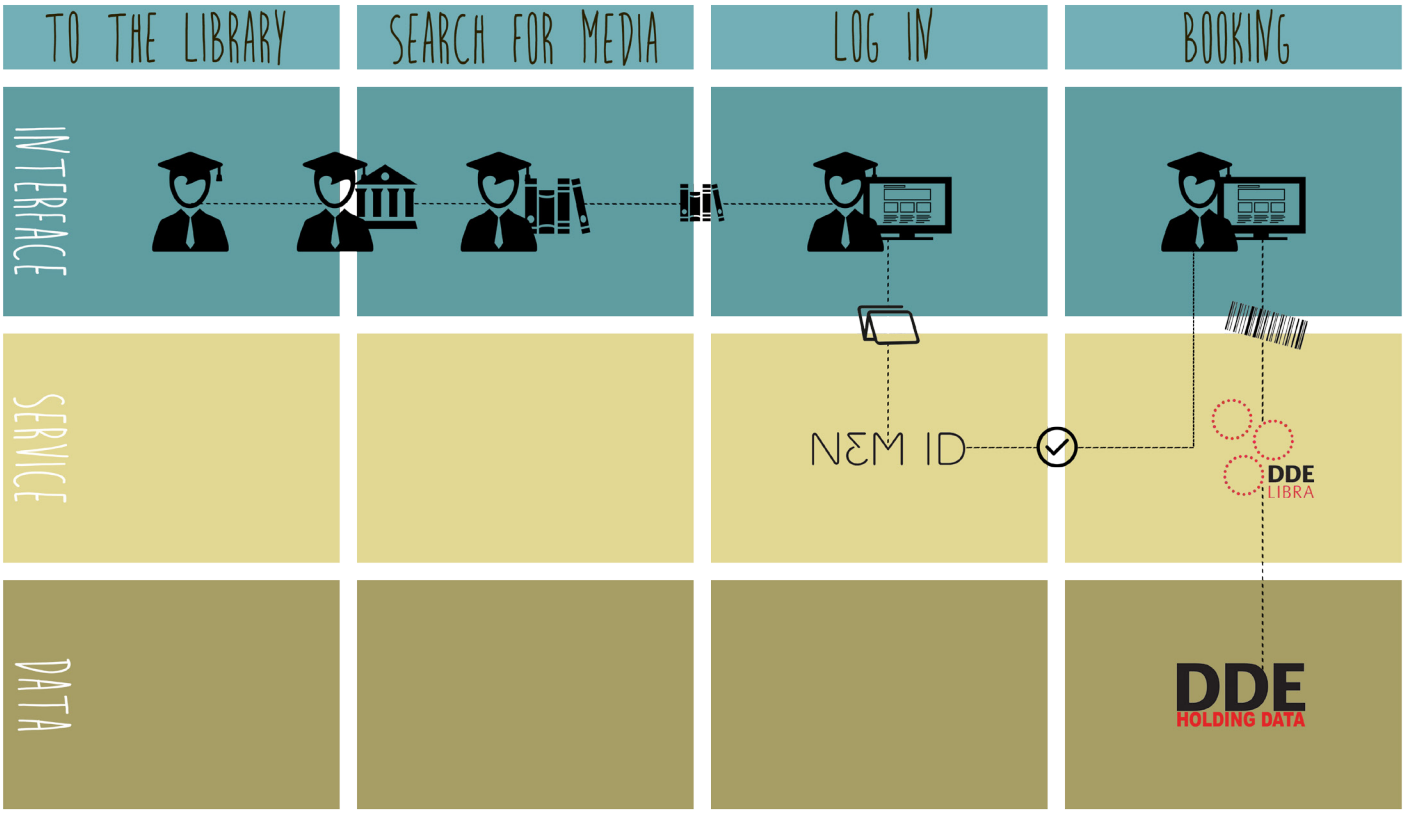
To visualize and describe the customer journey[Ill. 19] where the student is reserving a book, and collect it from the library, the journey is segmented, in to four sections.

- **Question:** In this section the user, is accessing the library webpage through a computer an searches for a piece of material, based on the search of the user, the service makes a call into the DBC Data Well.
- **Answer:** Before delivering an answer, based on the results of the call into the Data Well, the results are compared by DDB, to the holding data about the specific material. Afterwards, the results are delivered to the user, with the description of the material from the Data Well, but also if the book is in stock.
- **Reservation:** If the user finds a piece of material, amongst the delivered results, the user wants to reserve, he/she needs to login to the webpage. The login is done through the use of nem-id or account. After logging in, the reservation is saved by DDElibra, into the holding data and a receipt is delivered to the user through the web-page, about the reservation has been made.
- **Picking Up**: To pick up the book, the user travels to the library, collects the book reserved for the user, and registers that he/she has collected the book.

Customer Journey 2

The same style of visualisation is again used to show the customer journey[Ill. 20], where the student is applying for help from a librarian. The purpose of the segmentation, is to express the exact action, done during that section.

- **To The Library**: The user goes to the library.



[Ill. 21]. The customer journey 3 model

- **Ask Librarian**: The user, applies for help from the librarian, in order to find a book within the scope of the interests of the user, or the studies of the user. The librarian is assessing help through DDELibra, searching into the Data Well and Holding Data to find material matching the needs of the user. The librarian suggest material based on knowledge and results from DDELibra. If the user finds something he/she wants to reserve, the material is found, and delivered to the user, by the librarian.
- **Log In**: To borrow the book, the user needs to log in to the library webpage, and book the material through that interface.
- **Booking**: The booking is done by finding the book, and register that it is picked up by the user, through one of the computers at the library.

Customer Journey 3

The last customer journey[Ill. 21], is very similar to the Customer Journey 2, but instead of assessing help from one of the librarians, the user browses around the books, on its own. Again, is the segmentation of section used in order to show the types of actions, carried out through the use of the service.

- **To The Library**: The user is traveling to the library.
- **Search For Media**: The user searches through the shelfs and drawers, for material that the user might find interesting, inspirational and/or relevant to his/her study topic. If the user finds something to borrow, the user takes the material with him/her.
- **Log In**: the user is logging in to his/hers account, through one of the computers available at the library.
- **Booking**: The user books the material, and registers that the material is picked up.

2.4.2. ANALYSIS OF THE CUSTOMER JOURNEY MAP

By generating the customer journey, the different touch points of the current library service, the students are interacting with, are identified. Furthermore, the connections between the stakeholders and touch points identified in the system map[Ill. 14], are elaborated by putting them into function.

Looking at the customer journeys, all the users

need at some point to log into their account, in order to borrow materials. This means that all students using the library, at some point will make use of the web page. This information, is crucial in order to depict the user interface, for a future service. Another discovery, which is interesting in relation to the future service, is that it is only the users, searching for material through the web page who deliver user session data. It seems though, according to the surveys, that all the users at some point, use the web-page to search for material. At the customer journey 1[Ill. 19], it is shown that the users only search for material outside the library. This is in fact not the case. It is also possible for the user to search for material inside the library, by using one of the public computers, that are available to everyone.

When registering to use the library, the user needs to use Nem-ID. The Nem-ID is only used the first time, an account is registered, afterwards a personal password is used. The fact, that Nem-ID is used, means that somewhere in the system, it is possible to trace the library account to the person. Such data is very sensitive, therefore it is important to the library, the system is as closed as possible. The library also needs to follow as special set of legislations[72], which states that no data, must be traceable to the user.

A new touchpoint is discovered through the customer journey, the touchpoint which makes it possible to register the user collects the material. The touch point, is a simple scanner, for scanning the books, a screen to get information about the current status of the material. This touch point, is connecting the piece of material, to the users account, and registers that the material is borrowed in the holding data.
After investigating the system and the users, the total outcome of the study is organized and transformed in to a set of requirements, which a design for the future service, needs to take into consideration. The outcome of analyzing all the information, obtained through the study, is also serving as a specification of the problem-statement. To carry out the analysis, a requirement specification is carried out.

2.5. REQUIREMENT SPECIFICATION

The requirement specification is segmented into two parts, a part where the hi-fidelity users requirements[1] are defined, and a part where the low-fidelity system requirements[2] are defined. In each of the parts, an analysis of the findings in the discovery and define phase is carried out. The outcome of the analysis, is a set of requirements. At last a problem specification is carried out.

User Requirements

To define the user requirements, an analysis of the theoretical research, the survey, Personas and Customer Journeys is carried out. The purpose of the analysis, is to identify the requirements of the end-service users.

According to the theoretical research(on page 82) about youth culture, the users are in a state of their lives, where the identity of the individual needs to be unique, in order to be recognizable. The student is individualizing itself by adding and combining aesthetic markers of several different cultures. The result of the student's need of individualization is that the students culture is changing constantly, and any specific culture of the student is indefinable. In order to distinguish the many different cultures, the student is using to individualize itself, the aesthetic markers of the user are required.

Req 1. Aesthetic Markers of the users, which the user needs to use, in order to define the users interest.

In order to fulfill the user's need of creating a unique identity, the cultural offers targeted the user, must hold new cultural information, instead of give the user a deep insight in the same culture.

Req 2. Broaden the user's knowledge, by target new cultural information to the user, outside the interest of the user.

1 Requirements that are qualitative.
2 Requirements that are quantitative

This urgent need of creating a unique identity, is also resulting in a constant change of interests, or different use of computer. Therefore, the service needs to take the constant changes into considerations.
Req 3. The system must dynamically update the aesthetic markers.

The users are mainly finding information about cultural interest on the Internet. Several different tools are used in the search of new cultural information. These tools must be incorporated in the service system, if the system is supposed to understand and predict the users' needs. During the survey, the subjects were asked to choose one or some of the presented pictures, fitting their cultural interests. Afterwards the subjects were asked to define why they chose the specific pictures, and where they would search for information about the picture. The subjects responded very clear, all of them would use the Internet and even some of the students specified they will use Google.

Req 4. Data from the users search on web pages, must be aggregated and used, to find and define the user aesthetic markers.

Another big actor in the flow of cultural information, is social medias. During the survey 3 social medias are repeated, Facebook, Instagram and Youtube. The Social Medias, are mainly used in order to get news about specific aesthetic markers or to communicate with others about aesthetic markers. To gain even more data about the user's aesthetic markers, data from social medias is used.

Req 5. Data from Social Medias must be used, to specify the aesthetic markers of the user.

Many of the students are using the library, to find school relevant material. Using data about the user session of the web page can give data, revealing the users study in high school together with the aesthetic markers of the user. This data is very relevant, in order to combine the student's study goals and aesthetic markers.

Req 6. Data about the user session f the webpage, by the users, must be aggregated and used.

Six requirements are defined, by analyzing the outcome of the user investigation. These requirements, must be fulfilled by the design, in order to fit the needs and behavior of the users. To develop a design, fitting into the already existing service system of the library, system requirements are defined. Problem specific requirements are also defined, through the system requirements.

System Requirements

Through the investigation of the system, many stakeholders and touchpoints are defined. Some of these defined stkeholder and touchpoints, are more relevant to the problem statement than others.

The current IT infrastructure is supported by one large database, handling all information about the material in the library system. The data is handled by DBC, and the database is called the DATA WELL. The structure of the Data Well is very complicated, since it makes use of several kinds of data. Instead of adding more content, and data into the database, a new database, would be beneficent to use. This new database, should serve as a layer, to the Data Well, containing cultural and educational relations. A supplier of the database could in this case be DBC, since DBC already manages the data well, and thereby knows the existing data structures.

Req 7. DBC should be supplier of the database, handling the cultural relational data.

The developer and manager of the IT-Infrastructure, is the organisation called DDB. This organization is delivering all the user interface services to the libraries, through the DDB-CMS. The service taker of the service, must therefore be DDB.

Req 8. The service taker must be DDB.

In order to combine the study goals of the high school students, data about the students study is need. During the study about educational goals of the high school, several communication platforms between the students, the high school and the teachers, were identified. The most used, and only

used platform in Copenhagen, is Lectio. Through Lectio, the lecture, studies and schedules are planned and communicated to the students. This data must be used, in order to combine the cultural interests of the students, to the study goals of the student.

Req 9. Data from Lectio, must be used, to combine the student's culture and education.

To deliver cultural offers, to the students, cultural information is needed. During the state of the art investigation, three cultural distributors, also called civilizers, are defined. These civilizers are aggregating data from different cultural actors, and delivers it to the customers through one interface. Instead of using resources, aggregating data from these civilizers, the service must use the data stored by the different Civilizers.

Req 10. Data from the civilizers, AOK, Ibyen and Kultunaut, must be used, in order to deliver cultural offers, to the students.

The current digital interface of the library, is the webpage www.bibliotek.kk.dk. The webpage, is based on the services delivered through the DDB-CMS, and is a key component in the information and dataflow of the library. The webpage should therefore be used, as interface of the service.

Req 11. Bibliotek.kk.dk must be used as interface of the service.

The requirements found throughout the requirement specifications, are structured in order to get an overview of all the gathered requirements. These requirements are segregated in to Low-Fidelity requirements and High-Fidelity requirements. Where the low-fidelity requirements are describing requirements related to usability. The high-fidelity requirements, describes requirements related to the experience of the service.

Low-Fidelity Requirements

- **Req 4:** Data from the users search in Google and other web pages, must be aggregated and used, to define the user aesthetic markers.
- **Req 5:** Data from Social Medias must be used, to specify the aesthetic markers of the user.
- **Req 6:** Data about the use session f the webpage, by the users, must be aggregated and used.
- **Req 7:** DBC should be supplier of the database, handling the cultural relational data.
- **Req 8:** The service taker must be DDB.
- **Req 9:** Data from Lectio, must be used, to combine the student's culture and education.
- **Req 10:** Data from the civilizers, AOK, Ibyen and Kultunaut, must be used, in order to deliver cultural offers, to the students.
- **Req 11:** Bibliotek.kk.dk must be used as interface of the service.

High Fidelity Requirements

- **Req 1:** Aesthetic Markers of the users, must used, to define the users interest.
- **Req 2:** Broaden the user's knowledge, by target new cultural information to the user, outside the interest of the user.
- **Req 3:** The system must dynamically update the aesthetic markers.

Based on the Discovery and Define Phase a problem specification can be carried out. The problem specification will specify and incorporate the requirements into the problem statement.

"HOW TO USE DATA ABOUT HIGH SCHOOL STUDENTS AESTHETIC MARKERS COMBINED WITH DATA ABOUT THEIR STUDY, IN ORDER TO TARGET CULTURAL INFORMATION THAT EDUCATES THE STUDENTS, BY USING A RELATIONAL DATABASE."

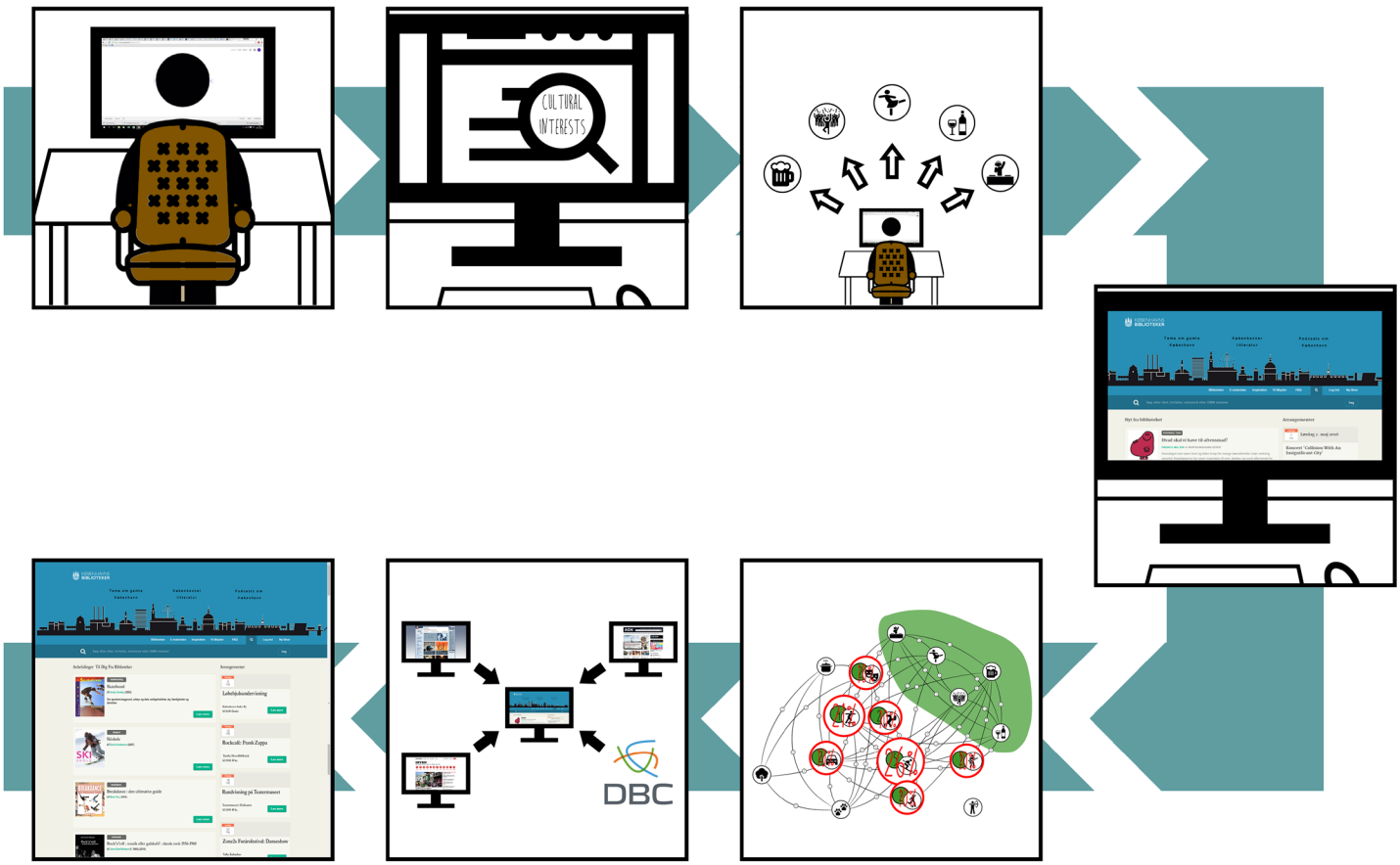
3. DEVELOP

To carry out the ideation process, to come up with a concept, that covers the requirement. Co-creation with the employees is carried out. Instead of planning and having multiple workshops, with different stakeholders and users, the ideation is carried out, in parallel with the discover and define phase. When a new discovery is made, the employees of the development department is briefed, and ideas about how to settle the discovery is carried out. Due to lack of time and resources, a co-creation workshop together with the high school students, was not carried out. According to experience from the user investigation, high school students are difficult to reach and make participate in the project. To test the conceptual idea, the concepts are presented for the Development Department. The first concept is based on the findings and ideation during the project, together with the IT-development department.

The first concept developed, the concept 0.1, is actually a concept designed for an interim problem statement, that did not incorporate the educational goals into the original problems statement. After presenting the concept 0.1, the library wanted to add the educational goals to the service, in order to legitimate a service that targets cultural material and events to its users.

3.1. CONCEPT 0.1

Along the discover phase the concept 0.1 is developed. The following chapter, will cover the development of the concept and explain the experience of the concept. The concept is afterwards prototyped through sketching, making it possible to get feedback and co-create/co-develop the ser-



[Ill. 22]. The short sturyboard, used to show the different steps in the concept 0.1

vice, with the IT-Development Department. The Concept 0.1 is based on many ideations carried out, along several meetings together with René[1]. At each meeting, a new area is investigated, and solutions and ideas about how to make use of the specific area is discussed. The outcome of these discussions are serving as foundation of the first concept.

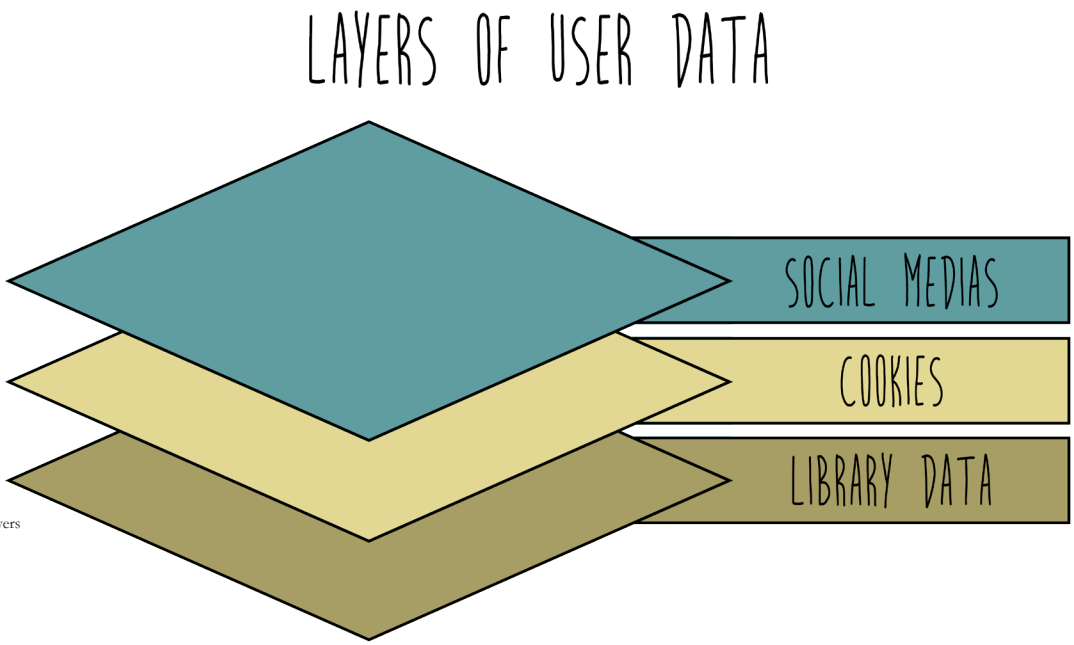
To explain the user experience, to the IT-Development Department, a small storyboard[Ill. 22] is developed. The Storyboard, shows in seven pictures the steps of the user. The different mechanisms of the storyboard, are throughout the chapter elaborated. The steps are as follows:

1. **Assesses computer:** The first step, is pretty self explanatory. The user is either assessing a private computer or a public computer.
2. **Search for Aesthetic Markers:** In the second step the user is searching for aesthetic markers. This is done either through social medias or other websites.
3. **Gather and Store Aesthetic Marker Data:** The user is throughout the search of aesthetic markers, producing data about the aestethic markers. This data is either stored in the social media, or in cookies at the computer.
4. **Assess and Login to Bibliotek.kk.dk:** The student assesses the library web page, and logs on to the account. If the users wants, he/she can add the data from social medias to the webpage, by logging in to social medias through the interface.
5. **Defining new aesthetic markers:** Based on the data aggregated through, the users actions on bibliotek.kk.dk, the cookies stored on the computer, and the social media, new aesthetic markers are defined, through relational pattern recognition.
6. **Find Cultural Offers:** Based on the new aesthetic markers defined through pattern recognition, cultural information is searched for through, civilizers and the Data Well.
7. **Deliver Cultural Offers:** The cultural information found, through the civilizers and the Data Well, is delivered to the user, through bibliotek.kk.dk.

1 The leader of the IT-Development Department

3.1.1. USER DATA AGGREGATION AND USE

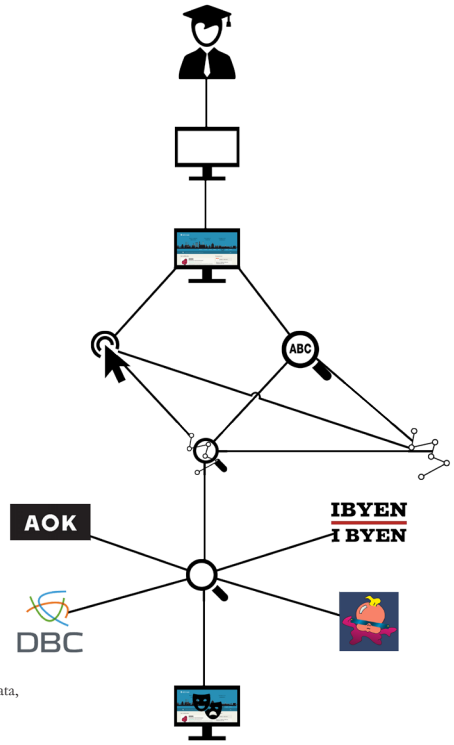
The users are changing their cultural interests constantly, which requires a dynamical system, taking care of and understanding the changes of the user's cultural interests. In order to do so, it must analyze the users choices based on the data aggregated during the use of bibliotek.kk.dk, other web pages and social medias. Each of the user data types, delivers unique valuable knowledge about the user. The data is structured in three different layers.[Ill. 23]



[Ill. 23]. The three layers of data

Library Data

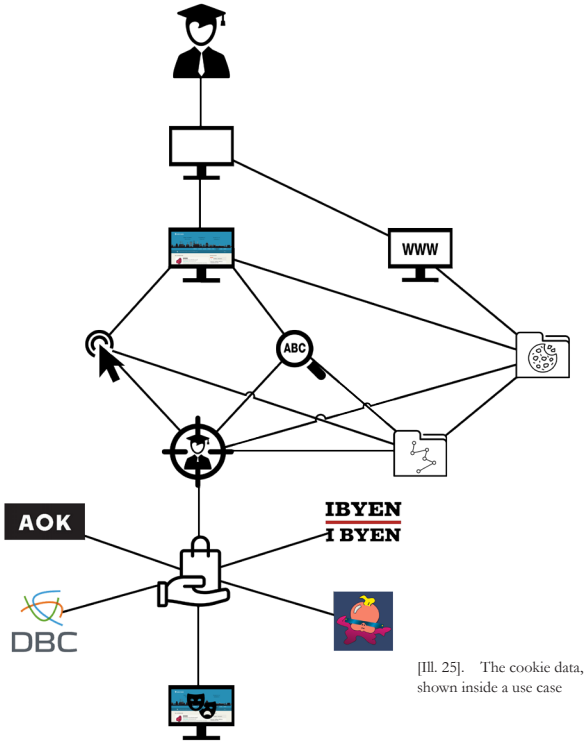
The data[Ill. 24] gathered during the use session of the library web page, can be used along the way. During a user session at the web page www.bibliotek.kk.dk, data about the users search words and choices, are saved. This data is directly analyzed, to target cultural offers, based on the use session only. The result of using this data, is offers based on the specific session, which means the service only targets offers to the user, on behalf of the session purpose. A service with only this data layer, does not make use of data stored at the computer, or any social medias, but only data gathered from the session. This layer secures that data from the user using a shared computer, still can be used. Instead of using the cookies of a shared computer, where a lot of different users data, is stored. This kind of data, is always available



[Ill. 24]. The library data, shown inside a use case

Cookies Data Use

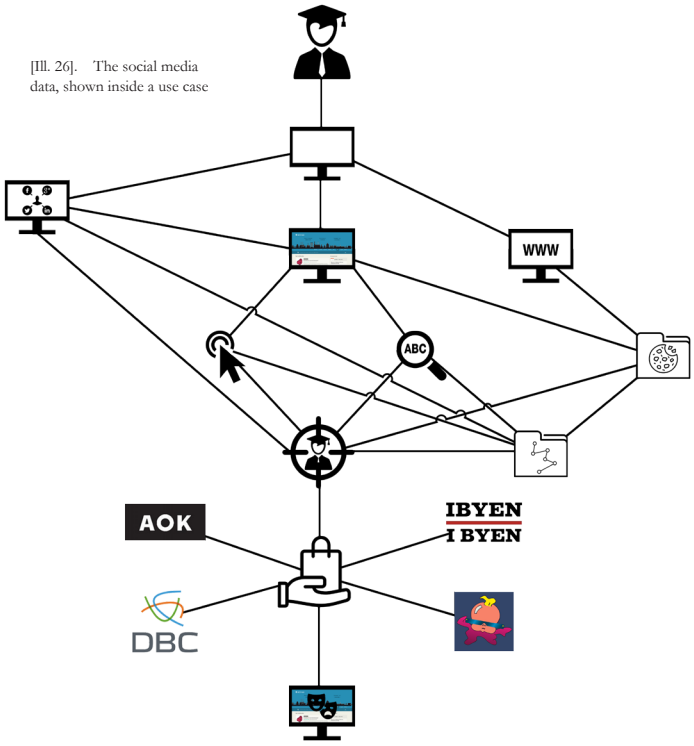
The next layer, is data from cookies[Ill. 25] on the computer. The cookie data is only stored at the specific computer, based on the user history of the PC. This kind of data, is therefore not beneficial to use at computers shared with other users, such as public computers. This type of data is very precise, because the data is gathered over time, and is aggregated from the webpages, where the users are searching for new aesthetic markers. The same use of cookies, is also done by some of the state of the art services, mentioned in (1.1 on page 10). The data of the cookies is structured in different ways, depending on the webpages, where the cookies are aggregated from. A generic algorithm, able to translate and analyze the content of different cookies, is therefore needed.



[Ill. 25]. The cookie data, shown inside a use case

Social Media Data Use

The social media data[Ill. 26] is providing personal knowledge about the user's aesthetic markers. As described by the students of the user study(on page 82), all of the users, are using some kind of social media to maintain and find new aesthetic markers. The users of the social medias are able to express their interests, by liking and following groups and posts, and by choosing their interests in the specific account data. All of the data from the social medias are structured and are available everywhere, as long it is possible for the user to connect the social media account to the service. It might though be difficult to implement in the service, because of the privacy law and sensivity of the library account. The data from the social medias, is very beneficial to the service, since it delivers the most precise and correct data about the user. The social medias are not only storing data about the user's Internet history, but also about the user's personal life.



[Ill. 26]. The social media data, shown inside a use case

The users' interests are identified, through the use of aesthetic markers, which according to findings of chapter (1.4.2 on page 22), is the only way to understand the cultural interest of a modern High School student, since the culture of a High School Student, is a mix of many different aesthetic markers from different cultures. The data from the different layers, are gathered when the user assesses the interface.

The concept 0.1 is using the already existing platform.bibliotek.kk.dk, as the main interface of the service. This is done, to keep the interface design, as true to the original, since many hours and resources have been spend on the already existing interface, and also to keep the web-page recognizable to the users. By keeping the design as true to the users existing interactions, the user experience of the service, becomes more convenient([63]). When the user is assessing the web page of the library, the web-page is gathering the data described.

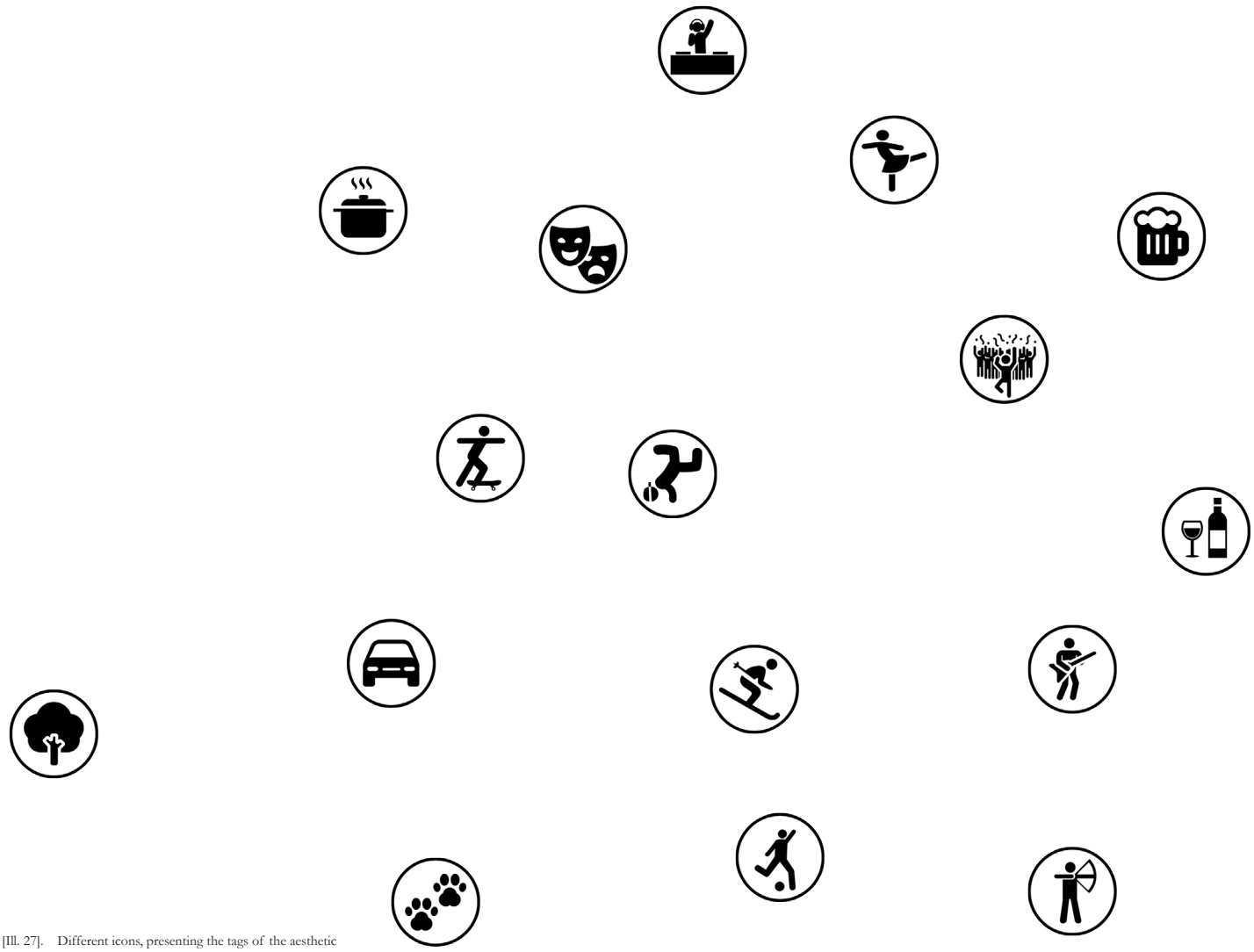
The investigated state of the art services revealed, the service providers are gathering and saving data about the user at a user account. This is not possible to do to the user's library account. According to the privacy law, it is not legal to save any data, that can be traced back to the specific user in the system. The privacy law also applies to this service, it is therefore not possible to save the data directly to an account. Instead of saving the data to an account, the data is used as aesthetic markers in a relational culture map, which is a map registering the frequency of aesthetic markers, identified in total from one user. Each time a user is accessing the webpage, the cultural markers are aggregated, registered and linked in this database, without storing any personal data. To explain the design, a visual data representation3.1.2 on page 49 is made. In this way, the database and the target algorithm is explained.

3.1.2. RELATIONAL PATTERN RECOGNITION

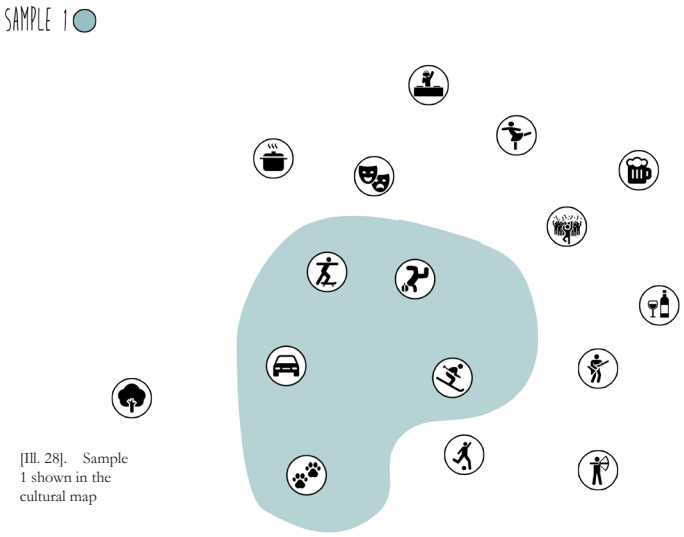
To explain how the target algorithm of concept 0.1 is designed, in order to understand which cultural information is delivered, to the user, a visual representation of the algorithm is presented. This visual representation of, the mapping and targeting of the user data, is carried out in steps. The targeting algorithm, is making use of pattern recognition, assembling the data from the different data providers, segmenting the data into aesthetic markers, and defining the relations between the aesthetic markers. To show the process of identifying and linking the aesthetic markers, the presentation makes use of icons, presenting the aesthetic markers.

Adding sample data to the Database

At this point no knowledge about the relationship between the different aesthetic markers is assembled. Each of the icons presented in the picture[Ill. 27], is stored as a tag of the aesthetic marker. In this case, the tags are very extensive and covers a large culture, while in the final service, a tag is a small and precise word, describing a specific aesthetic marker. Instead of just skateboarding as seen in the icon at picture[Ill. 27], it could be street skating, skateboard, extreme sports, vert, kickflip, pop shuvit, hoodie, street wear, skate shoes, DC, Vans, Element, red bull etc. All words that is connected to the skateboarding culture. This means also, that the culture map does not necessarily



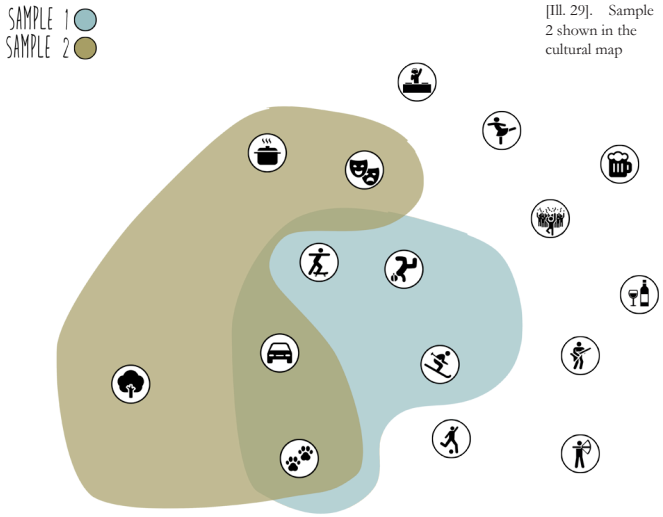
[Ill. 27]. Different icons, presenting the tags of the aesthetic markers.



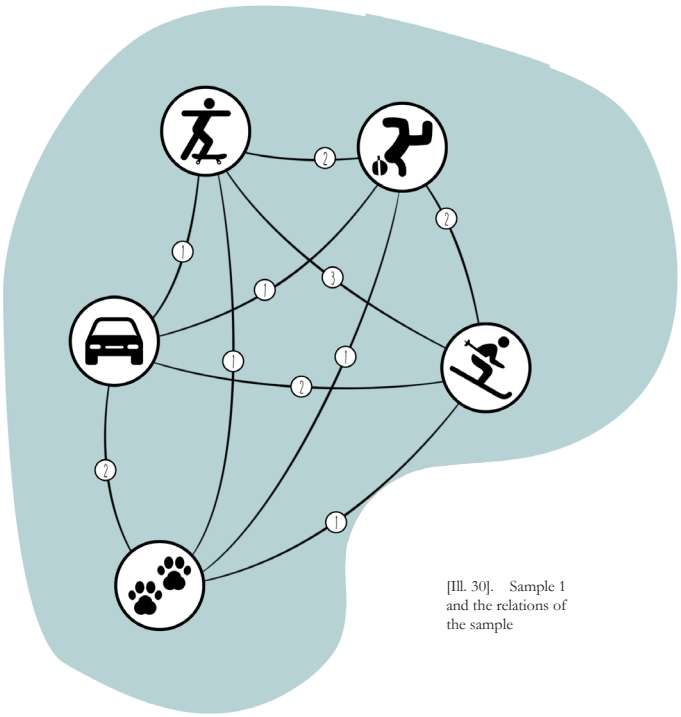
[Ill. 28]. Sample 1 shown in the cultural map

know what we perceive as skateboard culture, but will learn along the way, that these tags, are related to each other. This process of defining cultures through relations, is explained throughout the following illustrations. Each time a user is assessing the web page of the library, the data is translated into different tags. These tags are initially defining the user, as long as the user is using the library web page. As explained earlier, three layers of data are used in the service, the use session data, the cookie data, and the social media data. The use data is dynamically changing along the use of the web page, because it only takes the data gathered during the use of the web page, into consideration. The two other kinds of data, are only aggregated when the user is accessing the page and logging into social medias, through the user account.

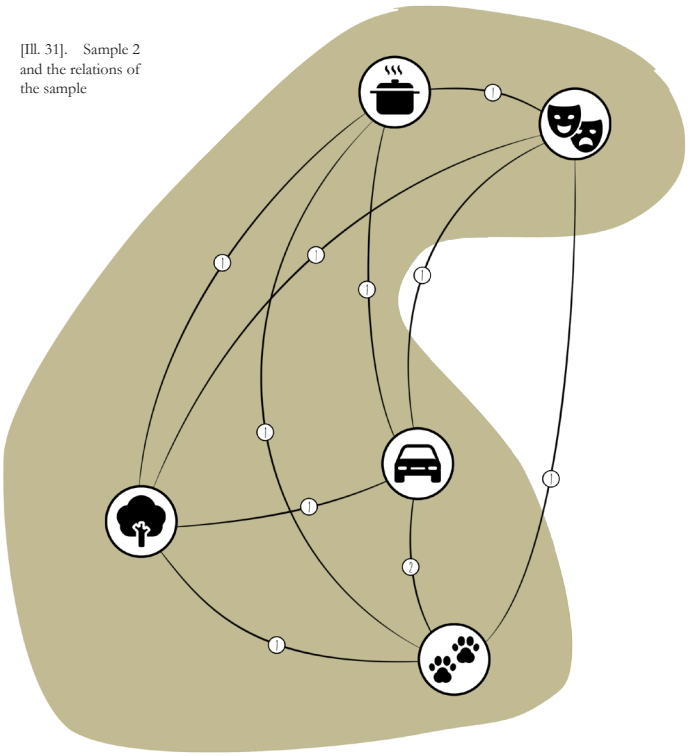
A sample[Ill. 30] of data is added to the map[Ill. 28]. Sample 1 is presenting a user assessing the web page. In this sample 5 different aesthetic markers are identified. The identified aesthetic markers are animals, cars, skateboarding, breakdancing, and skiing. After identifying the aesthetic markers of the user, the relations between the markers are identified. Since this is the first sample, there is only defined one relation between



[Ill. 29]. Sample 2 shown in the cultural map

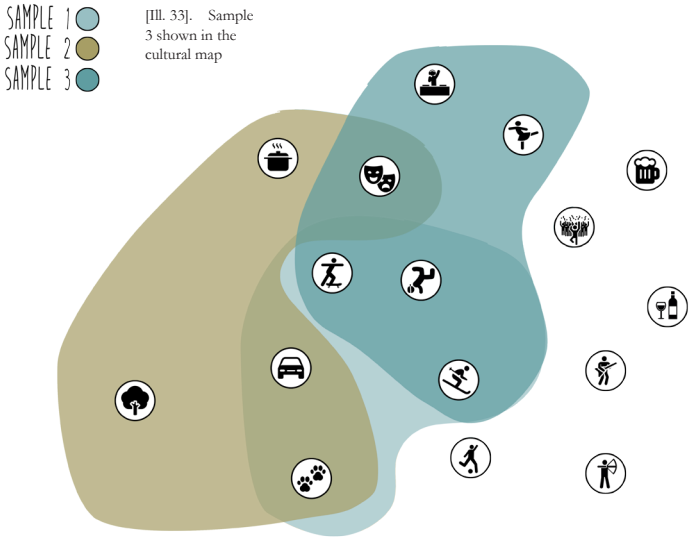


[Ill. 30]. Sample 1 and the relations of the sample

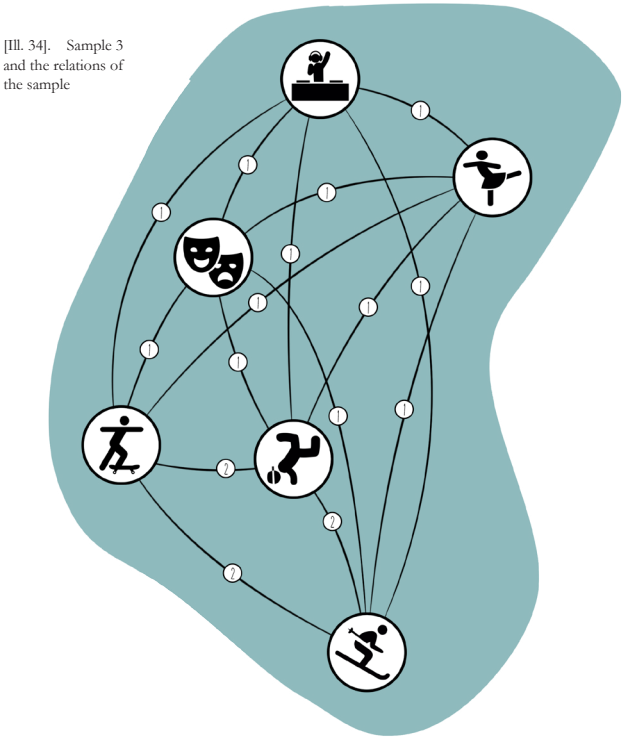


[Ill. 31]. Sample 2 and the relations of the sample

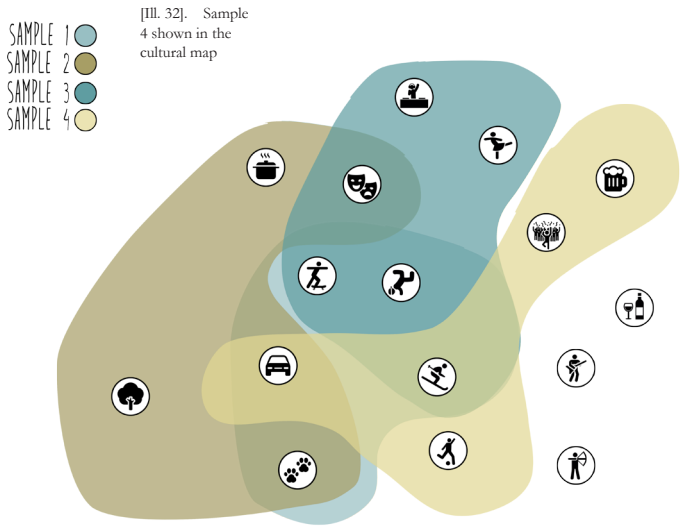
each of the aesthetic markers. When another user assesses the web page, the data from the former users is saved in this case "Sample 1". Each time a user is assessing the web page a new layer is added to the map. The amount of data aggregated about the aesthetic markers of the user, is dependent on the amount of sources that are eligible, where the lowest amount of data, is the use data, aggregated during browsing the webpage.
Sample 2 [Ill. 31] is added to the map[Ill. 29]as a layer. In this layer, there are yet again defined 5 different aesthetic markers. The car and animal marker are appearing again, resulting in yet another relation between the car and animal. At this point



[Ill. 33]. Sample 3 shown in the cultural map

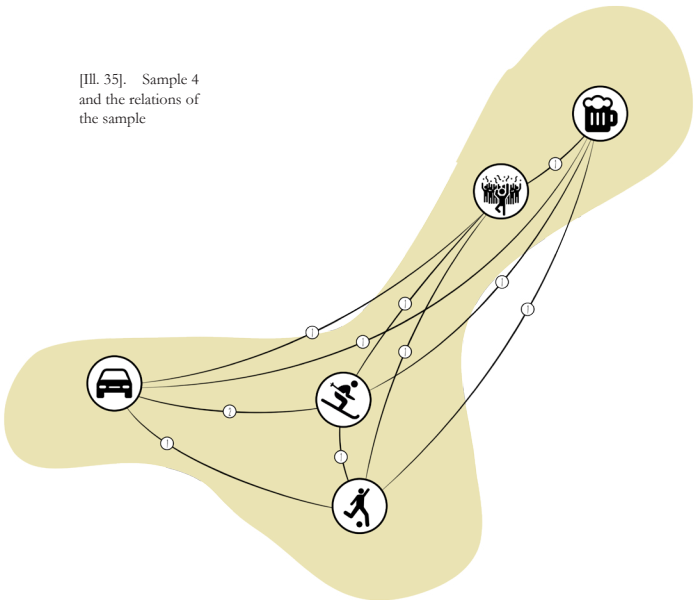


[Ill. 34]. Sample 3 and the relations of the sample

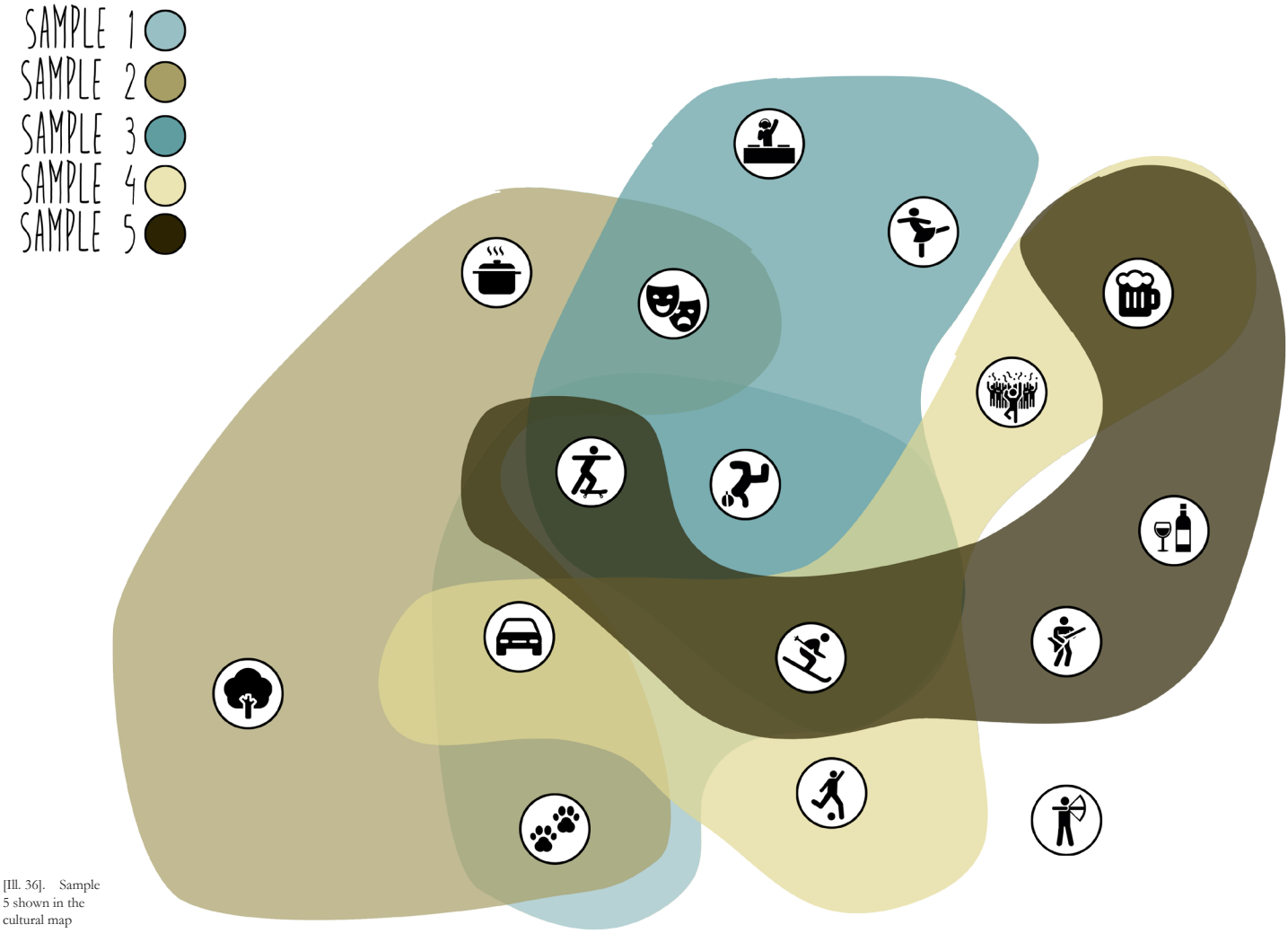


[Ill. 32]. Sample 4 shown in the cultural map

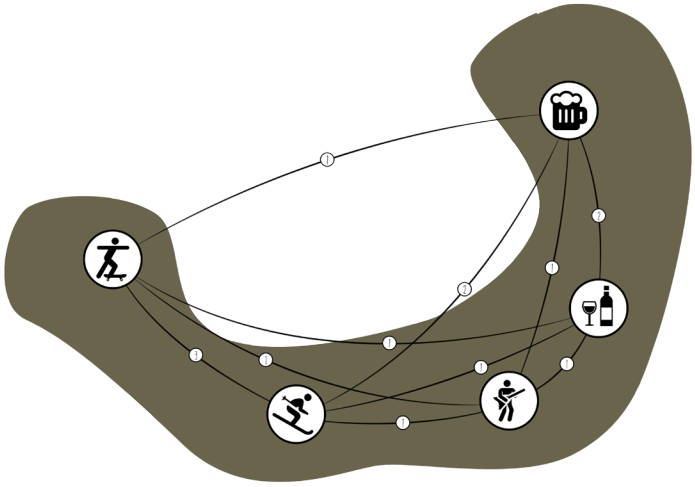
all other relations are only counted once, while the car - animal relation is counted twice.
Sample 3[Ill. 34] is consisting of the aesthetic markers, dancing, DJ, Theatre, Skating, Break Dancing and Skiing to the cultural map[Ill. 33]. The sample is crossing the two other layers, and adds yet a relation to the skateboard, break dance and skiing relation. The theatre aesthetic marker, have been counted once before, but sample 3 does not share any relations of the theatre aesthetic marker. Therefore, there is not added relations, to an already existing relation.
Sample 4[Ill. 35] is added to the map[Ill. 32]. The sample is consisting of the aesthetic markers, cars,



[Ill. 35]. Sample 4 and the relations of the sample



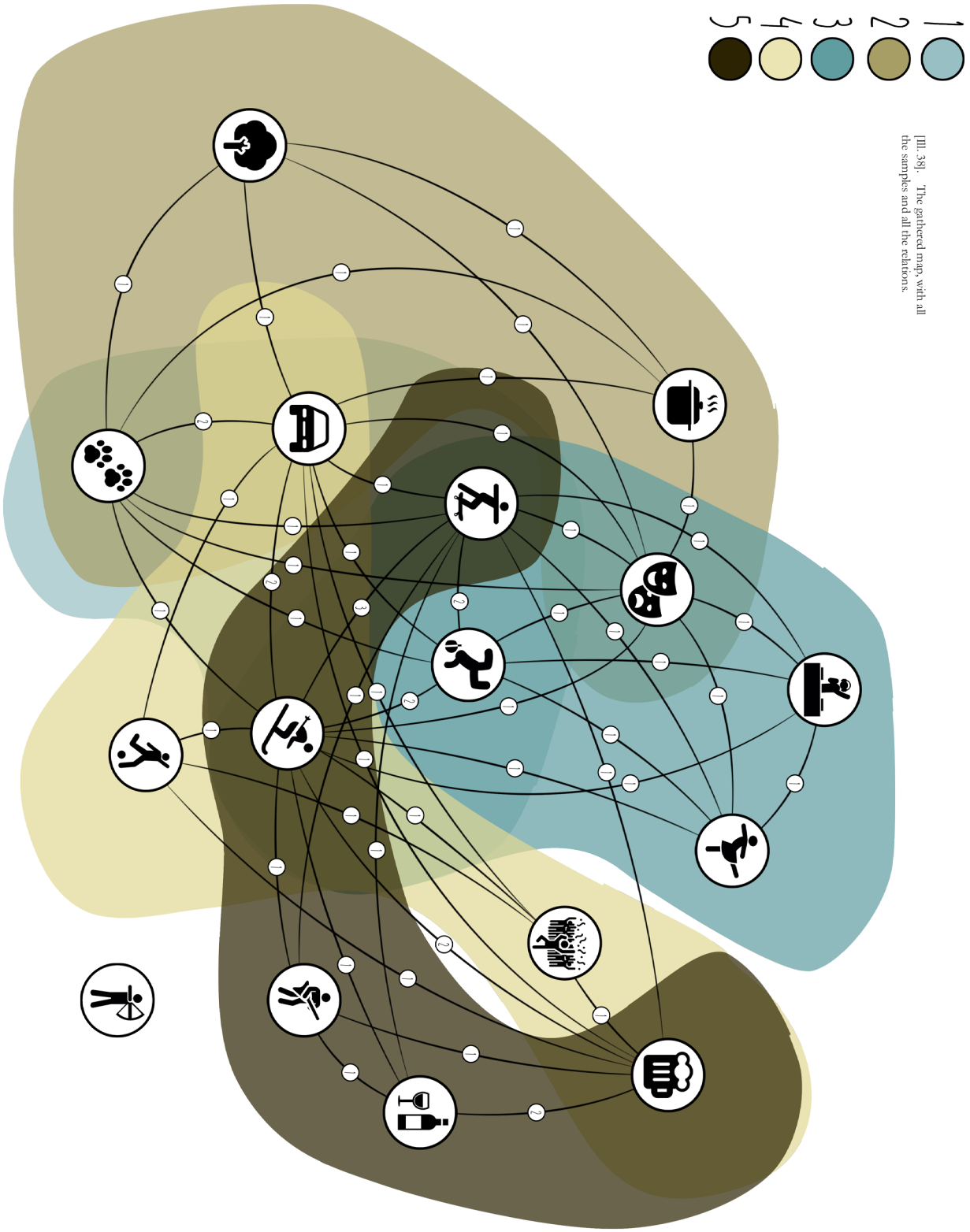
[Ill. 36]. Sample 5 shown in the cultural map



[Ill. 37]. Sample 5 and the relations of the sample

skiing, football, party and beer. One relation is seen before, the car and skiing relation, therefore the relation is incremented. Sample [Ill. 37] is added to the map[Ill. 36]. This map is consisting of the aesthetic markers, skateboarding, skiing, music, wine and beer. Three of the relations, are identified before. Two of the other sample are relating skateboarding to skiing, while one sample is identifying beer and skiing, and beer and wine.

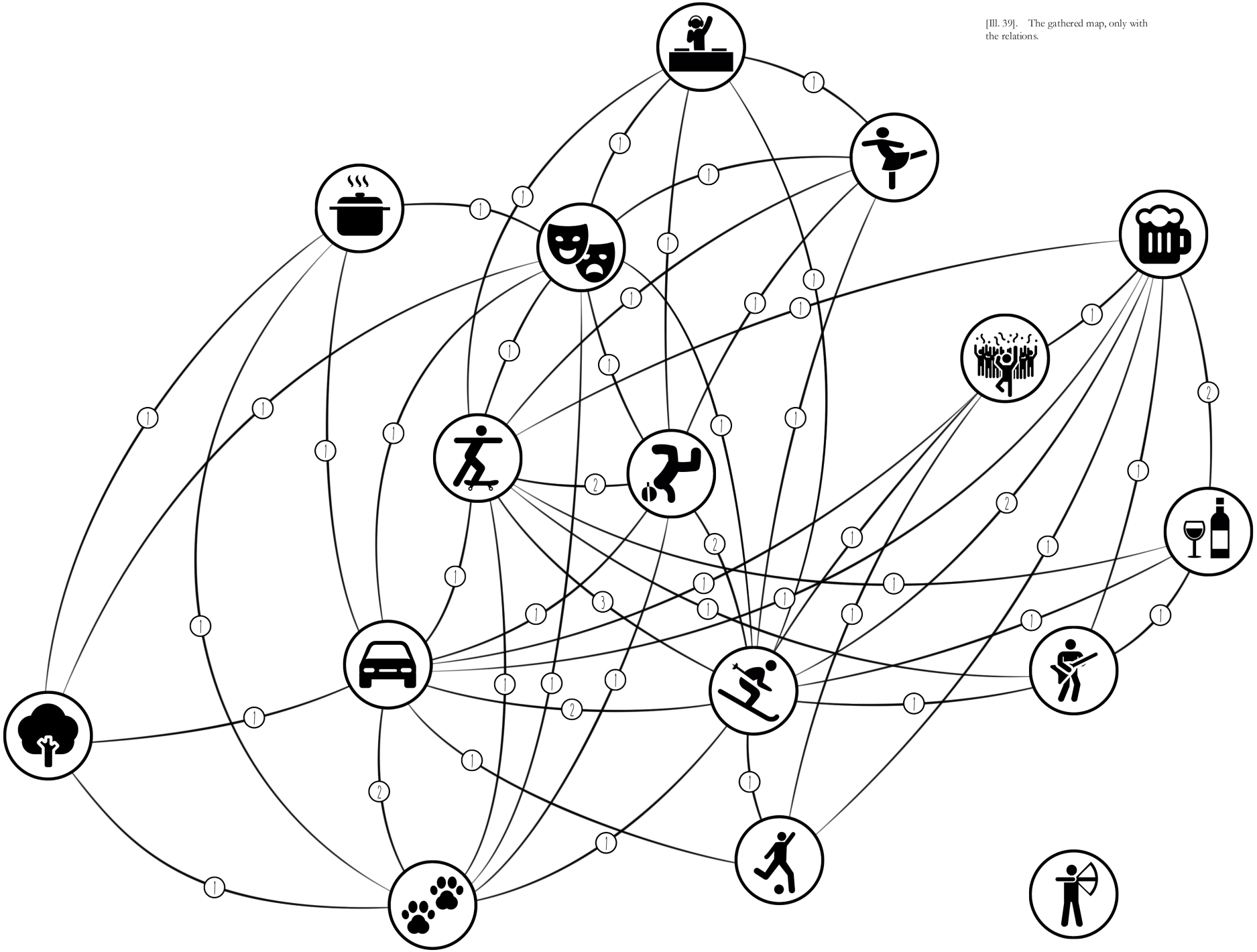
All of the data added to the cultural map until now, is only used as sample data, to have some data, before giving a case. The samples, does only show how the data is stored, and how the relations are developed, not how it is used. To show, how the data relations of the cultural map, is used, a case is added to the map. The total map of all the relations between the aesthetic markers, is

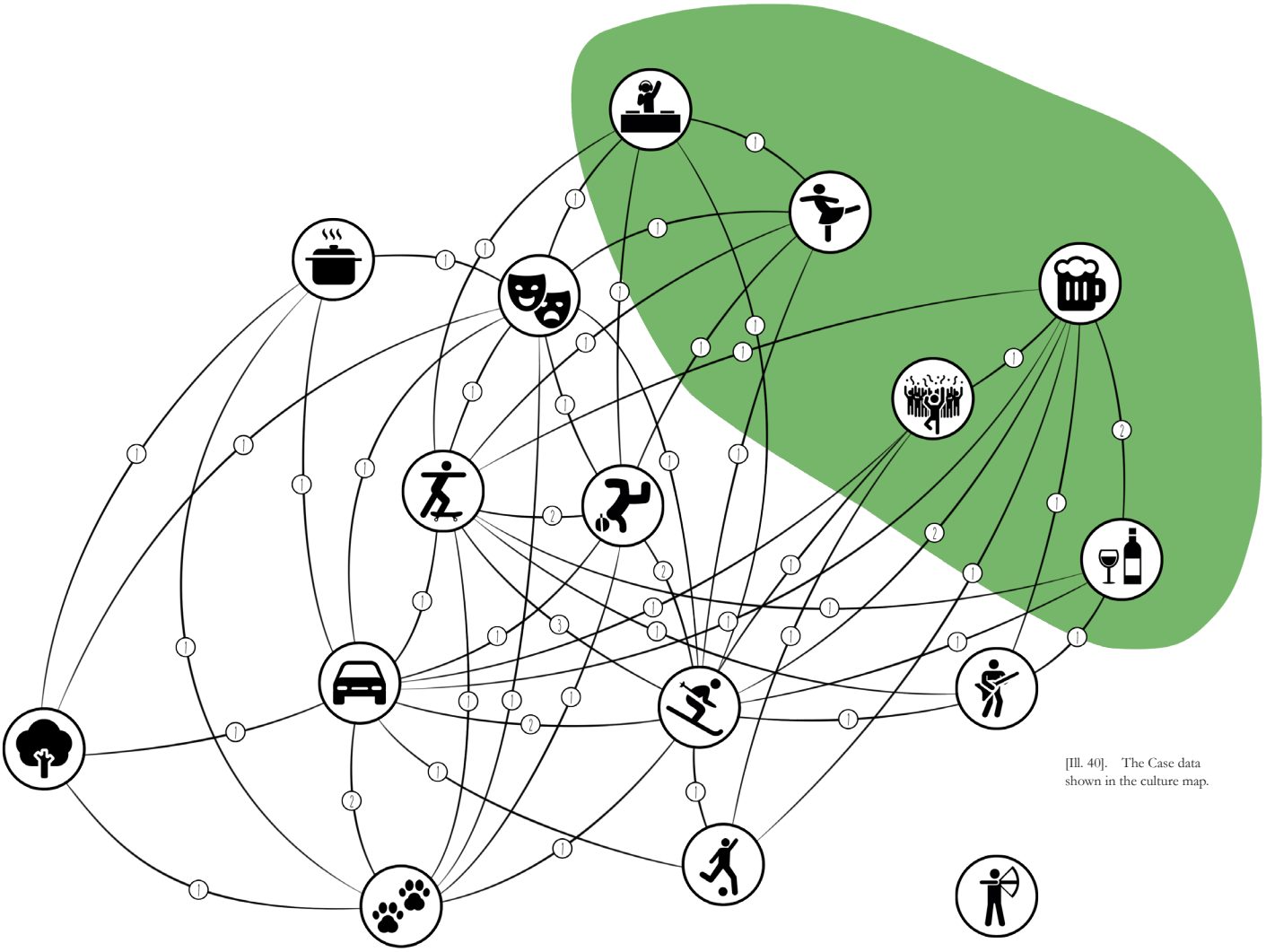


[Ill. 38]. The gathered map, with all the samples and all the relations.

shown in illustration [Ill. 38]. All of the relations, are based on the five samples of data presented. In order to use a case, the samples are removed, but the relations are saved. The Illustration[Ill. 39] show how the database stores the data, without the knowledge about the users interests. The data gathered about the users, is untraceable to the user account.

[Ill. 39]. The gathered map, only with the relations.

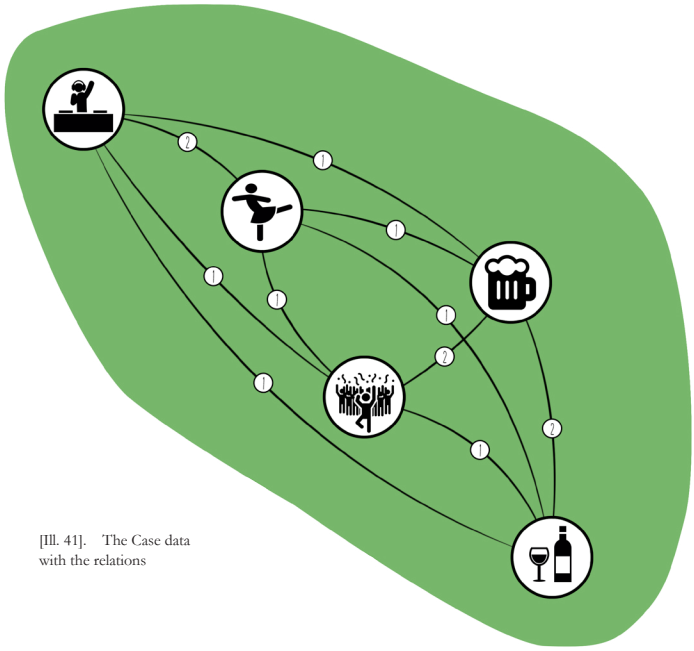




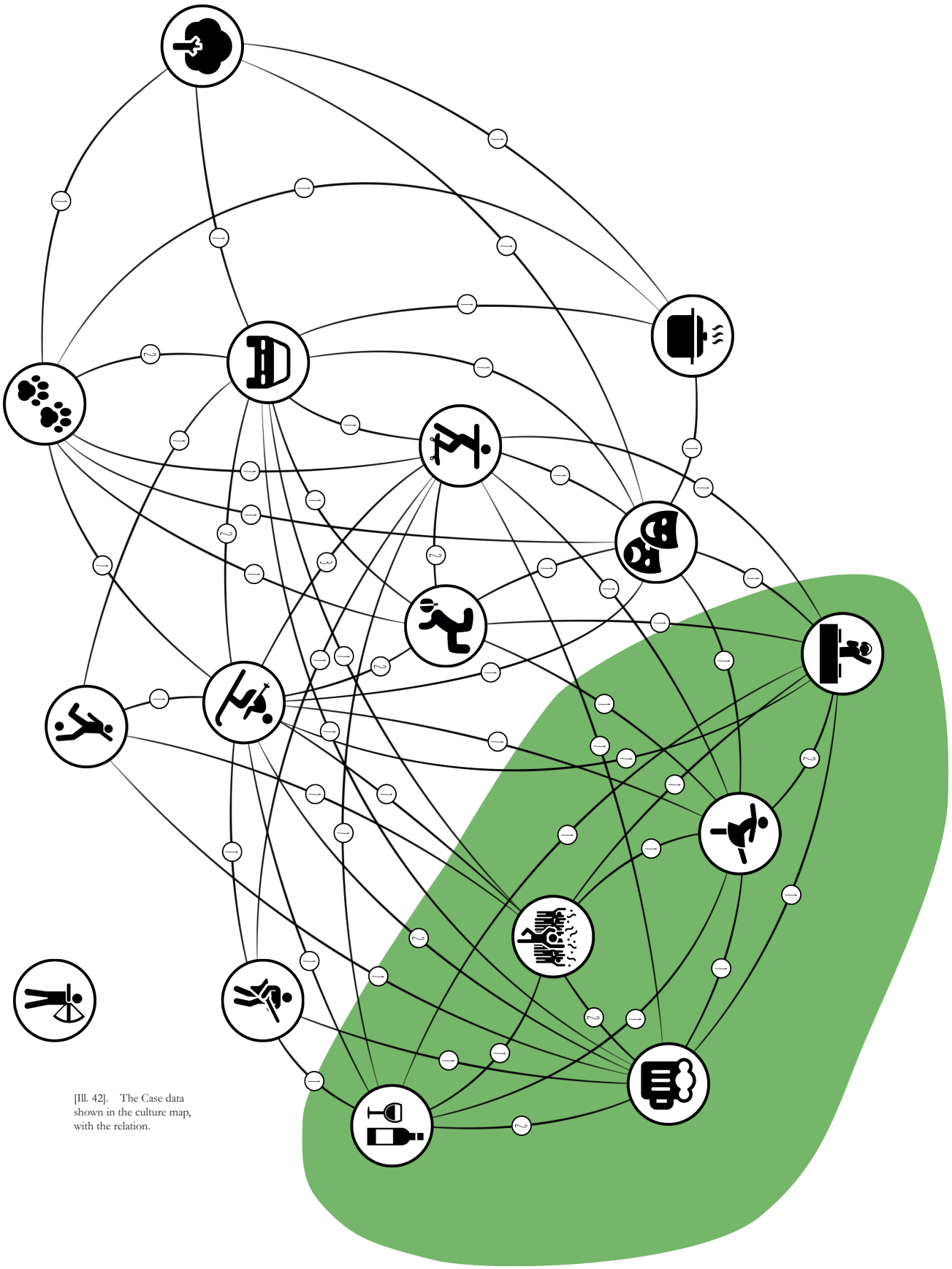
[Ill. 40]. The Case data shown in the culture map.

Case using the database.

To explain the relational pattern recognition algorithm, a case[Ill. 40] is presented, where a specific students activity is followed. The case represents a user, who will be used to explain how the service is delivered. The case is shown as the green cloud, illustrated in [Ill. 41]. The aesthetic markers identified, through the data is, DJ, Dancing, Partying, beer, and wine. As explained in (3.1 on page 45), each time a user assesses the web page, the identified aesthetic markers and the relations of the aesthetic markers are added to the database. This type of data construction, is also known as reinforcement learning, and is very much used in artificial intelligence. The data identified, is stored in order to get more precise results later. Three of the relations, have been identified earlier, through the samples. The three relations, that have been



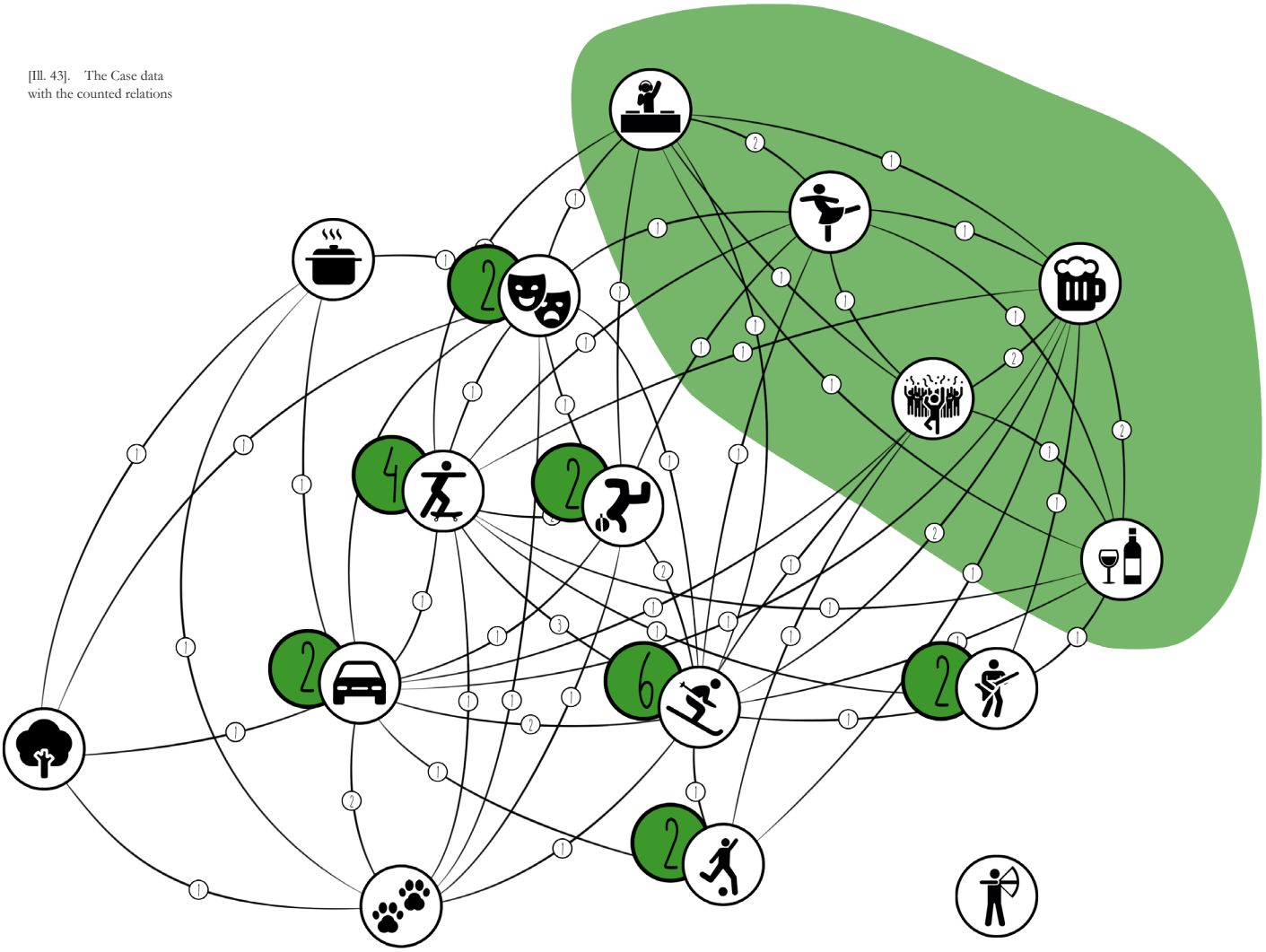
[Ill. 41]. The Case data with the relations



[Ill. 42]. The Case data shown in the culture map, with the relation.

identified before, and therefore is increased by one, is the DJ - Dancing Relation, Beer - Party Relation and Beer wine relation. In [Ill. 40], the aesthetic marker is illustrated, and in [Ill. 42], the aesthetic markers, inclusive the relation to aesthetic markers, outside the ones from the user case are presented.

[Ill. 43]. The Case data with the counted relations



To target the aesthetic markers, with the highest possibility of fitting to the interest of the user, the probability is calculated. To calculate the probability of the interest in an aesthetic marker, the relations between the aesthetic markers of the user and the aesthetic markers outside the aesthetic markers of the user, are counted. The counts are based on the amount and weight of relations. In [Ill. 43], the amount of relations, to each of the aesthetic markers are shown, in the green circles.

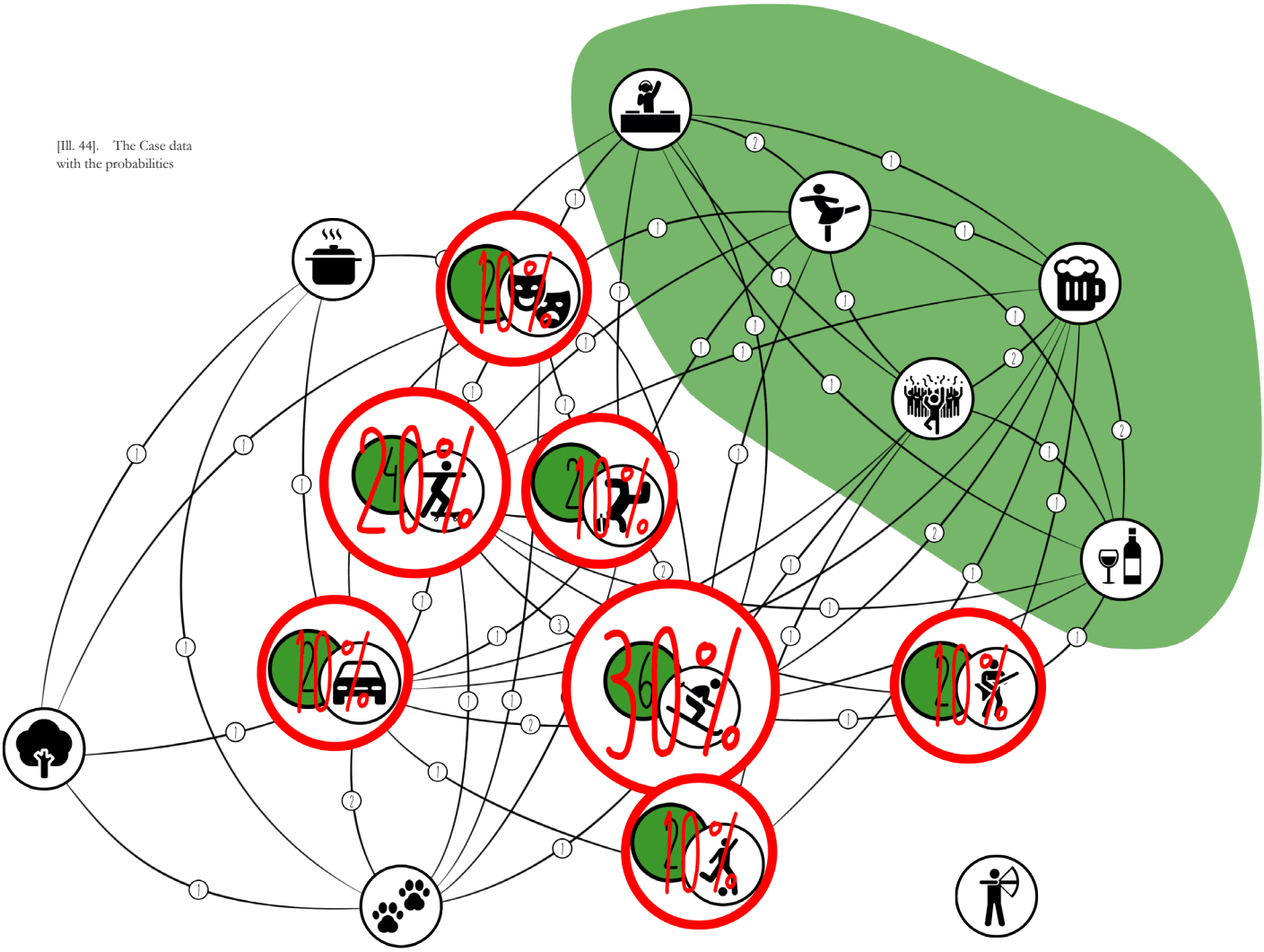
The results of the relation counting are:
Skiing has 6 relations
- Beer w. 2
- Wine w. 1
- Music w. 1
- Party w. 1
- Dancing w. 1

Skateboarding has 4 relations
- DJ w. 1
- Dancing w. 1
- Beer w. 1
- Wine w. 1

Theatre has 2 relations
- DJ w. 1
- Dancing w. 1

Break Dancing has 2 relations
- DJ w. 1
- Dancing w. 1

Cars has 2 relations
- Party w. 1
- Beer w. 1



[Ill. 44]. The Case data with the probabilities

Football has 2 relations
- Beer w. 1
- Party w. 1

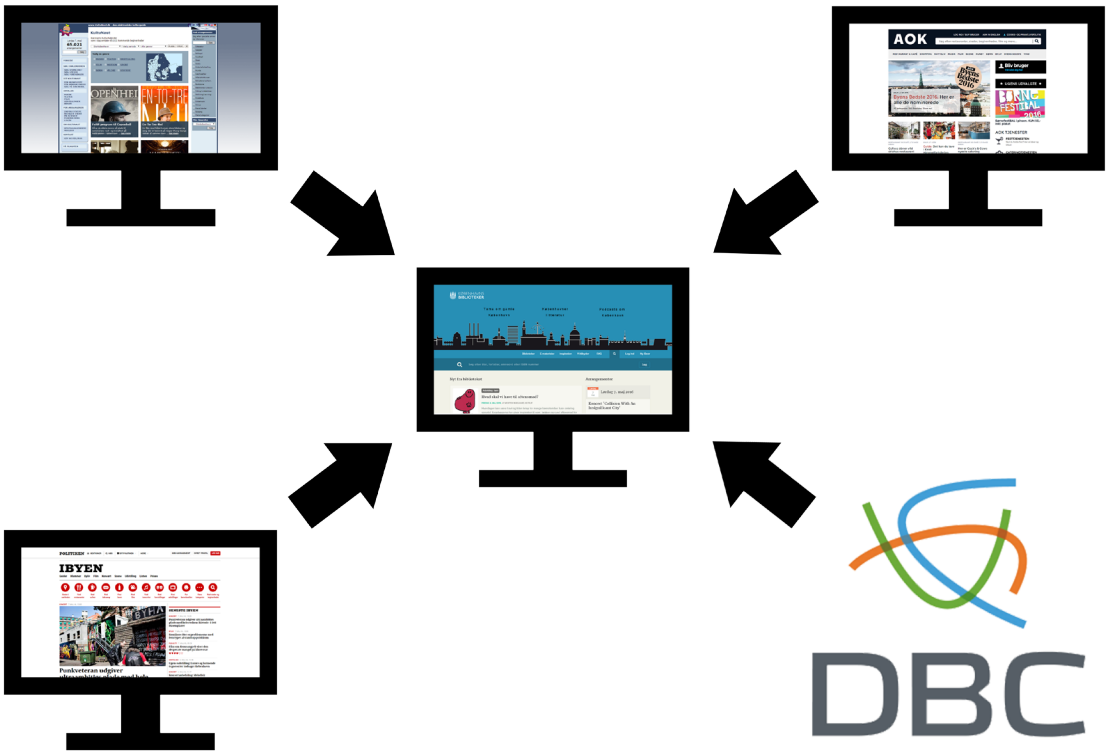
Music has 2 relations
- Beer w. 1
- Wine w. 1

When the relations, to the users aesthetic markers are counted, the probability is calculated. The probability is calculated in percentage. By adding all the relations to the users aesthetic markers together, to get the total amount of relations from the users aesthetic markers. Divide each of the aesthetic markers, with the total of the markers and multiply it with 100. in this case it is:
- Skiing: 6/20*100 = 30%
- Skateboard: 4/20*100 = 20%
- Theatre: 2/20*100 = 10%
- Break Dancing: 2/20*100 = 10%
- Cars: 2/20*100 = 10%
- Football: 2/20*100 = 10%
- Music: 2/20*100 = 10%

The probability[Ill. 44] that the aesthetic marker about skiing is fitting the user is 30%, while the probability the aesthetic marker about skateboarding, is fitting the users needs is 20%. These probabilities are used, in order to decide the amount of the aesthetic markers, offered to the user, and to which aesthetic markers that is most important to find.
After defining the probability of the aesthetic markers, that fits the users needs, cultural offers that contains these aesthetic markers, are found. This is done by searching through the civilizers and DBC.

3.1.3. DISTRIBUTING CULTURAL MATERIAL AND OFFERS

To find cultural offers, containing the aesthetic markers. The data about the cultural offers, are aggregated[Ill. 45] from the three civilizers mentioned in the state of the art, and the Data Well. The services search through the database of each civilizer, and through the Data Well, using the tag presenting the aesthetic marker, as search word.
The seven aesthetic marker tags, defined through pattern recognition, are used by the service, to find the cultural offers of the user, described in the case[Ill. 43].



[Ill. 45]. The civilizers and DBC, delivering data to offer.

Step 1: The service asses Kultunauts database, and search for the aesthetic marker, with the highest probability. This is done, by searching for the tag "Skiing" in the keywords, the description and the name of the cultural offers, in Kultunauts database. If the tag "Skiing", is found in a cultural offer name, keyword or description, the offer is saved to a database of the service.

Step 2: The next tag "Skateboarding" is searched for in the database of Kultunaut. Instead of saving the cultural offer directly to the service database, the cultural offer is compared to all the existing cultural offers from the "Skiing" tag. The comparison is done by comparing the time, date and address, since the name and description of the event, might be different from database to database, or the name of the event might be the same, but the location different, such as Distortion, which happens in many locations, at different times, but is called the same. This procedure is applied to the rest of the tags, defined through the pattern recognition.

Step 3: After searching Kultunaut for cultural offers containing the tags, the other databases of the civilizers are searched through as in step 1. The results of the search, is compared to the existing data of the service database as in step 2.

Step 4: After aggregating cultural offers from the civilizers, a search of cultural material, about the tag "Skiing", is carried out. The search is done, by searching into the Data Well, of cultural material, with the name, description or tag, containing the aesthetic marker tag "Skiing". The cultural material identified through the search, is saved to the service database.

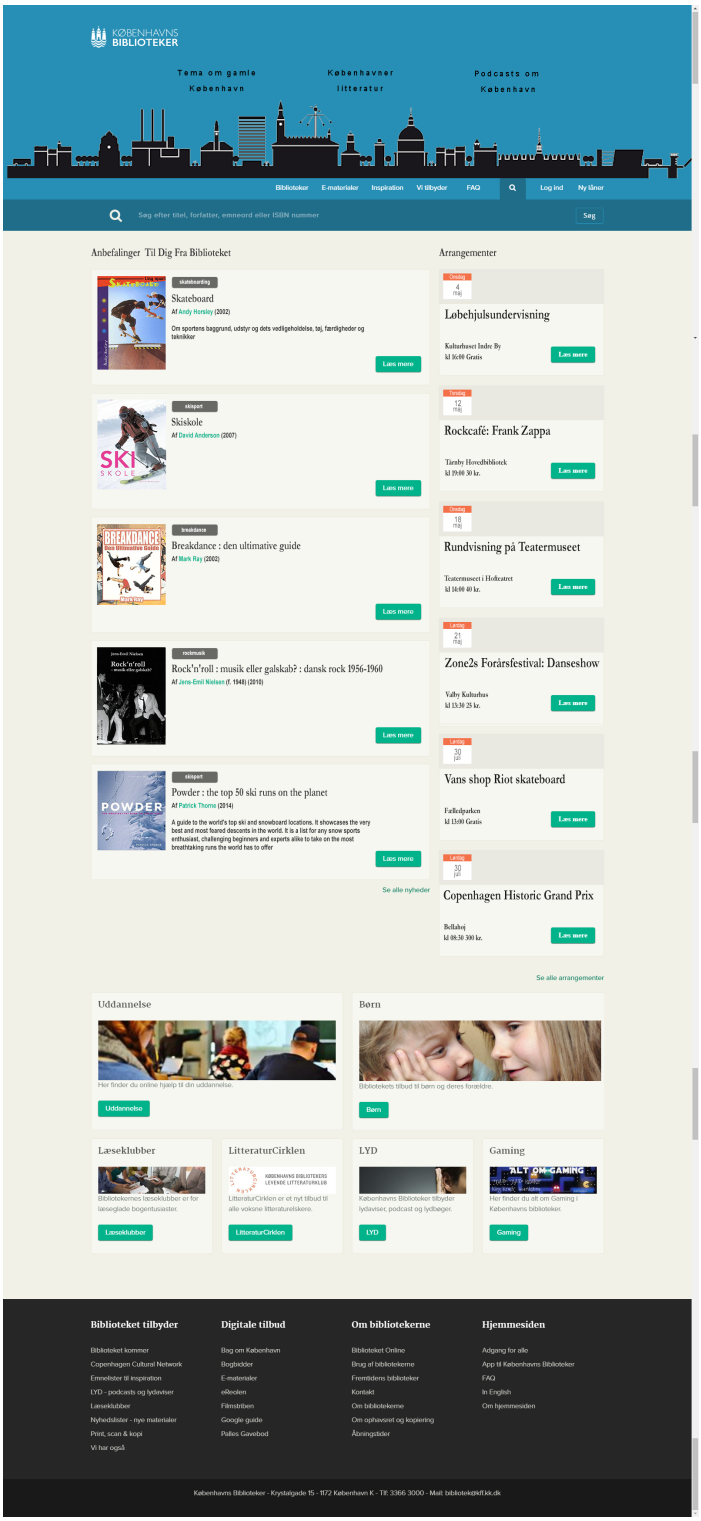
3.1.4. INTERFACE

Until now cultural offers and cultural material, containing the targeted aesthetic markers, are saved to a database. In order to deliver the cultural offers and cultural material to the user, the web-page Bibliotek.kk.dk is used. The existing web-page, is designed with an event schedule and news feature at the frontpage of the webiste.

Instead of the news feature, the cultural material from the Data Well, identified through pattern recognition, is shown. The material is shown, based on the probability. 30% of the material presented at the web page, is the cultural material, containing the aesthetic marker "Skiing", 20% is skateboarding, and the last material is randomly presented, since they have equal probability.
The event schedule, is not replaced. The data of the event schedule is just replaced, with the data from the service. The cultural offers, are delivered in the same way as the cultural materials. 30% of the offers presented at the frontpage[Ill. 46] are offers about skiing, 20% are about skateboarding and the rest of the offers, are randomly presented. If the user wants to see all of the offers, the user clicks on the links underneath the schedule or the material in order to browse through all the offers found.

If the user, clicks on one of the events of the schedule, a new tab is opened, with the original page about the event. This is done, to secure less data traffic and less data storage of the service.

After the user session is done, the data gathered through the user session is saved to the relational culture map, defining new relations between aesthetic markers. Furthermore, the data about cultural offers and cultural material stored at the service database to deliver offers to the user, is removed. The reason why removing the data about the cultural materials and offers, is to constantly secure the server is able to handle new users of the service, without generating and buffer new material constantly. The only data saved, is the data in the relational culture database.

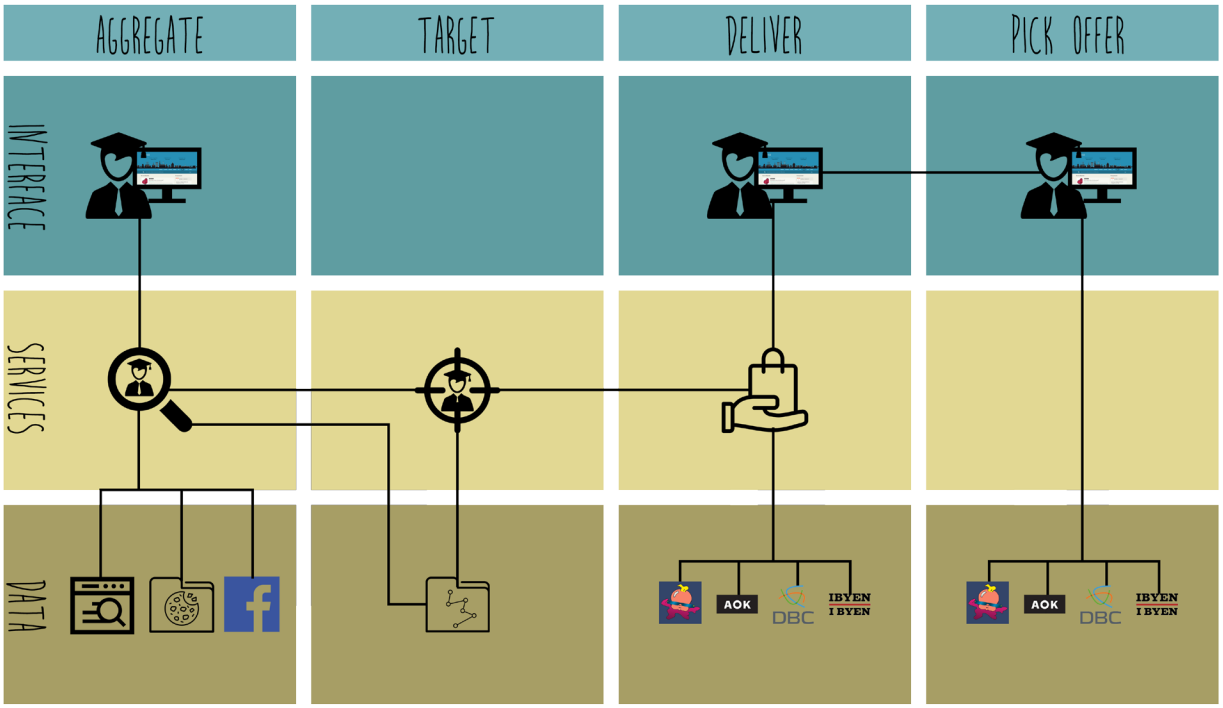


[Ill. 46]. The user interface

So far, the concept have been elaborated, and each of the parts have been explained. To understand the line of interactions done by the user throughout the future service a customer journey of the user is developed. The customer journey, provides the final overview of the total line of interactions.

3.1.5. CUSTOMER JOURNEY

A Customer Journey[63] is made, to create an overview of the line of actions carried out, throughout the service. The method is also used in concept 0.1 (3.1 on page 45), to define the current students journey, throughout the library service. In the design part, the customer journey[Ill. 47] is a method to communicate the service, from the customers perspective.
The customer journey is segmented into 4 sections, the aggregate section, the target section, the deliver section, and pick offer section. The reason segmenting the journey into 4 sections, is to make it easier to communicate the actions carried out, in the different layers of the service, during the use of the service.



[Ill. 47]. The customer journey of concept 0.1

Aggregate: The user asses the webpage and logs into the user's library account. The service aggregates data about the user's aesthetic markers, from cookies, facebook and the use session.

Target: The data aggregated, is stored into a database, and the relations is defined. The same data is used by the service, to define the new relations of the users aesthetic markers. This is carried out, using the relational pattern recognition algorithm.

Deliver: After defining the aesthetic markers, the cultural offers needs to contain, the service search for the cultural offers in the Data Well and in the civilizers. The cultural offers containing the aesthetic markers, are delivered to the user, through the library's webpage.

Pick Offer: Based on the offers delivered by the service, the user is picking one or more of the cultural offers, and is directed to the original page from one of the civilizers or the page, on bibliotek.kk.dk about the materials.

After developing the concept, and sketch the different processes of the concept, the concept is tested. The purpose of the test, is to get the concept design confirmed, in order to start specifying the details of the service. Many methods are available to test the service concept, such as creating an experience prototype or a service prototype in order to get feedback about the experience of the user or testing the usability of the service. Due to the time and resources, it is not possible to set

up any of these kinds of tests, with high school students who, as experienced, are difficult to reach. Instead an interview is setup with René from the IT-Development Department, in order to make him confirm the design, from the service providers perspective.

3.1.6. CONFIRMATION OF CONCEPT 0.1

To get the concept confirmed, a meeting is carried out with René from the IT-Development department. This interview is carried out as a small presentation of the concept, using the sketches and models, explained through Chapter (3.1 on page 45). The scope of the meeting is to make René understand the concept, and give feedback. The interview is setup as an informal semi structured interview, making it possible for both partners, to elaborate on questions or answers.

Result

As explained in the design of concept 0.1(3.1 on page 45), is an interim design, since the project changed direction, based on the design of concept 0.1. The concept 0.1 design is based on the research of a problem statement, which doesn't include the educational goals of the student.

According to René the project and the concept was missing the students. The students was simply missing out on the service concept, and the project was not taking the students study into consideration. Instead of just of looking at the culture of the students, the service should also take the goals of the study into consideration. Especially the study goals of the students, were very interesting to incorporate in the project, according to René. By incorporating the study goals of the student into the project, the students as focus group, was becoming more legitimate. Therefore the problem statement, and the problem specification changed, and new research about the users, and their study goals were carried out.
After changing direction of the project, and the re-iteration is carried out, a second concept is developed.

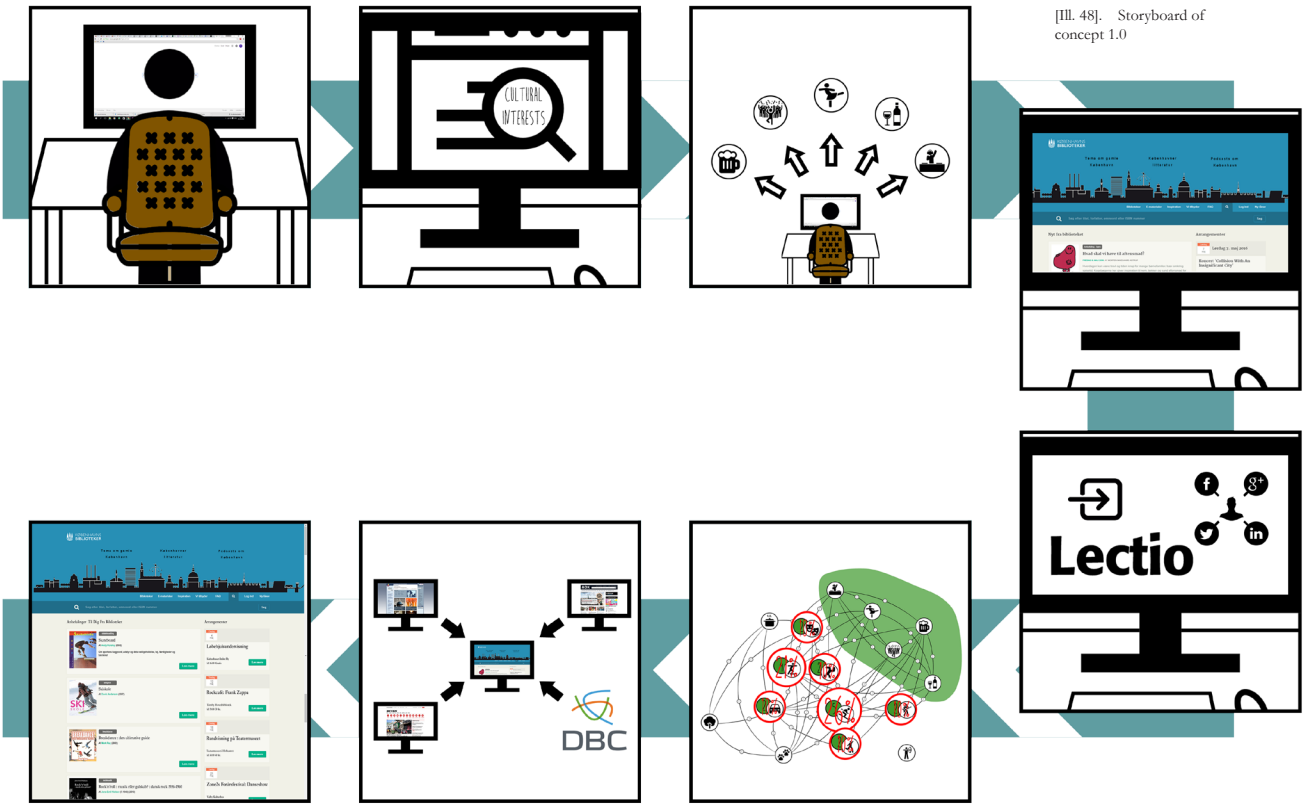
3.2. CONCEPT 1.0

Concept 1.0 is developed, after, a large reiteration in the project. This concept, is designed in order to fulfill the problem specification, and all the specified requirements(2.5 on page 40). Feedback given by René from the IT-development department, is incorporated into the design of the concept 1.0. Concept 1.0 is based on concept 0.1, but instead of only deliver cultural offers, based on the aesthetic markers of the student, information about the students education is added to the service. The following chapter, is explaining how the use of study data, is implemented into the concept. In order to explain the concept, the same methods as used in concept 0.1 (3.1 on page 45), is also used here. To understand the overall concept, storyboarding is used.

3.2.1. SKETCHING THE SERVICE

To communicate and explain the service, a storyboard[Ill. 48], that briefly explains the steps of the service. This use of storyboards, to explain the service in a narrative, makes it possible to communicate the experience of the service from a users perspective. In this case, the storyboard is used to communicate the concept to the IT-Development Department of the library, and to stakeholders inside the service. The difference between creating a narrative to the stakeholders instead of the user, is the amount of technical details communicated. To explain the storyboard, a small description of each picture is carried out. After explaining the steps of the storyboard, the concept is elaborated.

1. **Assesses computer:** The first step, is pretty self explanatory. The user is either assessing a private computer or a public computer.
2. **Search for Aesthetic Markers:** In the second step the user is searching for aesthetic markers. This is done either through social medias or other websites.
3. **Gather and Store Aesthetic Marker Data:** The user is throughout the search of aesthetic markers, producing data about the aesthetic markers. This data is either stored in the social media, or in cookies at the computer.
4. **Assess Bibliotek.kk.dk:** The student assesses the library web page.



[Ill. 48]. Storyboard of concept 1.0

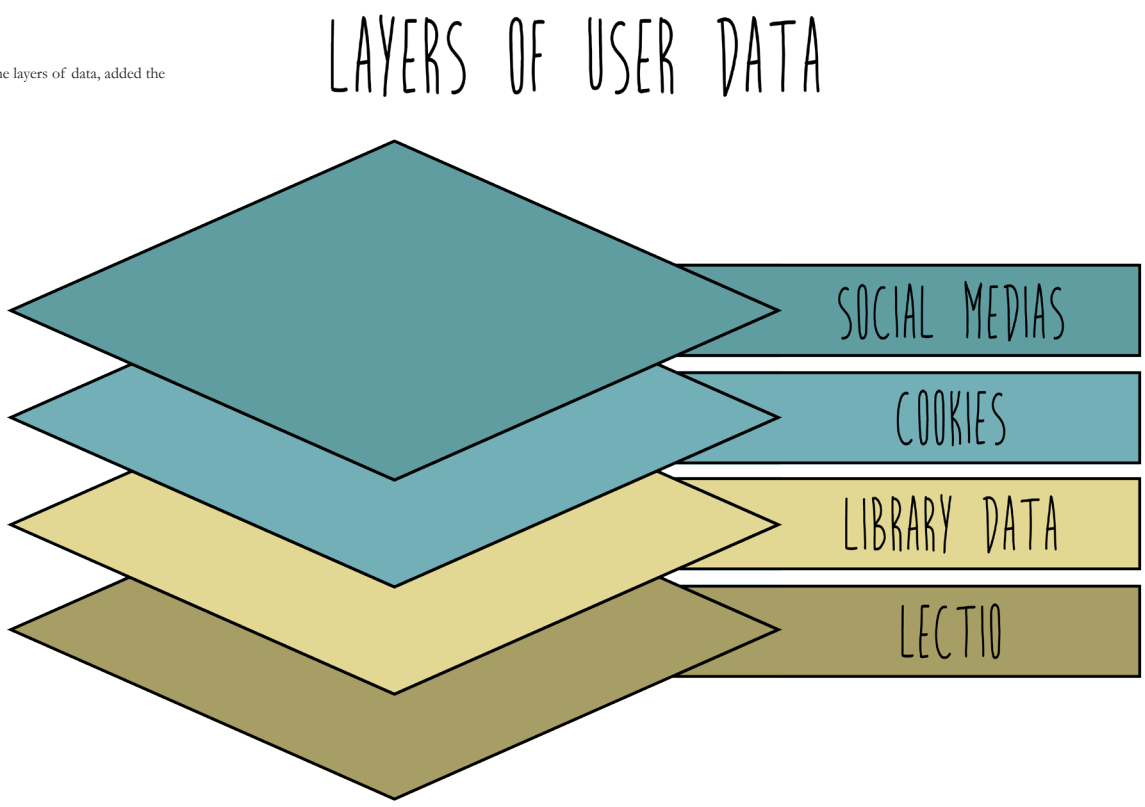
5. **Login:** In order to make the service delivered to the user, the data about the user's study is needed. This data is assessed through the user's account on the web-page. When the user is logged in, and have registered the lectio account and social media account, a button is added to the menu, making it possible to assess the service. When pressing the button, data is aggregated from cookies of the user's pc, social medias, session data, and data from lectio is aggregated.
6. **Defining new aesthetic markers:** Based on the data aggregated through, the session data, the cookies stored on the computer, and the social media, new aesthetic markers are defined, through relational pattern recognition.
7. **Find Cultural Offers:** Based on the new aesthetic markers defined through pattern recognition, paired with the study goals from Lectio, cultural offers and material is searched for through the civilizers and the Data Well.
8. **Deliver Cultural Offers:** The cultural information found, through the civilizers and the Data Well, is delivered to the user, through bibliotek.kk.dk.

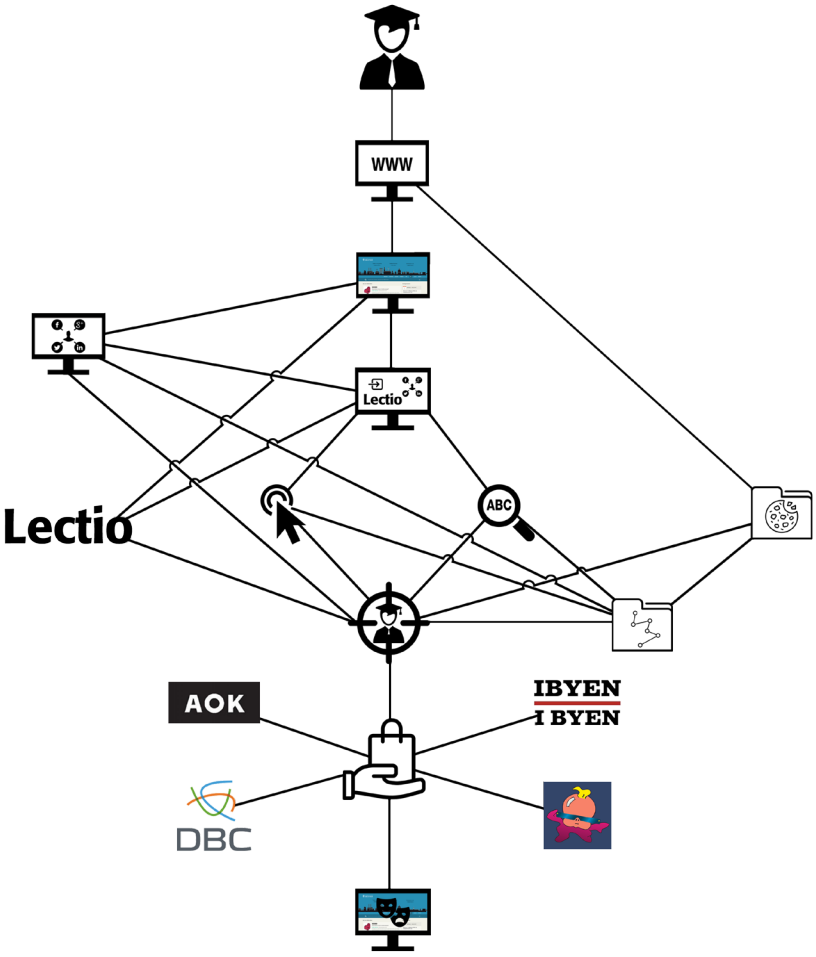
To understand the different mechanisms throughout the process of the concept, an elaboration of the mechanisms is carried out. Since large part of the concept 0.1, are used in concept 1.0, only the new mechanisms of concept 1.0 is elaborated.

3.2.2. DATA TYPES

The first change from Concept 0.1 to Concept 1.0, is the data types[Ill. 49]. A new data type is added to the concept, in order to combine the cultural data of the student, with the study data. The new data is data about the study and the study subjects of the student. This layer, serves as the base layer of the service, since it is the most important layer in the service, in order to make it fulfill the problem statement. There are only one place, where data about the user's study is available, it is through the communication and education platform Lectio. This data is not going to be used to decide, which aesthetic markers are related to the interests of the user. Instead the data from Lectio is used together with the new aesthetic markers, in order to deliver cultural material, that educates the student, while inspiring the person, to explore new cultures. To understand how the data, is used during the use of the service, a use case is carried out.

[Ill. 49]. The layers of data, added the Lectio Layer





[Ill. 50]. A use case, showing the data, with lectio

3.2.3. USE CASE

A use case([64]) is carried out, to make it possible for the stakeholder or service taker, to investigate the different parts and actions of the system, inside the service. In this use case[Ill. 50], the level of details is kept at a minimum, since the use case main purpose is to communicate how the new data is connected, inside the service system.
Large changes to the concept is made in the transition from concept 0.1 to 1.0.

Change 1. The user needs to login to the account of the library, to use the service. The login is needed, since the service must be able to retrieve data from Lectio, in order to target cultural material, related to the study of the specific student. This change is also securing, that the system fulfills the Requirement. (Req. 9)

Change 2. The user needs to register the Lectio account of the user, in order to gather data from the user's specific Lectio account. This change makes the service fulfill requirement (req. 9)

Change 3. The service is not able to be used, by other users, than students with their Lectio account registered.

Change 4. The cultural offers targeted to the student, are based on the new aesthetic markers from the relational pattern recognition, and the study of the student.

Change 5. A new page of the library webpage is made, to deliver the cultural offers, only to the students.

The changes made to the concept, secures the requirements (2.5 on page 40) based on the discover and define phase, are fulfilled. As described during the use case, the changes are primarily affecting the user interface, where a new page at the

bibliotek.kk.dk is made, the user have to login to the library account, and register the Lectio account of the user.

3.2.4. INTERFACE

The interface of concept 1.0, is the webage of the library bibliotek.kk.dk. Instead of just adding a function to the first page shown, when the user is logged in, making it possible to register ones social media accounts, a new tab in the menu is shown when the user logs in. Furthermore, it is not possible to use the service, without logging in at the webpage or having the Lectio account registered.

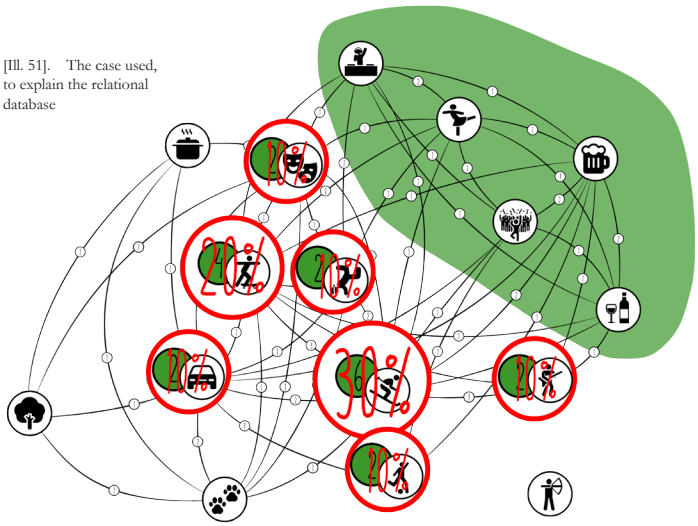
When the students wants to asses the service, the user needs to:

1. Login to the library account
2. Assess the service through the menu
3. Register the Lectio account.

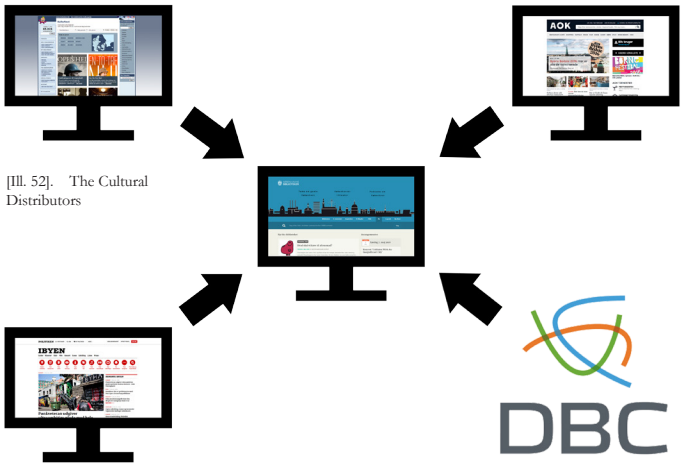
Registering the Lectio account is mandatory, while the social media accounts are optional. When Lectio is registered pattern recognition of the aesthetic markers is carried out, and the cultural offers can be delivered.

3.2.5. DELIVERY OF CULTURAL OFFERS

The service makes still use of the relational pattern recognition algorithm[Ill. 51], in order to target cultural offers to the user. It is though, not the only data used in order to find the cultural material and offers to target the user.
After the relational pattern recognition is carried out, the identified aesthetic markers are used in combination with the data from Lectio.
As explained in (1.3 on page 19) the data from Lectio is structured, which means it is possible to depict specific data about the study of the user. Data such as the study subjects of the student, or specific topic of a study subject. The data about the specific topic and subject, is narrowed down to a bunch of tags, just as the aesthetic markers.



[Ill. 51]. The case used, to explain the relational database



[Ill. 52]. The Cultural Distributors

To explain how it is done, the case[Ill. 51] is used.

The seven aesthetic marker tags, defined through pattern recognition are used by the service to find the cultural offers to the user.

Step 1: The service asses Kultunauts database[Ill. 52], and search for the aesthetic marker, with the highest probability. This is done, by searching for the tag "Skiing" in the keywords, the description and the name of the cultural offers, in Kultunauts database. If the tag "Skiing", is found in a cultural offer name, keyword or description, the offer is saved to a database of the service.

Step 2: The next tag "Skateboarding" is searched for in the database of Kultunaut. Instead of saving

the cultural offer directly to the service database, the cultural offer is compared to all the existing cultural offers from the "Skiing" tag. The comparison is done by comparing the time, date and address, since the name and description of the event, might be different from database to database, or the name of the event might be the same, but the location different. This procedure is applied to the rest of the tags, defined through the pattern recognition.

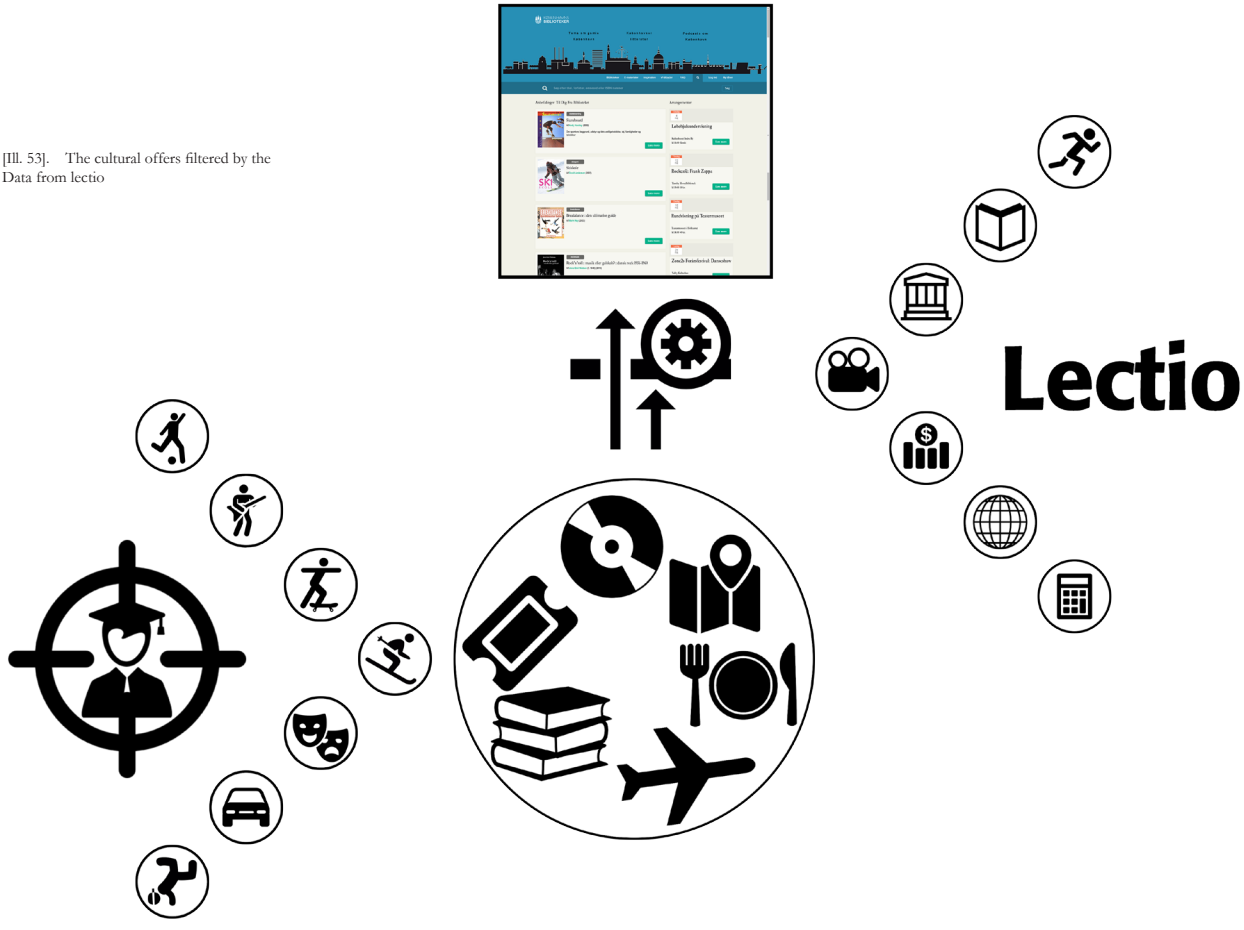
Step 3: After searching Kultunaut for cultural offers containing the tags, the other databases of the civilizers are searched through as in step 1. The results of the search, is compared to the existing data of the service database as in step 2.

Step 4: After aggregating cultural offers from the civilizers, a search of cultural material, about the tag "Skiing", is carried out. The search is done, by searching into the Data Well, of cultural material, with the name, description or tag, containing the aesthetic marker tag "Skiing". The cultural material identified through the search, is saved to the service database.

Step 5: The new aesthetic marker "Skateboarding", is searched for in the Data Well. As in step 2, the outcome of the search is compared to each other before the content is saved in the service database.

Step 6: All offers gathered from the Civilizers and all the gathered material from the Data Well, is then gone through a filter[Ill. 53]. The first Study Tag, of the list of study tags, is searched for in the gathered material. In this case, the study tag is "Sport". All material that is containing the word "Sport", in its name, keywords or description, is marked as usable.

Step 7: The next study tag is chosen, and searched through the gathered cultural offers and materials. This procedure is done to all the study tags. In the end, a small amount of data, with material that is within the users cultural interest and study, is



[Ill. 53]. The cultural offers filtered by the Data from lectio

stored. This material is delivered through bibliotek.kk.dk.

3.2.6. CUSTOMER JOURNEY

To communicate the interactions and information flow carried out over time, a customer journey([64]) is made. The customer journey, gives the stakeholders of the service, an insight in how the service is carried out.

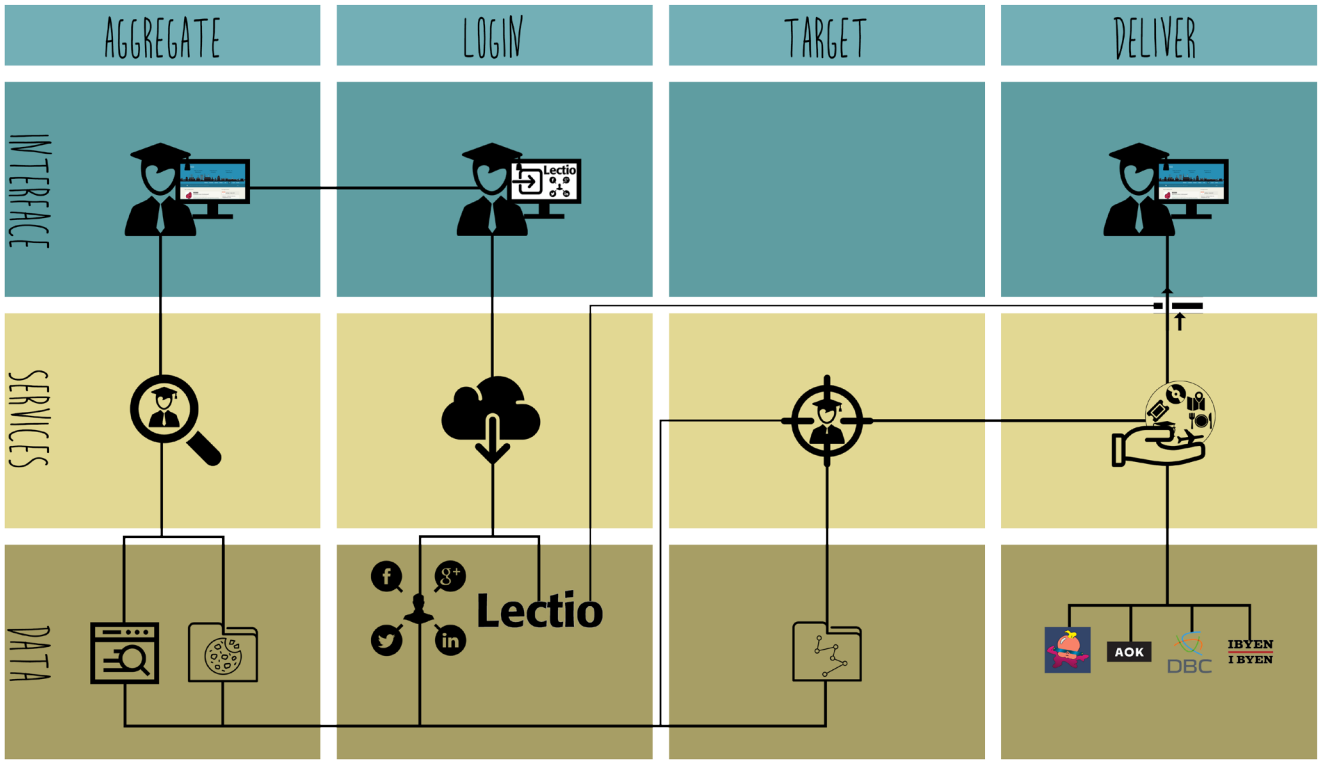
The customer journey[Ill. 54] is segmented into 4 times 3 sections. The vertical segmentation is describing the action done, Segmented into: AGGREGATE, LOGIN, TARGET and DELIVER. The horizontal segmentation is describing the layer of action, segmented into INTERFACE, SERVICE and DATA. To describe the process, the sections of the vertical segmentation is used.

AGGREGATE: The user is assessing the webpage. The service is searching for data, in the cookies of the computer, and in the use session data.

LOGIN: The user logs in to the library account. In the profile of the library, the user registers hers/his Lectio account. It is also possible for the user to register the social medias,of the user. The data of from the users Lectio and Social Medias, is aggreagted.

TARGET: All data aggreagted, through use session, cookies and social medias, are send to the relational culture database, to register the relations of the users aesthetic markers. The data same data is also send to the pattern recognition process, defining the aesthetic markers targeted to the user.

DELIVER: Cultural offers and material, containing the aesthetic markers, are found through different civilizers and the Datawell. This outcome of the serach of cultural offers and materials, are filtered through the study data from Lectio, in order to only deliver cultural material to the user, related to the study of the user.



[Ill. 54]. The customer journey map of concept 1.0

3.2.7. TEST OF CONCEPT 1.0

To test the final concept, a different types of tests can be carried out, such as usability testing of a low-fidelity prototype[63] or experience testing of a high-fidelity prototype[63], where the students are used as test subjects. Furthermore, a walk-through of the concept together with the IT-development department, can deliver insight about if they think the concept will work. Unfortunately, non of these different tests are carried out, due to time and resources. It is though still possible to test, whether the concept fulfills the requirements of the service, specified during the discover(1 on page 9) and define(2 on page 28) phase.

Comparison to Requirements.

To carry out the test, each of the requirements are evaluated through a thorough comparison to the concept, in order to conclude if the requirements are fulfilled.

Req 1: *Aesthetic Markers of the users, must be used, to define the users interest.*
To identify the cultural offers and material distributed to the user, data of the user is segmented into words, also defined as "tags". One tag, is a word describing a aesthetic marker, or part of a aesthetic marker. It is not absolutely certain, the aesthetic markers is defined during the identification of aesthetic markers in the data. It is therefore only likely, that the service will make use of the users aesthetic markers.
Fulfilled: Probably

Req 2: *Broaden the user's knowledge, by target new cultural information to the user, outside the interest of the user.*
The relational pattern recognition, is looking at the aesthetic markers of the user, to find new aesthetic markers that have not been identified to the user . The cultural offers delivered to the user is defined on these aesthetic markers, it is however not certain, the aesthetic markers find new offers and material to the user, since the new aesthetic markers identified, probably are too close to the aesthetic markers of the user. The concept is therefore not bulletproof, in order to constantly deliver new material related to the users interest, but outside the core interest of the user. This requirement is therefore only probably fulfilled.
Fulfilled: Probably

Req 3: *The system must dynamically update the aesthetic markers.*
To dynamically update the aesthetic markers, reinforcement learning is used. By saving the data, used to find the aesthetic markers, for the cultural offers, the relational database is constantly updated. It can be questionable if it is dynamical, or if it is updating itself with the tags, the system is consisting of. A usability test is needed to be carried out, in order to understand whether the system is dynamical or not. This is not possible at this point, the requirement is therefore defined as probably fulfilled.
Fulfilled: Probably

Req 4: *Data from the users search in Google and other web pages, must be aggregated and used, to find and define the user aesthetic markers.*
Cookies are used, in order to define the aesthetic markers of the user. The cookies contains both information about Google, but also other webpages. An algorithm, to gather the data from the cookies, and filter the data, to only consist of aesthetic markers, is though needed. The requirement is therefore only fulfilled partly, until an algorithm is specified.
Fulfilled: Partly

Req 5: *Data from Social Medias must be used, to specify the aesthetic markers of the user.*
In the concept, the use of social media as a data provider, is optional to the user. According to the concept, the service is still possible to use, without registering any social medias. This makes the service base the targeted cultural offers on the use session data, and the cookie data. This requirement, is therefore only partly fulfilled.
Fulfilled: Partly

Req 6: *Data about the use session of the webpage, by the users, must be aggregated and used.*
The use session is recorded during the use of the

bibliotek.kk.dk, and the choices done, and search-words used, are saved in the relational database, and used in the pattern recognition, when the user asses the service at the webpage. The use session data is structured data, making it easy to gather for the service.
Fulfilled: Approved

Req 7: *DBC should be supplier of the database, handling the cultural relational data.*
The concept, does not state anything about the supplier of the database at this point.
Fulfilled: Inconclusive

Req 8: *The service taker must be DDB.*
The concept, does not state anything about the service taker at this point.
Fulfilled: Inconclusive

Req 9: *Data from Lectio, must be used, to combine the student's culture and education.*
Lectio is implemented in the concept 1.0. And it is mandatory to login to Lectio, before the user can make use of the service.
Fulfilled: Approved

Req 10: *Data from the civilizers, AOK, Ibyen and Kultunaut, must be used, in order to deliver cultural offers, to the students.*
The concept use all of the civilizers, in order to deliver cultural offers to the students, together with the Data Well from DBC.
Fulfilled: Approve

Req 11: *Bibliotek.kk.dk must be used as interface of the service.*
Fulfilled: Approved

The concept 1.0 fulfills several of the requirements, there are however still several requirements, which only partly is covered, or that isn't covered at all.

3.3. SUB-CONCLUSION

Throughout the development phase, a large change of the whole project was carried out. As described in concept 0.1, the result of the meeting with René from the library, changed the whole project problem statement, resulting in a large reiteration. Instead of making the reiteration, in the middle of the report, the reiteration is delivered, through the whole process, since the change of problem statement, had a large impact on the process from the start. After the large reiteration of the process, the concept 1.0 was developed. By adding study data, and change the line of interactions with the interface, the concept 0.1 was developed into concept 1.0.

The concept 1.0, is using a large amount of the concept 0.1, in order to deliver cultural offer and materials. To deliver cultural data, which also is related to the students study, data from Lectio is used. The data from Lectio, is used to filter the cultural offers, based on the aesthetic markers of the pattern recognition. To test if the concept 1.0, is working, many different tests could have been used. Because of the lack in time and resources, the tests were not carried out. Instead a comparison to the requirements of the define phase is carried out, in order to see if the current concept, actually are fulfilling the specified requirements. Many of the requirements are only partly approved, since many of the processes in the concept, not are specified. To specify the concept of the service, the project goes in to its final phase, the deliver phase. In this phase, the final design of the concept 1.0 is explained, through several models and methods, that specifies the details of the service.

4. DELIVER

In order to specify the final design of the of the service, developed throughout this project, the deliver phase is carried out. During the deliver phase, methods and models are presented, that delivers a detailed description of the service, and describes the outcome of the service to the users and the stakeholders. In the end a discussion and a conclusion upon the whole project and design is carried out.

In order to specify the different parts of the service, described in concept 1.0, an identification of the stakeholders and touch points, appearing in the service, is carried out. This investigation is done using the method and model System Map.

4.1. SYSTEM MAP

A system map[64] is used, to achieve an overview of the stakeholders inside the system of the service, and specify the connection between the stakeholders and touchpoints. The system map, is carried out, by analyzing the concept 1.0, and the current system of the Library. In order to simplify the service, only the system around the service is specified in the system map.

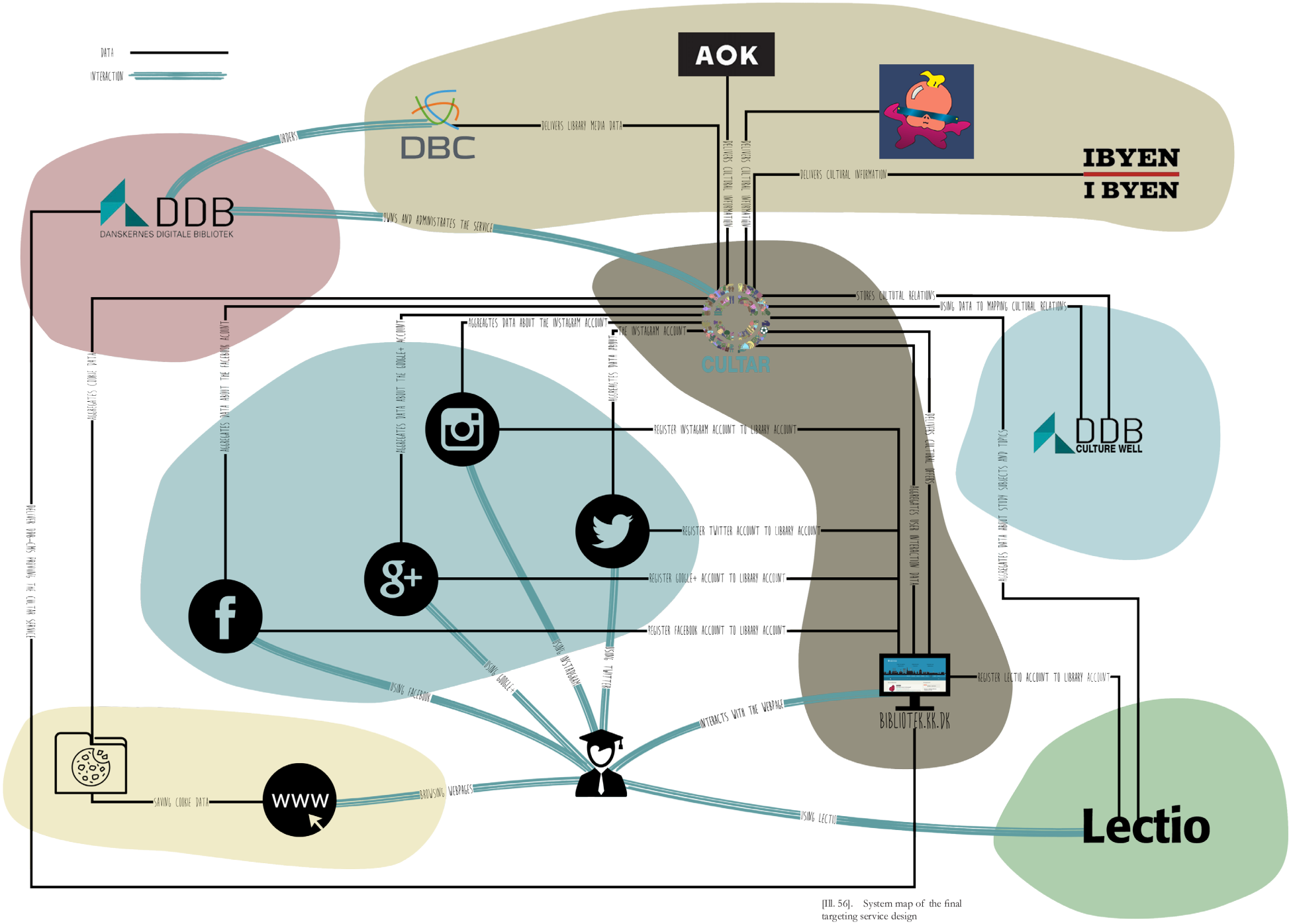
As explained (1.2.1 on page 13), DDB delivers the services to the libraries, through a CMS called DDB-CMS. The way the DDB-CMS delivers the service, is by providing the libraries with a predefined template, that creates the connection between the stakeholders and touch points. Therefore the service can be seen, as very transparent to the user, since it is simply featuring as a function of the webpage Bibliotek.kk.dk. In order to explain the connection of the service, inside the service system, a stakeholder called Cultar is added. This stakeholder is imaginative, and is just a template, which connects the data and the data transactions, between the user interface bibliotek.kk.dk, and different stakeholders. In order to make this server visible, a logo[Ill. 55] of the service is used. As in the system map[Ill. 56], different connections are used between the actors of the map, to visualize the type of connection. The blue lines, describe physical interactions, while the black lines

[Ill. 55]. Logo used to explain the service, inside thesystem map

describe the data interactions.

In the system map[Ill. 56], two new actors are defined.
The service Cultar and the DDB Culture Well
As described earlier, Cultar is a placeholder for a Wordpress template delivered through the DDB-CMS, which connects the data to the different stakeholders. As visualised, there is one physical interaction to the system, and it is the one to DDB. This connection describes the administrator of the service, who owns and delivers the service. The rest of the connections of Cultar, are data connections. These connections are aggregating data from the social media, cookies, use session data, civilizers, the DBC Data Well and Lectio; Saves aesthetic markers to the DDB Culture Well, and delivers cultural offers to the Webpage Bibliotek.kk.dk. The DDB Culture Well, is a server delivered by a supplier of DDBs Choice, which handles the Cultural Map of the aesthetic markers, and the computation of the cultural pattern recognition, and filtering of the cultural offers.

The system map, is providing knowledge and identification of the different stakeholders inside the service, and knowledge about how the service benefits from the stakeholders participation, in the service. To make these stakeholders participate in



[Ill. 56]. System map of the final targeting service design

the service, as an active participant, the input and output values of the stakeholders are identified. Futhermore, the input and output value of the student is needed, in order to understand how the user benefits from the service, and why the student should assess the service. To understand the input/output values of the stakeholders a motivation matrix is developed.

4.2. MOTIVATION MATRIX

To understand the values, delivered to the stakeholders, and the values received from the stakeholder, a motivation matrix [64] is made.
The matrix is a model, which defines the values delivered by each stakeholder to all of the stakeholders. The Y-Axis of the matrix, describes the value providers, while the X-Axis describes the value receivers. In the motivation matrix the same stakeholders, are used in the X and Y axis, resulting in a field where the provider and receiver is the same stakeholder. In this field, the stakeholders own motivation of attending the service is described.

The matrix is based on the discoveries of the studies, carried out during the discovery and define phase(1 on page 9 & 2 on page 28).
The stakeholders used in the service, are based on either the system map, or the findings of the discovery phase. Two new stakeholders are used in the motivation matrix which not are defined in the system map, the Library and the Employees.

The library is not identified in the system map of the service, because the library is actually not are directly connected in any way, to the service, it is though affected by the service, since the users of the service, also makes use of the library. The library is the face of the service, and is a shareholder, who wants to deliver the service to it's customers. This face is presented through the library webpage.

The Employees, are defined in the motivation matrix, since the employees of the library, are managing the webpage bibliotek.kk.dk. The service can also be seen as a tool to the employees, making it possible to understand the students cultural interests, in order to physically target material to the users, or create events that fits specific groups, interested in specific aesthetic markers.

In the motivation matrix[Ill. 57] there are two types of companies:

- **The public companies**, interested in empower their legitimacy, challenge the commercial market and develop their users.
- **The commercial ones**, who are interested in customers and money. The social media, offers an API, making it possible to use the data of them, in exchange of making their customer dependent of their services. The civilizers delivering data, in exchange of directing users to them, and Lectio who empowers the legitimacy, in order to make more municipalities and high schools, invest in their platform.

The library's goal, and the reason why the service is developed in the first place, is to empower the library, by fulfilling the object clause[78]. To achieve the object clause, the library needs to deliver new services, that fits in to the modern societies users. In a world where the commercial market deliver targeted material, based on the users preferences, the users are used to get everything delivered to them. The service suggested in present project is doing the same, just without any commercial interest in scope.

The student's main motivation for using the service, is to find cultural offers and material, that entertains and educates at the same time. The student is using the Internet to find and maintain cultural interests, by searching for information about specific markers. The aesthetic markers are already used by another service from Google, also delivering information about offers and material. This information about materials and offers, delivered to the students by google, are though not taking the study subjects and topics into consideration, since the direct purpose of delivering targeted material and offers, is of commercial reasons.
This service gives student the possibility to obtain information about cultural offers and materials with the only purpose, of developing the student,

into a better student and citizen, while entertaining the student. Instead of only deliver information about the big cultural events, or famous materials, it is possible for the user to dig into a world, where the offers still are targeted, but based only on the users cultural interests and study.
The values delivered throughout the service, is not changing the existing values delivered by the library, but adds extra values to the already existing value chain. The library is not only a distributer of cultural and educational material, but becomes also a distributer of cultural offers. Instead of just a large database, which the user is able to browse through, the library becomes an active participant, which distributes data actively to the user, by analyzing the cultural interests of the user. Using the service of the library, it becomes easier for the student, to relate the study subject and topics to them selves, and understand the study topics and subjects from a new angle.
After specifying the stakeholders of the service, and define the value exchange, and motivation of

	User	Library	DDB	DBC	Employees	Civilizers	Social Medias	Lectio
User	To find inspirational, offers & material that educates while entertain.	Legitimates the existence of the library and its services.	Data about their aesthetic markers through cookies and use session.	Legitimates the reason of DBCs existence, and Customers	Data about their aesthetic markers through cookies and use session.	Traffic and income	Traffic and Income	Legitimates lectio, by using it with the service.
Library	Educates the user as a citizen, and as a student, delivering cultural educational material.	Fulfill the object clause of the library, and success with the 2014 - 2019 strategy.	Customer, legitimation and Empowerment.	Digitalizes, the library material	Digital Service to understand the users cultural preferences			Better education of Lectios users.
DDB	Delivers Cultural Offers & Material to the user, by providing the service.	Cultural Map, of students cultural preferences.	To legitimate, the reason of using the DDB-CMS, and fulfill the goals of the library	Income, based on the traffic	"The Culture Well" The Relational Culture Database	Sends users to the civilizers, who becomes customers	Promotes the Social Media, by linking to them.	Legitimiates Lectio, by using it as a part of the service.
DBC	Provides the user with digital library material.	Digital library material	Delivers a database, of digital material, and potential supplier of the Culture Well	To increase the use of the datawell and increase the amount of customers.	Delivers the database, of digital material			
Employees	Target material and create events based on data of the Culture Well		Design of webpage, and new events of the library.	Deliver information about new library material.	Get a tool, making it possible to target specific events of the library, and to better fulfill the users needs.			
Civilizers	Cultural Events, Restaurants, Places, concerts Museeums.	Cultural Offers available for the users of the library	Data about cultural Events, Restaurants, places concerts and museeums.			Gain more traffic to their website and deliver offers matching the user		
Social Medias	more precise targeted cultural offers and social online platforms	Insight about the users cultural interests.	Data about the users aesthetic markers		Data about the users aesthetic markers		Gain more traffic, and make people dependent of their platform.	
Lectio	Cultural Offers, related to the users education, and a education platform.	Insight about the users studies	Data about the users study subjects and topics		Data about the users study subjects and topics			Legitimate the use of that specific platform and gain customers.

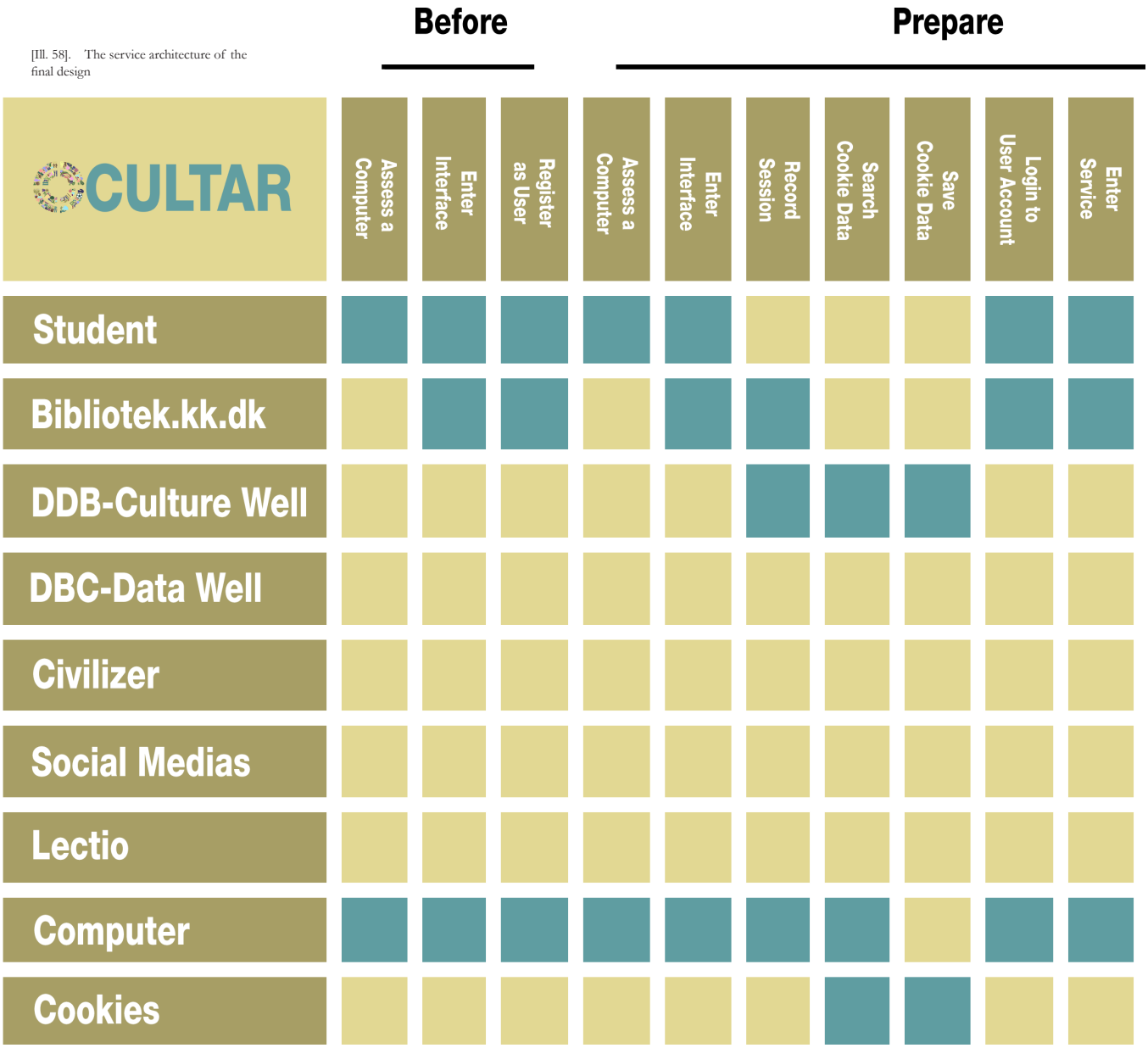
[Ill. 57]. THe motivation matrix, describing the value exchange of the service

the stakeholders, the actions carried out, to gain access and use the service is identified. In order to identify and specify the different actions inside the service, a service architecture is developed.

4.3. SERVICE ARCHITECTURE

In order to defined the actions, and the actors inside the action, the service architecture([64]) is used. A service architecture, is a model describing the actions happening along the way, from both frontend and backend in a service.
The service architecture[Ill. 58] is developed as a matrix, where the Y-Axis is showing the actors/ touch points, and the X-Axis shows the actions in sequence. When an actor is defined in a specific action, the crosspoint in the matrix, of the actor and action is marked in blue. By doing so, all actors of each action is defined. The service architecture facilitates, an overview of, when the actions are done, and who/what is used in order to carry out the action. Throughout the development of the service architecture, 24 actions are identified, and 9 actors/touch points are carrying out the actions. The actions of the service architecture are segmented into three different categories:

The Before Phase: This phase describe the actions, needed to be carried out by the user, before the service can be assessed, such as registering a library account. This action is only done once.

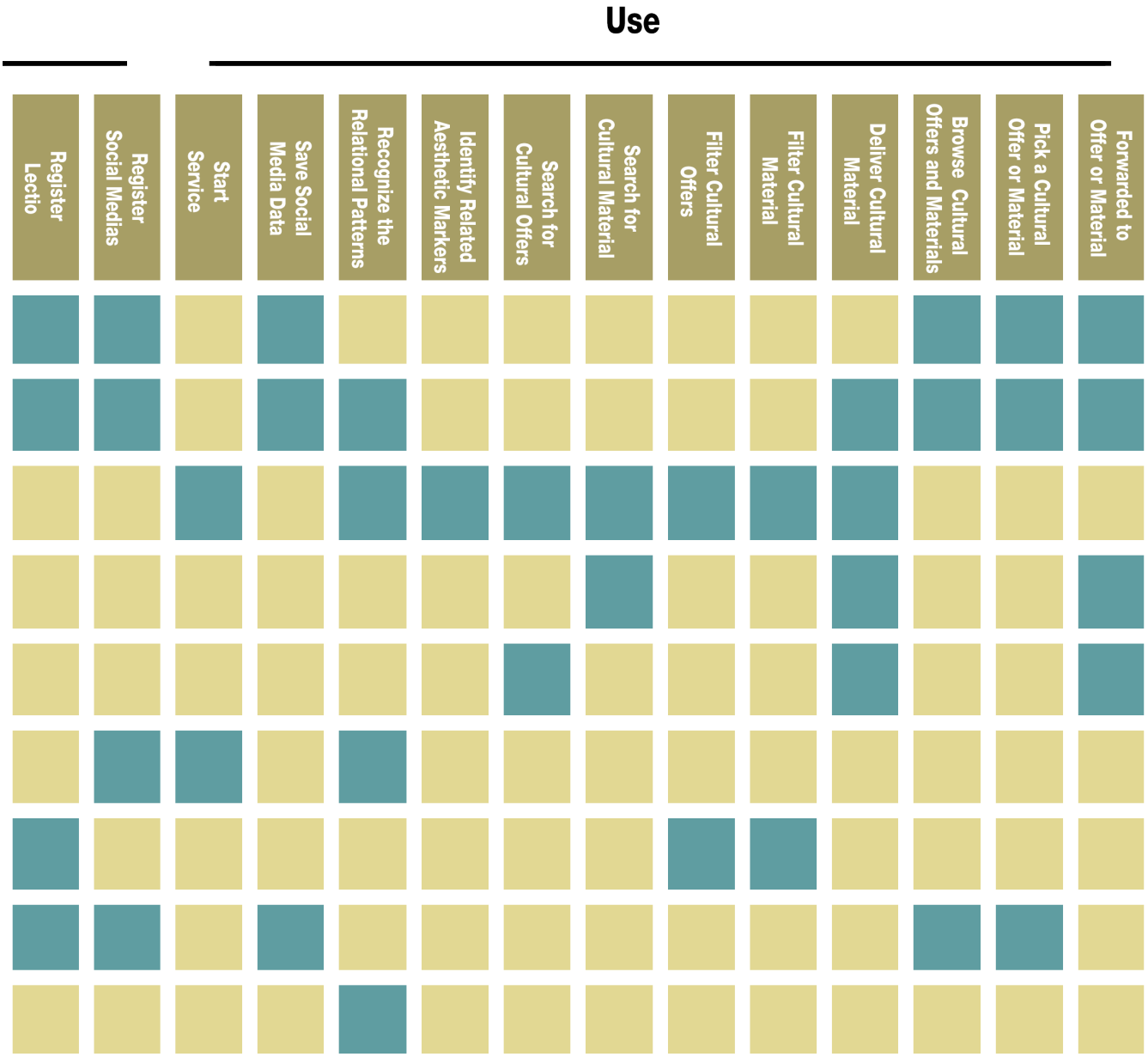


[Ill. 58]. The service architecture of the final design

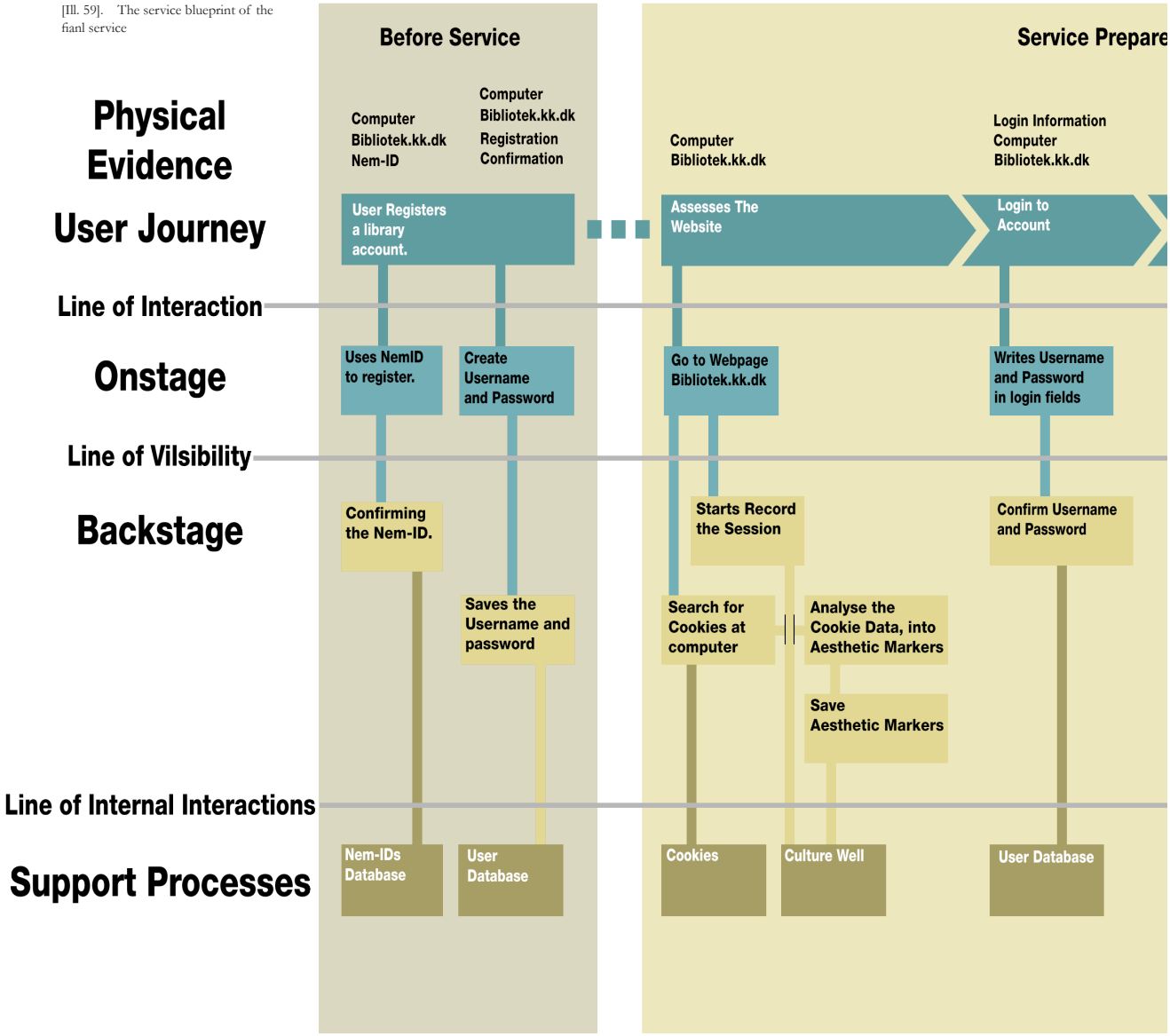
The Prepare Phase: In this phase the preparation of the service is done. The user and the service prepares the use of the service. The user prepares by login to the library account, and register the Lectio account, and Social Media accounts. The registrations of Lectio account, and Social Media Accounts are needed to be carried out each time, since the library not are allowed to save data, which is linking directly to the user. When the student assess the webpage, the use session is recorded, and cookies are saved to the Culture Well.

The Use Phase: The users push a button, and gets a list of cultural offers and materials, just af pushing the button. This list is generated, by using the data from the social media data, the cookies and the use session data, to predict new cultural offers and materials. The predictions, are used to gather cultural offers and materials, and at last the lectio data is used in order to filter the offer and materials, to deliver educational and cultural data at once. When the list is delivered to the user, the user browse the offers and materials, to pick the offers and materials, the users wants to use.

After identifying the actions carried out along the service, and the actors of each action is defined, a service blueprint is developed, to structure the processes and actions carried out throughout the service.



[Ill. 59]. The service blueprint of the fianl service

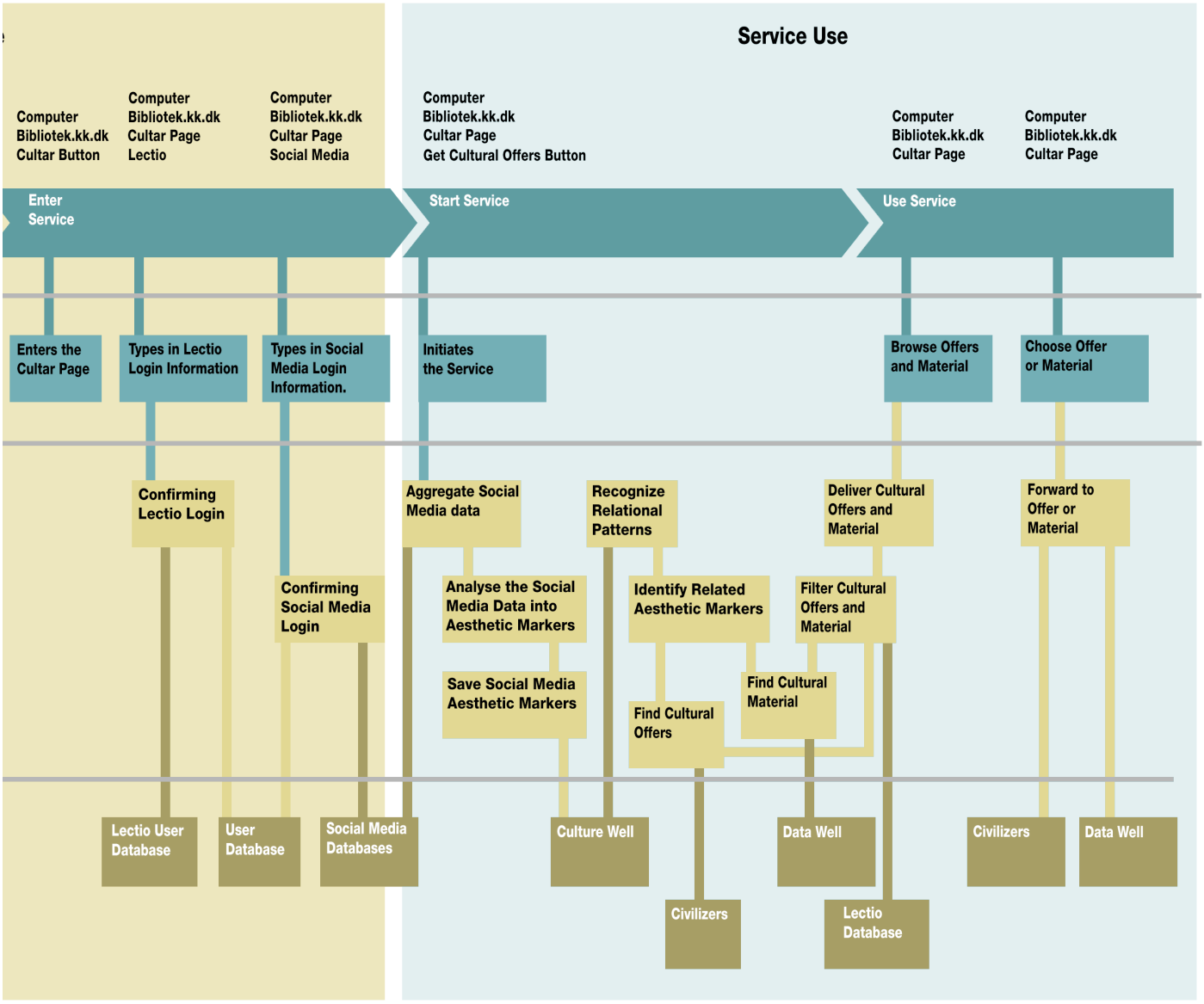


4.4. SERVICE BLUEPRINT

The service blueprint([64]) is developed, to give an overview of where the actions is done, who is carrying out the action, when the action are carried out, and how the actions are connected. The service blueprint[Ill. 59] structures the actions into different layers of action. These layers are separated by lines, describing the action and process in relation to the user of the service. The three lines separating the layers are the line of interaction, the line of visibility and the line of internal interaction. The layers these lines are separating are:

- **The User Journey layer**, describing the overall action of the user.
- **The Onstage**, describing the interaction between the touch point and the user.
- **The Backstage**, describing the processes carried out by the service, which not is visible to the user.
- **The support processes**, describing the database and/or processes, used by the backstage in order to carry out the service
- As a last layer, the **physical evidence** of the service is also identified. This layer describes the resources used, in order to carry out the action.

In the service blueprint developed for the Cultar service, a segmentation of phases during the service are carried out. This is done to explain the overall processes in the service.
The three phases are:



- **Before Service Phase:** In this phase, the user is not assessing the actual service, or makes any interactions within the service. The phase though, describes the actions, that are needed to be done, before the service can be assessed at all.
- **Service Prepare Phase:** This phase describes the action of the user, carried out, to use the service. In this phase the users register the data providers, needed in order to make the service work. This part is separated from the before phase, since this phase is done each time the user makes use of the service, and since the phase is a part of the actual service.
- **The Service Use phase:** This phase, is where the user actually uses the service, and gets the information about cultural/educational offers and materials.

The service blueprint serves as the final part of the deliver phase, and represents the service is one model.. Together with the system map, and the right technical knowledge, it should now be possible to implement the design, made for handling the problem statement.
In order to conclude upon the final problem statement, after developing the final design, a discussion about the process, the methods and the result of the project is carried out. The discussion serves partly as a reflection of the process itself, and as foundation of the conclusion.

4.5. Discussion

Throughout the project, several topics are analyzed and used, in order to answer the problem statement. To answer the problem statement a design of a final service, that overcomes the challenges of the library is designed. In order to achieve the design, a long process of using services system design related methods and models, is carried out. In the following chapter a discussion of the total process, the iteration done throughout the process, the methods and models used, and the research about the user and the current system, is carried out. The discussion is segmented into sub chapters, starting by discussing each of the phases, throughout the process, and in the end an overall discussion of the whole process is carried out. After the discussion, a conclusion upon the answer to the problem specification is carried out.

4.5.1. Discover Phase

In the discover phase, a state of the art study was carried out. The core purpose of the state of the art research, were to frame the problem statement. By framing the problem statement, an insight about, how challenges related to the problem statement have been solved by other service providers. The study was segmented into two groups, the targeting services, and the culture distributor services.

Targeting Services

The outcome of investigating the targeting service, was an insight in how other companies targets their customers. Five companies were studied, four international companies, and one national. The study could have been concentrating about smaller companies and services, which are more specialized into one specific method of targeting their customers. It is though challenging to tell whether, such specialized companies are thought of as "state of the art", in comparison to the large enterprises, who apparently succeeds in their targeting strategy. The state of the art research of the targeting services, is very influenced by my own knowledge of the area, and if it had been another person carrying out the research, other state of the art services, might have been identified. Throughout the study, a library([73]), trying to solve the same kind of challenges, as in the problem statement, were identified. Information about their solution was almost impossible to find, as if they never created a design or implemented the service, but just defined the challenge. The information from that library were therefore left out, since it was very little informative. More information from that library could have been gathered by contacting them, in order to get more information about their way of challenging the service. It can though be evaluated if the service offered by that library, is state of the art, since the transparency of the service, is almost non existing. I chose to skip the research of that service, to put more focus on the large targeting service providers.

Culture Distributors

Throughout the study of the culture distributors, only Danish culture distributors were researched. This was done in order to, understand how cultural offers currently are distributed to the citizens. This was also to use these distributors in a later design, in order to provide cultural offers to the students. As in the targeting services, the three civilizers identified through the study of culture distributors, were based on my selective choice. All of the studied civilizers identified was Danish. Choosing Danish civilizers, was done on purpose, since the problem statement focus on Danish high school students. It can though be stated that there at this point in the research, is no relation between the high school students, and the civilizers, which is right. However, it was valuated by me, as the most proficient civilizers, in providing cultural offers to the citizens, whether they are high schools students, elders or children. The research might have been biased by my own selection, of what services to define as the state of the art, which also have affected the final design greatly.

Library System

After the state of the art services were investigated, a research in the library service system was

carried out. I discovered quickly, that the current system was very large, with a huge amount of stake- and share-holders, which fulfills many roles in the library system. The investigation of the library system, was carried out in cooperation with the employees of the IT-Development Department. A lot of time and resources was used in order to map out and understand the entire system. The study of the entire library system, gave however a great insight in how to design a targeting service, making use of the already existing touch-points and stakeholders. The long time used at investigating the area, was very rewarding, since most of the final design was defined, by the many borders identified throughout the research. There were though also a large amount of stakeholders identified, which isn't used in the project at all. These stakeholders are briefly showed in models, to show the size of the system to the reader. As stated earlier, the whole process of investigating and defining the library system, was done together with, and confirmed by, the employees of the IT-Development Department, which have eliminated possible biases. There are though still areas of the library that are uncovered in the report. The whole IT Database has only been described briefly, without digging into the data structure. Insight of the data structure, might have delivered crucial information, that could had been used in the final design. This study was not carried out, due to time and resources, but would be beneficial to investigate, in a later study, in order to specify the data structure of the current system and in the final service.

Throughout the research of the physical interface, only the library and the librarian was identified. To achieve knowledge about th role of the librarian, and understand the tasks carried out by the librarian, an interview was carried out. The interview was designed as a semi-structured interview, with questions designed by me. Furthermore, the interview was also carried out by me, and were not pilot tested, before it was carried out. This might have resulted in a set a of bias, since the questions of the interview, were not tested before. It can however be stated, that a semi-structured interview, does not need a pilot tests, since the interview questions are changing according to the answers of the subject. Furthermore, the analysis of the results from the interview was only carried out by me, which might have been affected by my own opinon. The analysis might therefore not be as objective as wanted. This could have been avoided, by having another conductor making a similar analysis, and afterwards compare the two results. In addition, the documentation of the interview, was done using notes, written by the conductor. Several good points could have been missed during the interview, since the person documenting and conducting the interview was the same. This could have been avoided by having a co-conductor, which just documented the interview, or used a recorder, and listen through the interview afterwards.

The High School Study Goals

The chapter about the High School Study Goals, was added to the report, very late in the process, because it was studied after the large iteration, carried out, after discussing the whole report with René. This large iteration was carried out very late in the process and resulted in an iteration throughout the entire project, because the iteration affected the problem statement. The investigation was very brief, since the library came up with the idea about, using these study platforms as stakeholders, to deliver information about the students study subjects and study goals. A lot of bias are identified in the iteration alone. These bias, will be covered later in the discussion. Despite the suggestions from the IT-Development department, a study in how to identify a students study is briefly carried out, this is partly done on own knowledge, and knowledge from the library. This is a large bias, since the study not is taking all possible actors, in to consideration in order to deliver data about the student. Furthermore this data is really crucial to the final design, since the data, filters the targeted offers and material. A more comprehensive investigation in the students study goals, needs to be carried out, to remove a lot of the bias derived from the low amount of research in the topic. Lectio seems though as a great data provider, in order to identify the students study topics and subjects.

The User Study

To carry out the user study, a desk research based on statements by different theoreticians, and a survey of high school students was carried out. During the desk research of the modern youth culture, several theoreticians are used. These theoreticians, are basing their statements on tests and research of their own. These different statements are support each other, in the understanding of modern youth culture. Instead of only finding statements and research supporting each other, a oppositional research, and a discussion based on the two theories could have delivered even better grounded theory, to base the students cultural behavior on, which also would deliver a more critical point of view, to the information provided by the theoreticians. To test out the theory, derived from the theoretical study, an interview was planned with students. This interview, should provide insight about; the students use of Online Medias, to find cultural information; the students use of the library; and the students cultural interests. The interview, were though not conducted, since the students could not find time for participating in the interviews. Instead of conducting the interview, the design of it was transformed into a survey. The transformation from an interview, to a survey might have provided large bias, since a survey is a quantitative method, and a interview is a qualitative method. To try structure an interview, into working as a survey, might have biased the data and answers provided by the students. Furthermore, the survey was only pilot tested, with one participant. A lot of the questions asked in the survey, was closed, but meant to be elaborated on, with a subquestion. This was not possible to do, since i didn't get the possibility to react on the answers. Despite some of the questions were open ended, the subjects chose to answer in a one line sentence. To improve the user study, a remake of the survey with closed questions, where statistical data can be derived from, should be carried out, or an interview with the students, as first planned would be beneficent to the project, since more elaborated content from the students, would give a deeper understanding, of the students use of the library, and use of online medias. I won't suggest or use the same way of translating an interview to a survey again, in this context, it was a workaround, since too much time was used, on getting the interviews with the students.

4.5.2. DEFINE PHASE

Throughout the define phase several models and methods was used to structure and specify the findings of the discover phase. The methods used, to make these specifications were, stakeholder mapping, system mapping, persona creation, customer journeys and requirement specifications. During this section, each of the methods is discussed and reflected upon.

Stakeholder Map

The stakeholder map is used, to identify the stakeholders of the current system. All the stakeholders were identified, together with employees of the library. There might be stakeholders through the stakeholder identification, that might have been left out. It served though a great purpose of the project, and gave a great overview of the stakeholder, around the library service system. The segmentation of the professional and social stakeholders, was a request by the library to understand their stakeholders even better. As seen in the stakeholder map, many of the identified stakeholders, are professional. The reason why many of the stakeholders are professional is a matter interpretation. I have been interpreting the stakeholders, together with the employees, to limit the amount of bias that might have been derived, if it only was me identifying and interpreting the different stakeholders.

System Map

To define and develop the system map of the current systems, cooperation with the employees of the IT-Development department, have been carried out. This have been done, to secure that no connections and information of the current system was missing. There might still be areas, that have not been covered, since the library system is huge and complex, and some of the roles are disguised by other roles, of the same stakeholder. So far, the system map developed in this report,

serves as the best overview of the current library system. There might though still be missing stakeholder of the library. The missing stakeholders though, might not be affecting the final design, since these stakeholders not are direct stakeholders of the library. In order to create an even more detailed map of the entire system, an even deeper investigation is necessary. Whether a more detailed system map, will provide a better evidence and thereby design is though questionable, since it at this point seems that all relevant stakeholders are identified.

Personas

The personas identified, are based on the findings throughout the user study. As stated earlier, this study was very biased, because of the transformation of an interview to a survey. These personas might therefore be biased, because they are based on that data. The bias of the personas can have gone all the way through to the final design. It is at this point difficult, to describe how much these bias derived through the personas are affecting the final design, but there might be a coherence between the personas and the final design, that affects the final product. The personas though are still based on real data, from real students, so parts of the personas must be coherent with the reality.

Customer Journeys

To each of the personas, a customer journey is carried out. These customer journeys are not based on specific personas, but are based on the different ways, the subjects of the survey, is using the library. The users tends to mix the customer journeys, based on their purpose of using the library, or the inspiration they might get, throughout the use of the library. As defined earlier bias, might have been derived from the user study. Furthermore, the way of using customer journeys describing the journeys the users might use, throughout the use of the library, is at one point effective, but on the other side not giving the full picture of the current use of the library. A customer journey for each of the personas, might have provided more insight about each user's use of the library. The outcome of the customer journey, was though that no matter wheich kind of customer journey the user have with the library, the user is interacting with the webpage, and logs in to the account. This is not changing no matter how the customer journey is created, since this is a core part of using the library.

Requirement Specification and Problem Specification

To specify the problem, and define the borders, of the design, a requirement and problem specification was carried out. Throughout the requirements specification, requirements that must be fulfilled by the final design is specified. The requirements was derived from the user study, and the library and high school study. Bias in the requirement specification, might be present, sine these requirements are based on the entire discover phase, which is directly affecting the design. Most of the requirements though, are based on the research of the system, which are pretty covered by the constant confirmation by the employees. The problem specification, is based on both the user study, the high school study and the library system study. The bias that might have been derived from the user study and library system study, might have been included in the problem specification. At this point it is though difficult to filter the bias, it should have been done earlier in the process, when the bias were created.

4.5.3. DEVELOP

During the Develop phase two concepts were developed. A concept 0.1 that turned everything around, and the final concept 1.0. Throughout this section both of the concepts will be covered. Especially the transition between the two concepts are discussed.

Concept 0.1

The first concept developed, was developed throughout the discover and define phase, where each finding of the studies, were presented and discussed with the employees. Each of the discussions lead to an ideation process, which delivered material to construct the concept 0.1. Instead of having one large ideation workshop or process, many small ideation processes was carried out, along the way. This was a nice way to carry out the ideation, of the concept 0.1, since each ideation

took output, in a real challenge. The fact that these minor ideations, not were documented since they were unofficial, gave though some minor problems along the documentation of the concept 0.1. If this type of ideation, was to be carried out in an other project, documentation of these small ideation processes, would be beneficial. Furthermore, it is also difficult to facilitate methods that provides radical thinking in the ideation process, since these types of methods, such as different design games, and brainstorm sessions, takes time to plan, which is impossible in a process where spontaneous ideation is carried out.

The Transistion

To test the concept 0.1, a meeting was setup with the leader of the IT-Development Department of Copenhagen Libraries. The purpose of the meeting, was to explain the concept to him, using the storyboard and different models developed throughout the develop phase. This meeting changed the whole project, because the problem statement was changed, from only concentrating about delivering cultural offers to High Schools student, into delivering cultural offers that educates the student, by target cultural offers, towards the students, based on their cultural interests, in combination with the students study goals. Instead of continue working with, at that time, the current problem statement, a large reiteration of the whole project was done. The reiteration involved, every part of the project, since the education of the student also had to be added to the research. Biases might have been derived from the large iteration, at such a late point in the process, since parts of the research might have had been influenced, if the final problem statement had been the same throughout the entire research. I think that transparency is one of the most important keys, to reach a good project, and therefore i chose to include and describe the whole iteration, that were carried out, as a result of the one meeting about the concept. The re iteration in the middle of the report, is though delivering frustration to the reader, but is important, in order to make the user aware of the large change that lead, to the final project, and to the final design.

Concept 1.0

The concept 1.0 was based on the concept 0.1, and the meeting together with René from the IT-development department. This design was developed throughout the meeting together with René, and the research about Lectio. In order to test if the concept actually worked, a test of a prototype with the students, would have been beneficient to carry out, in order to understand whether the concept actually would work, or if it only will work in theory. Because of the large reiteration of the project, the time and resources were too low. This might have resulted in bias, since no evidence about, whether the concept actually was working with the users it is intended to serve. To test the concept, a test to see if the requirements were fulfilled by the concept 1.0 was carried out. Many of the requirements was partly covered by the concept, while coverage of some of the other requirements were inconclusive, until a user test actually were carried out. Since no more time were left, to carry out a test of the concept, the concept was chosen to be the final design of the report. To conclude upon the problem statement, in order to understand, whether the concept and final design is answering it, a conclusion chapter(4.6 on page 86) is carried out.

4.5.4. OVERALL PROCESS

The planning of the entire project, was probably a bit too optimistic. As described throughout the discussion, different challenges along the way, slowed the process immensely down, such as the high school student participation in interview, and the large reiteration of the project in the development phase. The challenges are the main providers of bias throughout the project, since wrong or low amount of information, might have been provided through the survey, and since user and client testing of the concept 1.0 have not been possible due to time pressure, because of the reiteration.
Throughout the study, i have not been using the supervisor, as much as i could have been. More use of supervisor might also, have eliminated some of the challenges that have been faced, along the way.
There have been close communication with the

IT-development department of the library. It would though have been nice to, include the people of the library even more in the process. It have though been difficult, since these people of the library, also have to care about their own work.
It has been the first time, i have been writing a project alone, which at some points have been nice, but also difficult, since i have had nobody to spare with. Sometimes, a partner with better skills than me, in areas, such as graphical design or visual communication, had been beneficial. I have though learned a lot from this project, since i have been forced to do everything on my own, and reflect upon my choices on my own. Large decisions such as the transformation of the user interview to a survey, have been difficult to do, but had also been necessary, in order to continue the process.
The same applies to the large reiteration. Looking back, implementing a chapter just after concept 0.1, have probably been fulfilling, i felt though, the whole project needed a reiteration, since this change, also legitimated the problem-statement, developed in cooperation with René from the IT-Development Department.

4.6. CONCLUSION

"How to use data about high school students aesthetic markers combined with data about their study, in order to target cultural information that educates the students, by using a relational database."

To conclude upon the problem specification, and thereby the problem statement, an analysis of the final design, is carried out. As described in deliver chapter(4 on page 72), the final design is based on concept 1.0. This concept is never tested in order to understand, whether the concept actually will work, with the user. A comparison to the requirements of the deliver phase, was though carried out. Several of the requirements compared to the concept 1.0, in order to see if the requirements was fulfilled, were either partly covered or inconclusive. Most of the requirements that was inconclusive or partly covered, were requirements related to the user requirements. Requirements that were very important to a service, in order to make the service itself work. In order to conclude upon the problem specification, these requirements needs to be answered. This can only be done, by testing the concept, on the students themselves. Even then, the service needs to be implemented, to really answer whether the service actually works.
The design is designed to use aesthetic markers of the student, in order to predict which cultures that might interest the high school student. The design though, needs to be implemented, in order to test if the student actually are targeted with offers that is interesting, to the student. This design is at this point only logically, working based on the discoveries made during the research.
The designed service is using the data from Lectio, in order to target cultural offers, that matches the study of the student. This is done by filtering, the cultural offers by searching for study topics or subject in the cultural offers. Theoretically and technically the design would work, but in order to answer if this also will educate the student, is inconclusive and is foundation for a new hypothesis, if student actually will be better educated, by targeting educational material, that is within the cultural interest of the student.
The design makes use of a relational database, in order to find new cultures, that might interest the user. This relational database is not saving data that is traceable to the user, but saves only the relations of the users aesthetic markers. To test whether the relational database would be able to target, cultures that is within the students interest is though inconclusive. In order to get the answered the problem specification, and thereby the problem statement, tests including the users are needed. Testing the final design, might not even sufficient in order to answer the problem specification, since a conclusion first really can be made, when the final service is implemented, and then afterwards tested.

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4.8. APPENDIX

APP. 1. Excel: Spørgeskemaundersøgelse(Svar).xls