Master of Arts Thesis

A comparison of the impact between recorded and classic cooking recipes employing user experience research methods

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Abstract

In the modern world, distance training is becoming more popular and is being actively used nowadays for both obtaining a basic education and improving the skills of company employees. In addition to this, self-study on the Internet helps develop skills even on a professional level. E-learning aims to build certain knowledge and skills to enhance the quality of learning. There are many ways to obtain knowledge for almost any hobby: from text and video blogs to textbooks and lectures with training exercises.

The cooking topic was chosen as an example of internet learning, based on the fact that food pictures can stimulate the human brain to the point of arousing reminiscences of smell, taste, look, sound and texture. Which enables the current study case to be as stimulating as instructing.

Consequently, this research focuses on measuring learning curves from different people while they cook with aid from various media channels. The goal of the research is not only to get subjective insight but also to differentiate the progress between experts and novices. Thus, participants will be divided into focus groups, according to a set of cooking skills and availability for cooking online research.

During the research, the participants of such focus groups will be asked to create a meal following a set of instructions provided through videos, pictures and classic text.

Basically, each recipe is represented in the mentioned types of media. And after cooking sessions, the changes in the culinary skills will be measured in each group. For such purpose profile inquiries, interviews, self-recorded assignments, and a method for the analysis of movements; the Structural Dimensional Analysis-Motoric (SDA-M) (Schack, 2004) will be used.

The analysis of the results intends to derive into good practices of e-learning media design. Furthermore, this research could benefit the pedagogical and marketing perspective of food constructor delivery services (e.g., Hello Fresh, Marley Spoon, Lidl Kochbox) by remarking on the potential that e-learning solutions have to develop the skills of cooking enthusiasts and experts alike.

Keywords: self-education, cooking boxes, kochbox, learning media, SDA-M, UX

1. Introduction

Each person has a different way of acquiring culinary skills: someone gets the first knowledge from relatives, someone watches popular shows on Netflix and tries to repeat what he or she has seen, someone goes to training courses, and someone learns culinary skills on their own, by trial and error, inventing new dishes. My personal interest in cooking started to develop only after my 20th before that I could not cook. Travel and acquaintance with the new cuisine, cooking unfamiliar products aroused my curiosity and made me think about what is the best way to learn cooking on my own?

Moreover, the knowledge of cooking is obtained in different ways and at different ages, it is not the easiest and most obvious task to determine the most effective variant of learning material and to compare the results of training between different groups of people like professionals and newbies. The answer to this question may seem trivial to figure out. However, there are a lot of resources on the Internet, but what is the most effective one? A lot of media leave a lot of questions after themselves because they are designed for people who already have cooking skills. Some media are not appealing enough, as the training materials are so extensive that interest in the subject is simply lost. After researching the mass of popular resources, blogs, videos, articles, and professional sources, three types of the most popular learning materials were selected: video, photography, and text.

In Germany, the concept of so-called "cooking boxes" is gaining popularity - it is the delivery of products that are strictly measured for the preparation of certain dishes, the recipe of each is included in the delivery set.

This thesis focuses on solving the problem of finding an effective form of media, which will allow people with different level of initial cooking skills to improve or develop their knowledge. As part of the work on this thesis for chapter 2, all of the cooking boxes available for the city of Essen will be tested in practice and analyzed. This makes it possible to answer practical questions about what information is most relevant in cooking education and how this type of media influences the learning process.

Chapter 3 will describe the methodology of the user observation study with focus-group of 20 people, each of them did cook 3 different recipes, represented in 3 different media forms. Chapter 4 will focus on the conclusions about the effectiveness of media materials in cooking education and the possible development of this topic, including AR-based suggestion.

2. State of the Art

This chapter will describe the available background around the topic, which includes analyzing the cooking process from a user experience perspective and different digital learning tools, which are used nowadays.

Further, after focusing on the problem statement and raising research questions and challenges. Competition on the existing market of cooking boxes will be thoroughly analyzed. Structure, media materials, learning impact, and overall impression will be compared and evaluated.

2.1. Background

“No one is born a great cook; one learns by doing.”—Julia Child

Cooking is a unique kind of art, not worse than music, painting, and dancing. After all, it took decades and even centuries to create many culinary masterpieces. And, of course, their construction was directly influenced by many historical factors. Each dish has its own rich and interesting history. Over the centuries, a special place in the literature and painting is given to cooking.

The Dutch artists of the XVII century were especially proud of their gastronomic skills, on whose paintings one could see elaborately painted hams, various breakfasts, roasts, fish dishes, pies, buns, desserts, and many other things. Also, many literatures contain descriptions of various meals that the reader has an irresistible desire to taste.

Reflecting on how to transfer the user's experience into cookery, this chapter will explore the possible iterations of a user with kitchen appliances and common ways of learning how to begin cooking, what modern cookery is all about and without any of the technical facilities it is impossible. In the second part of that chapter, the scope of the topic will center on existing popular digital cooking educational solutions: online blogs and books, video recipes, social networks, and applications.

2.1.1. User Experience in Cooking

“Saying a website is ‘usable’ is like saying dinner was ‘edible’. – Jared Spool

User experience refers to a person's emotions and attitudes about using a particular product, system or service. The kitchen can provide inspiration for how to balance important

principles like consistency, creative freedom and effective problem solving, all under stressful conditions. Everything that is designed is a consequence of human action.

There are clearly defined common points in Design Studies and Food Studies (Margolin, 2013). Both fields are necessary for everyone, even if politics affect the accessibility of them. The earliest example of employing design in human history of cooking is a process of creating hunting tools, further transformed from the only tool to hunt an animal and process raw food to designing cutlery. Food preservation and kitchen industry are responsible for inventing a numerous amount of kitchen tools, the design of which has been a central component. In domestic architecture, the food consumption process takes a special place in the dining room and the cooking area is separated in the kitchen.

Throughout history, design and food are deeply involved one in another and this connection is not obvious to anyone, because it is difficult to distinguish, where one area stops and another begins. It is possible to have knowledge about the meal without knowing the processes of designing kitchen tools and equipment. The technological objects are taken for granted and may be a subject of design study without a direct description of the food.

5 key principles for UX designers from UX guide (Hess, 2013):

- Have empathy
- Understand the underlying problem before attempting to solve it
- Don’t hurt anymore
- Make things simple and intuitive
- Acknowledge that the user is not like you

Each of these principles can be implemented in the cooking field. First, without empathy, the matching meal and mood will never appear. Second, trying to solve kitchen problems before understanding the mechanics of the equipment may be dangerous which is linked with the third principle. Intuition and passion are playing a big role not only in high cuisine cooking but in ordinary day to day cookery when there is a need to decide a replacement for the ingredient. And last but not least not to forget that everybody has a different taste, and sometimes some people will dislike it anyway.

Figure 01 - Facets of eating experience and user experience

The human experience is playing a major role in understanding food experience and building own system of taste preferences. Eating experience contains 5 elements: Basic taste, Taste, Flavor, Palatability, Food Acceptability, and 7 facets: edible, tasty, healthy, appetizing, savory, healthy, palatable, nutritious (Bogaards, 2010). For user experience 7 facets are: usable, useful, valuable, desirable, findable, credible, accessible (Morville, 2004). Just several examples of analogies and similarities, there are more of them in more specific topics. Gastronomy as a field is a vivid source of inspiration for researchers, designers, and users.

2.1.2. Digital Learning Tools in Cooking

The challenge of the distance culinary qualification development is faced by the owners of culinary schools, school teachers, managers of hobby centers, popular bloggers, everyone who need to teach remotely. Culinary apps are coming to the top of the ratings as well as social networks, photo editors and games and are continuing to grow in popularity. The mobile phone is an accessible learning tool. Thus, further several examples of digital learning materials will be described.

In the app Jamie Oliver's Recipes that Oliver has specially designed for mobile phones, there are many exclusive recipes with step-by-step, colorful instructions. In addition, some recipes are accompanied by high-quality video guides in which Oliver himself explains what and in what sequence to add to make the dish unforgettable.

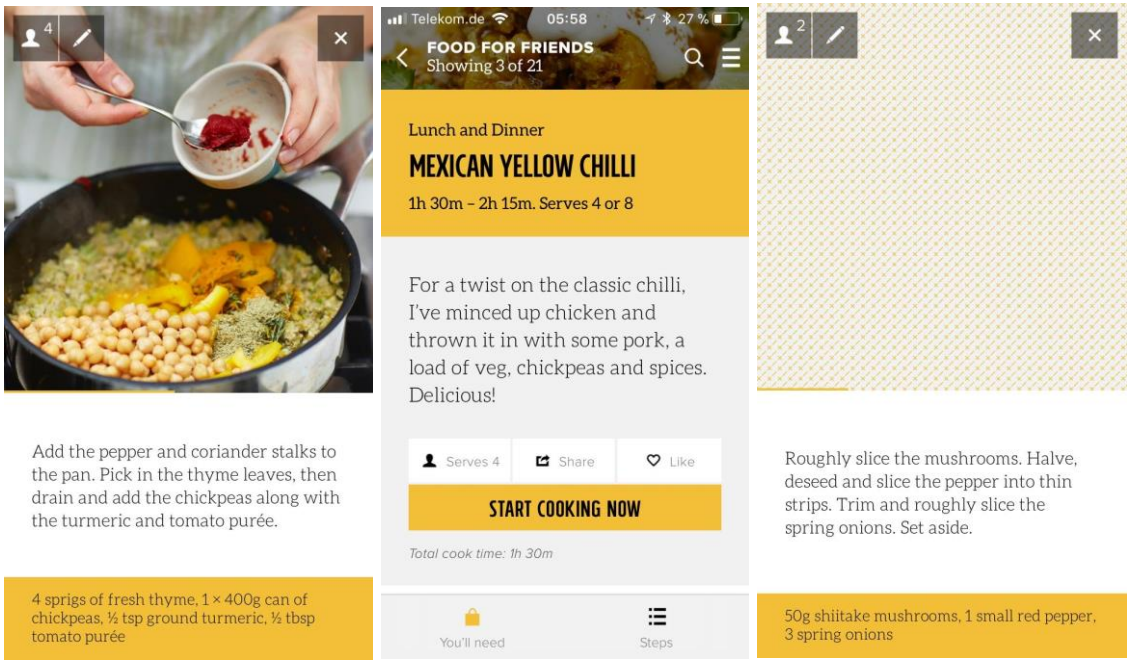


Figure 02 - Screenshots of iOS application Jamie Oliver's Recipes

Suggested learning materials are photos and text description, no videos are available. Among top app features are a list of ingredients and equipment and a modern "swipe" system of following the steps of the recipe. Information about ingredients and time is duplicated on each page. Nevertheless, the amount of content is very high and this is heavy to manage thus there are recipes without any pictures.

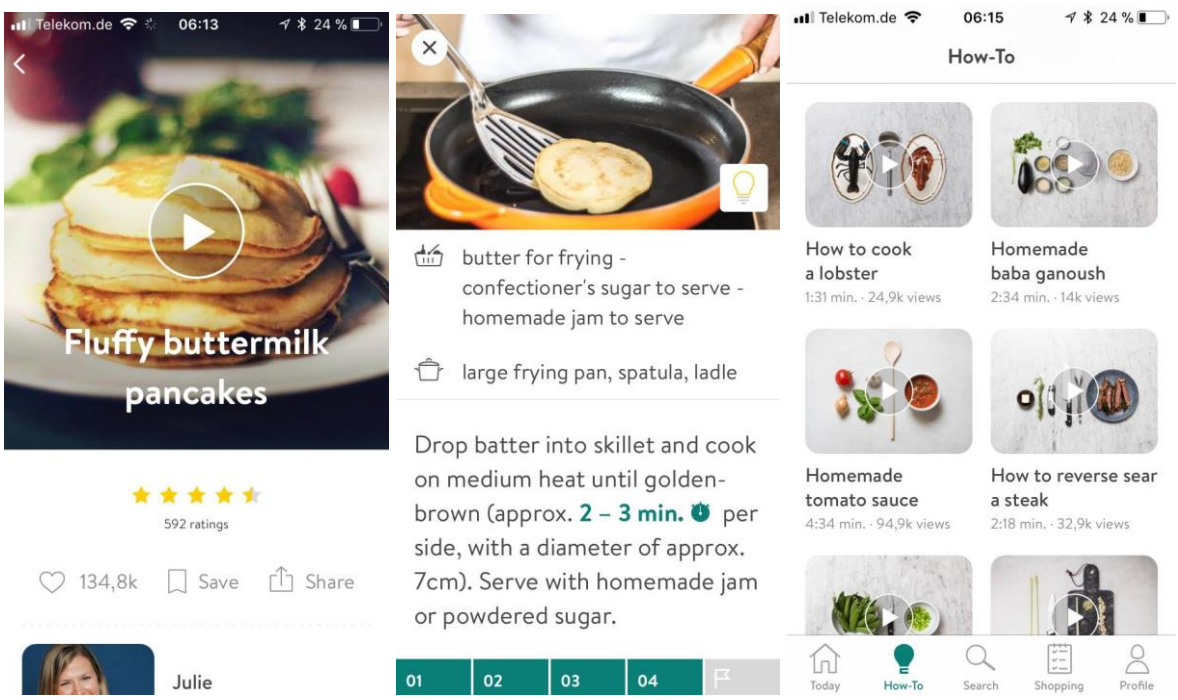


Figure 03 - Screenshots of iOS application Kitchen Stories

Delicious and original recipes from Kitchen Stories have been approved by thousands of users. In the app, there are step-by-step recommendations and video guides. The main video of the whole recipe has sound and light music, the average length of the video is 3 minutes. The majority of videos are available in “How-To section”, with the number of views and timing. In descriptions of the meal, icons are used. The app encourages curiosity and polishes current cooking skills.

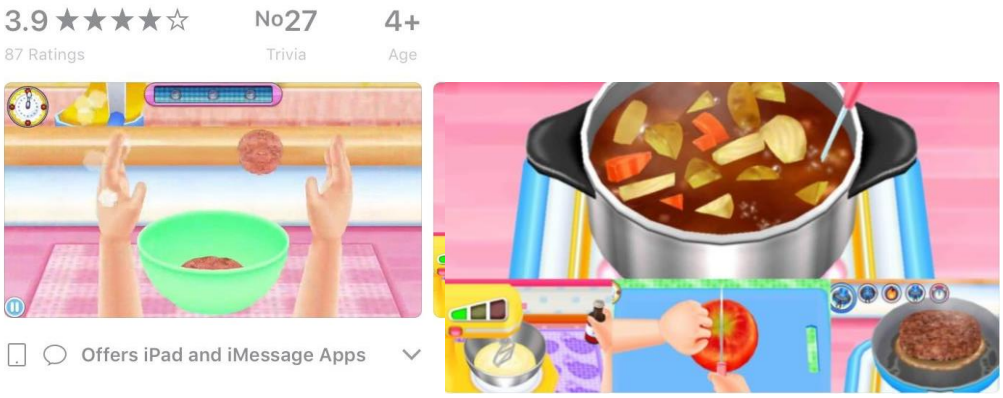


Figure 04 - Screenshots of iOS application Cooking Mama

Among other cooking games where you need to build a burger, one game stands out with an interesting approach to training cooking skills - a first-person view “Cooking Mama: Let’s cook” is an application for kids from 4 years old. This is a gardening cooking game, meanwhile, children are learning cooking basics and food consuming circle. In videos of cooking is used realistic 3D animation, the user should repeat actions like imitating the knife movement or rolling the meatball. The app is helping to feel empathy to the chef and grow interest to a gastronomic from a young age.

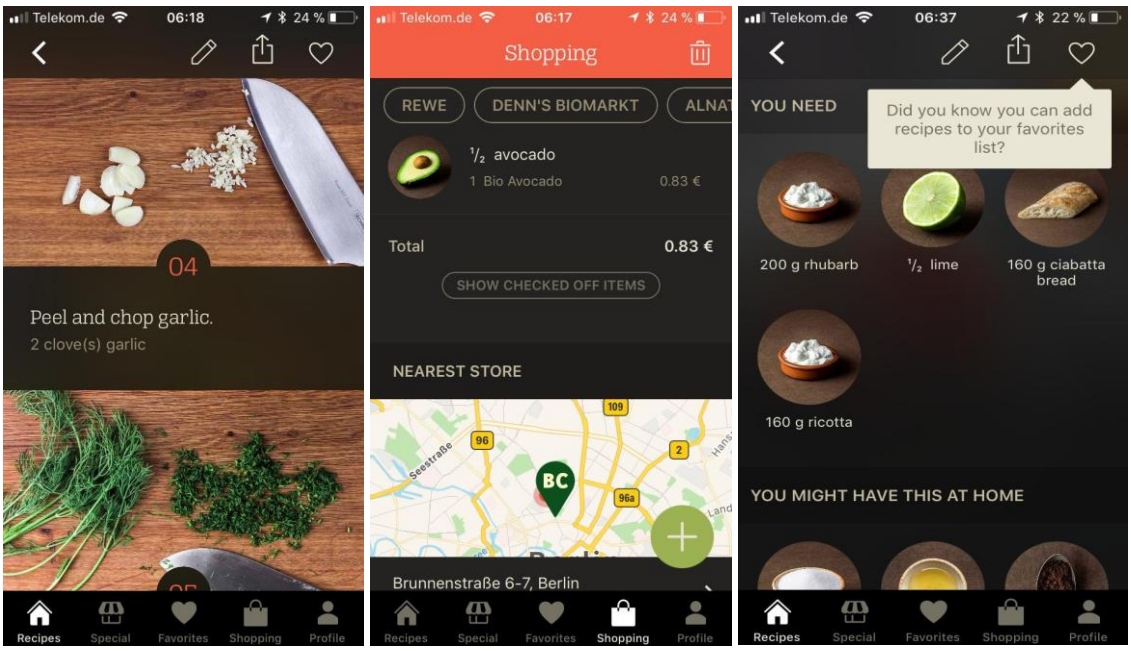


Figure 05 - Screenshots of iOS application KptnCook

German “KptnCook” is a new promising app, containing recipes plus some more preparation features. Instructions are simple and short – each step is illustrated by one-line text with mentioning active ingredient. It is possible to add recipes to favorite and to create a shopping list and compare prices in nearby supermarkets. Each ingredient has a beautiful picture. However, due to the high amount of data; mistakes with wrong pictures can occur, as illustrated in Figure 05 with the same ricotta picture for another ingredient rhubarb.

To create a successful learning application, it is necessary to integrate as many levels of cognitive activity for the user. Access to the internet and new technologies are increasing the demand for quality content. This content should be specifically developed for well-defined user groups. There are 3 levels of cognitive activity (Shamova, 2013):

- The first level - reproductive activity - is characterized by the desire of the student to understand, remember and reproduce knowledge, to master the way of its usage according to the sample. In the cooking field would be represented as a thought “I have just cooked the meal and I want to repeat this recipe”.
- The second level - interpretive activity - is characterized by the student's desire to identify the meaning of the phenomenon studied, getting into its essence, the desire to master the ways of applying knowledge in altered conditions. In the cooking field, this leads to the desire of exploring the origins of the product and mastering the favorite meal.
- The third level - creative activity - is characterized by interest and the desire not only to get a deep insight into the essence of phenomena and their interrelationships but also to find for this purpose a new way, as well as to apply knowledge in a new situation. A characteristic feature of the creative level of activity - the manifestation of the student's volitional qualities, perseverance, persistence in achieving the goal, wide and a strong cognitive interest.

2.2. Problem Statement

This project aims to better understand the process of designing cooking learning material – a complex task, involving defining the systems of measuring the learning impact and testing the recipes. To understand the topic from the beginning, the difference between basic learning materials should be explored. Text, photo, and video are used as reference media for creating test learning materials. Currently, there is no tool or described procedure, evaluating learning impact in digital materials in the cooking field due to the complexity of the topic. Solving this problem will help researchers to understand the process of user ability to learn on the example of 3 basic media, used in cooking education. The level of learning

effectiveness of different media will be compared and factors, affecting better memorizing will be exposed.

2.3. Research Questions

- How to measure cooking skills learning impact implying user experience methods?
- How to measure learning ability of learning material with SDA-M?
- How different is the learning impact of different media for different groups of people?
- What is the difference in learning ability between self-educated experienced cooks and novices?
- Which media recipes are having the biggest learning impact for each group?

2.4. Challenges

The topic of increasing learning capacity in cooking is broad, it was challenging to narrow the scope. The scope of the research initially contained 11 recipes and 6 learning media to compare. Even without increasing the number of participants it would give 220 results, which should be processed one by one. To narrow the scope of research, 3 recipes with 3 learning media is a considerable amount to process.

The process of analyzing material should be simplified. According to the initial plan, 6 media types have been considered for the experiment: text, photo, video, icons, text, and pictures combined template, and non-stop looped videos. The new way of learning cooking through fun is Emoji or icon-based instructions. Future development in this sphere can focus on transmitting the data through emoji's and how the data transforms during the processes of decoding. Unicode emoji chart can be a helpful source in researching the influence of displaying the same message on different devices differently and distorting individual perception. Exploring the topic that broad would be very challenging and could be expanded to bigger research, thus it has been decided not to use icons or any other mixed media and focus on 3 classic media.

Figure 06 – Unicode emoji "Taco" existing icons

The last challenge of this research is a big set-up work. Everything has been set up and ready for remote research and work with participants worldwide. The preparation part included a lot of UX writing and developing individual instructions and questionnaires. Time-management and forehead planning are essential for that kind of research.

2.5 Competition on the market of meal kits

The business model of meal kits originated in Sweden, and conflicting sources credit either Kicki Theander's launch of Middagsfrid (roughly translated as “dinnertime bliss”) in 2007 or Linas Matkasse, launched in 2008 by siblings Niklas Aronsson and Lina Gebäck (Konrad, 2015).

In 2012, financier Matt Salzberg, e-commerce specialist Ilya Papas, and chef Matthew Vadjak founded the Blue Apron startup in the United States. The service, which offers dinners from farm products for two or a family, quickly became popular, and the company's value in 2015 exceeded $2 billion.

Deliveries of kitted grocery sets to home have also appeared in Germany. German meal kits, so-called “kochboxen” are representing a rapidly growing sector of self-educating services. Meal kits are delivered packages with a prepared amount of products, following by instructions, combining text and photography. Additionally, in some cases, the user can find a video recipe of the box online. This experience is unique and supposes to improve cooking skills and spare the time for buying ingredients in the supermarket.

In this chapter, each of the Case study meal kits learning materials will be analyzed from the side of a customer and from a user experience perspective. For such purpose, the learning materials are included below as well as graphic representations of semantic sectors.

2.5.1. Marley Spoon

The Berlin-based meal kit subscription service Marley Spoon launched in 2014 under the helm of Fabian Siegel and Till Neatby. For research calendar week 40 of 2018 recipes has been tested. Learning media material is an A4 standard size paper instructions with sides A and B.

At the following figure 07 side, A of the learning sheet described in modules. For comparison, scanned side A from the meal kit is presented in figure 08. Marley Spoon learning template side A contains 6 objects: logo, the big picture of the meal, meal description, name of the meal with a short description, estimated time of cooking, and amount of portions. Pictures are taking 75% of the paper. The pencil-written data of planned cooking has been put additionally while testing the meal kit.

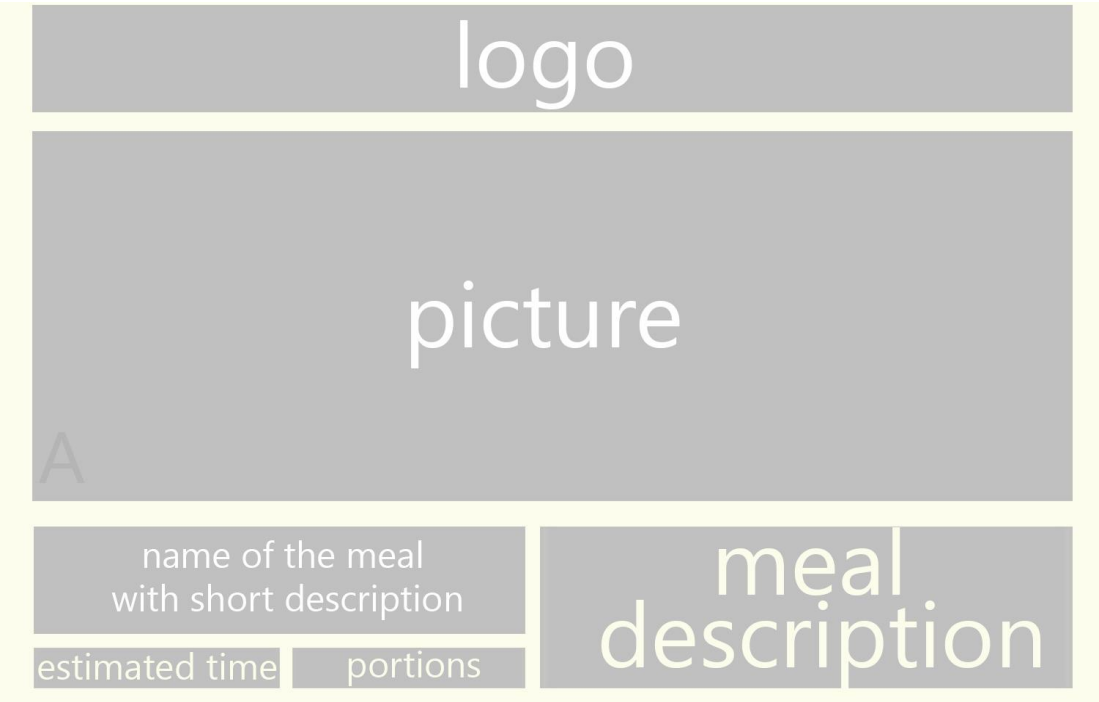


Figure 07 - side A of the learning template of Marley Spoon

Figure 08 - scan side A of the learning template of Marley Spoon

At the following figure 09 side B of the learning sheet described in modules. For comparison, scanned side B from the meal kit is presented in figure 08. Marley Spoon learning template side B contains 23 components: 6 pictures, 6 headings for each action, 6 descriptions of actions with key-words in bold, list of products received in a meal kit, list of must-have home products, required kitchen equipment and table of nutrition information, hotline telephone

number and social network icons. Pictures are taking 35% of the paper, text data requires more attention.

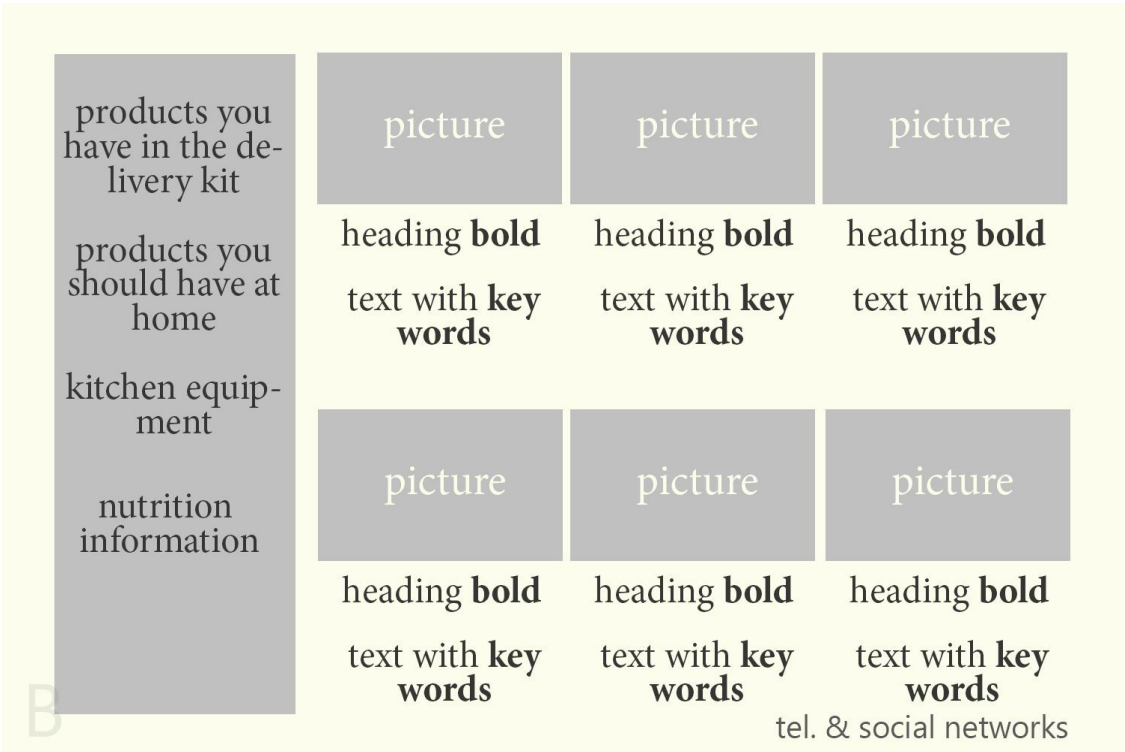


Figure 09 - side B of the learning template of Marley Spoon

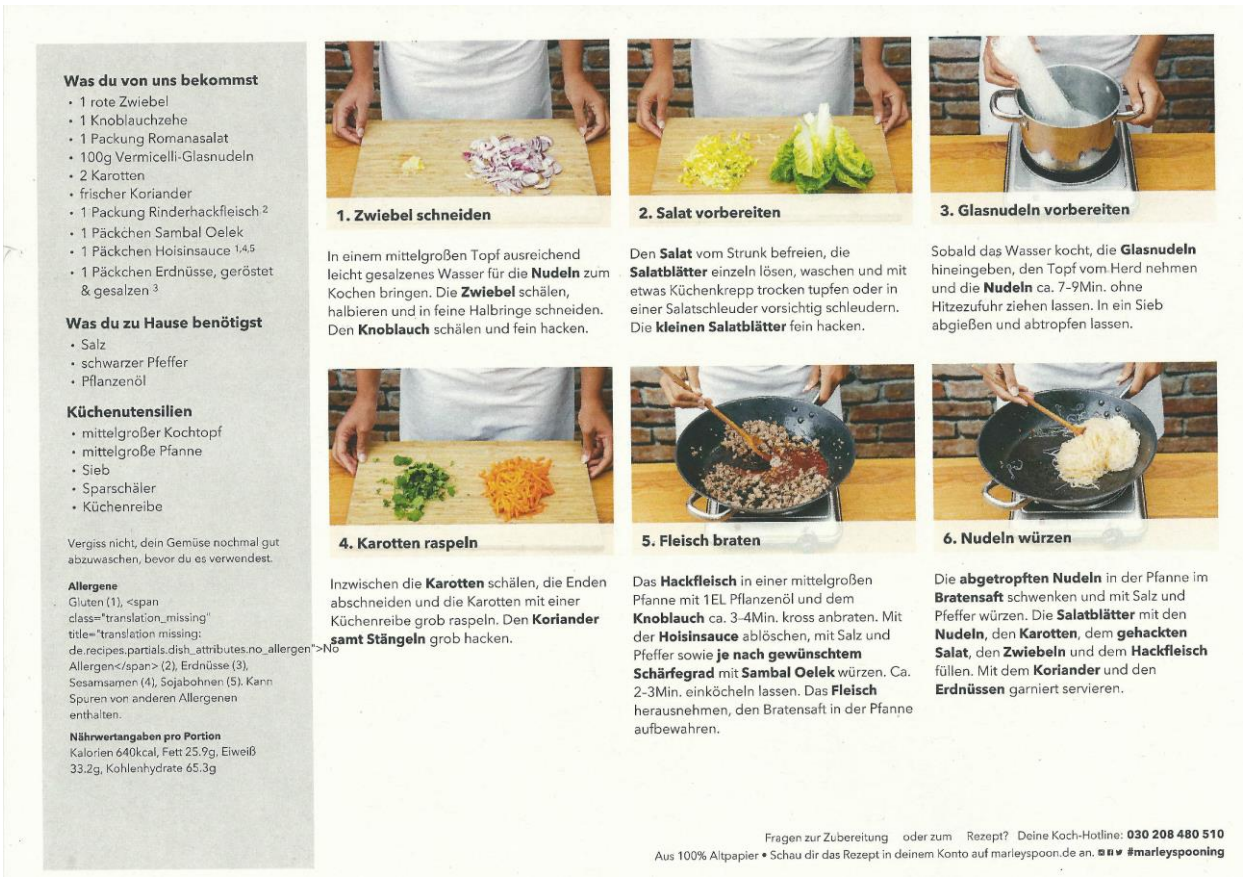


Figure 10 – scan side B of the learning template of Marley Spoon

2.5.2. Hello Fresh

HelloFresh is a cooking box service, launched in 2011 in Berlin by D. Richter, T. Griesel and J. Nilsson. For research calendar week 38 of 2018 recipes has been tested. Learning media material is an A4 standard size paper instructions with sides A and B. Further there are models of the structure of side A and side B with description, what is included in each sector.

At the following figure 11 side, A of the learning sheet described in modules. For comparison, scanned side A from the meal kit is presented in figure 12. Hello Fresh learning template side A contains 8 clusters: logo, big picture of the meal,description of the meal with keywords in bold, name of the meal with short description, star ingredient, pictures of all ingredients used for cooking the whole meal, package individual color label, icons with time, level, type and category of cooking. Pictures or icons are taking 80% of the paper.

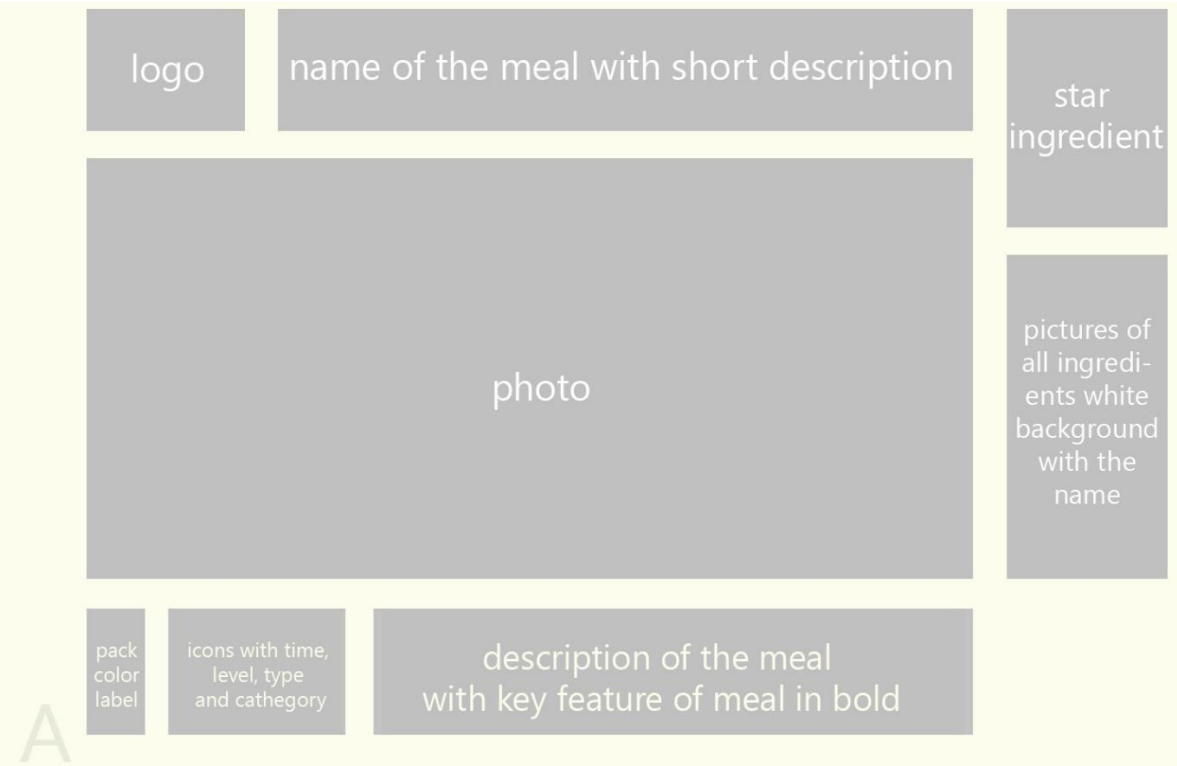


Figure 11 - side A of the learning template of HelloFresh

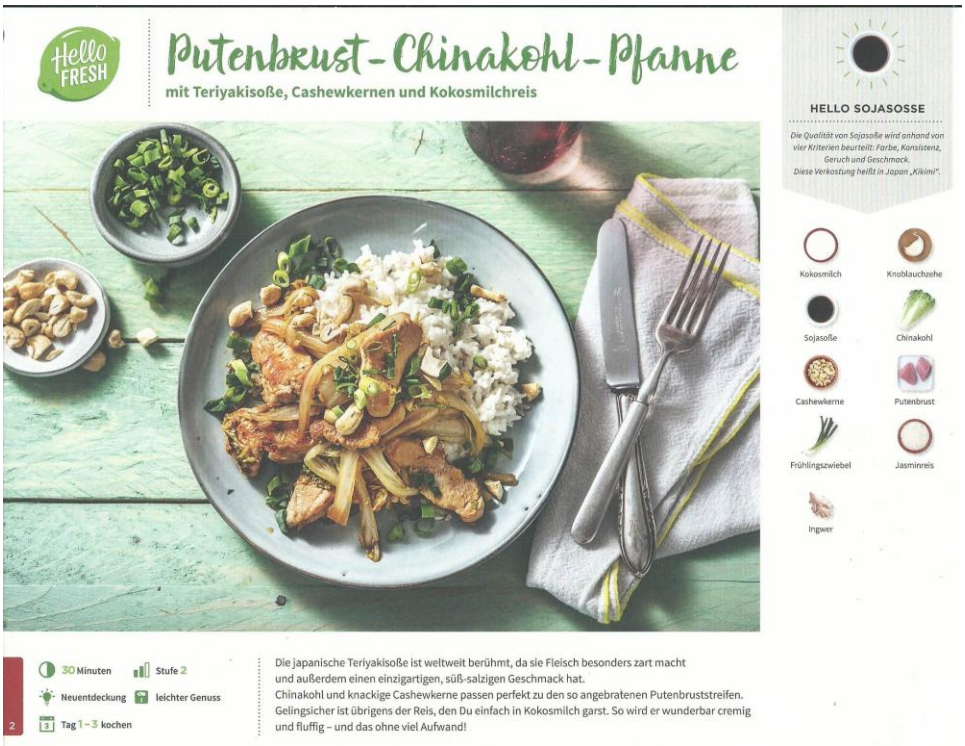


Figure 12 – scan side A of the learning template of HelloFresh

At the following figure 13 side B of the learning sheet described in modules. For comparison, scanned side B from the meal kit is presented in figure 14. Hello Fresh learning template side B contains 33 components: 6 pictures, 6 big numbers of actions, 6 headings for each action, 6 description of actions with key-words in bold, pre-cooking instructions, kitchen equipment required, social networks icons, telephone and e-mail, week of the recipe, Ingredient dosage for 2-4 servings, nutrition information panel, allergic information, guten appetite wish. Pictures are taking 30% of the paper, text data requires more attention.

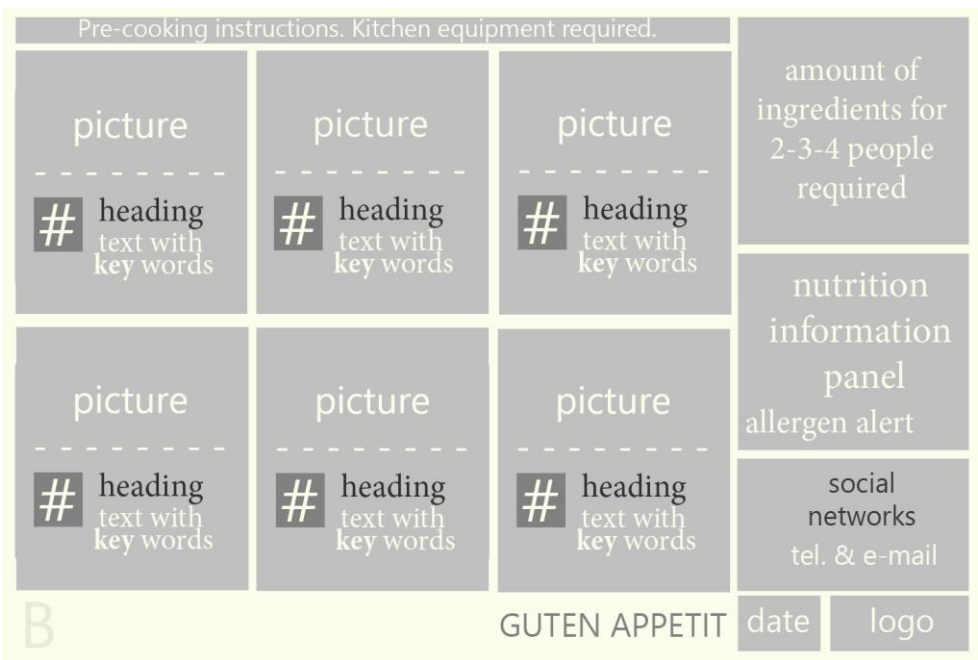


Figure 13 - side B of the learning template of HelloFresh

Figure 14 - scan side B of the learning template of HelloFresh

2.5.3. Lidl Kochzauber

Kochzauber was founded in 2012 by Steffi Keuler and Frederic Knaudt. Most recently, Lidl managers Catharina Diekmann and Christian Welz ran the business. After three years of existence, at the end of 2015, the meal kit supplier wanted to shut down its operations. Kochzauber remained an independent brand, and Lidl took the Kochboxes into its own online shop. However, because the products were not sold there, the supermarket put the bags in the stationary shop. This concept did not work either.

Lidl-Kochzauber, unfortunately, had to draw the conclusion that the market for cooking boxes in Germany had not developed as dynamically as it would have been necessary to lead the range into the future. According to a spokesman, the 33 employees who worked for Kochzauber in Berlin will be offered alternative positions at Lidl. Employees from the warehouse in Brandenburg will also be accommodated in the company.

Learning media material is an A5 standard size paper with instructions - sides A and B. Figures 15 and 16 are showing the media structure and scanned side A. Lidl Kochzauber learning template side A contains 7 components: logo, big picture, type of meal, how many

servings the dish is designed for, estimated time of cooking, name of the meal with short description. Pictures are taking 85% of the paper.

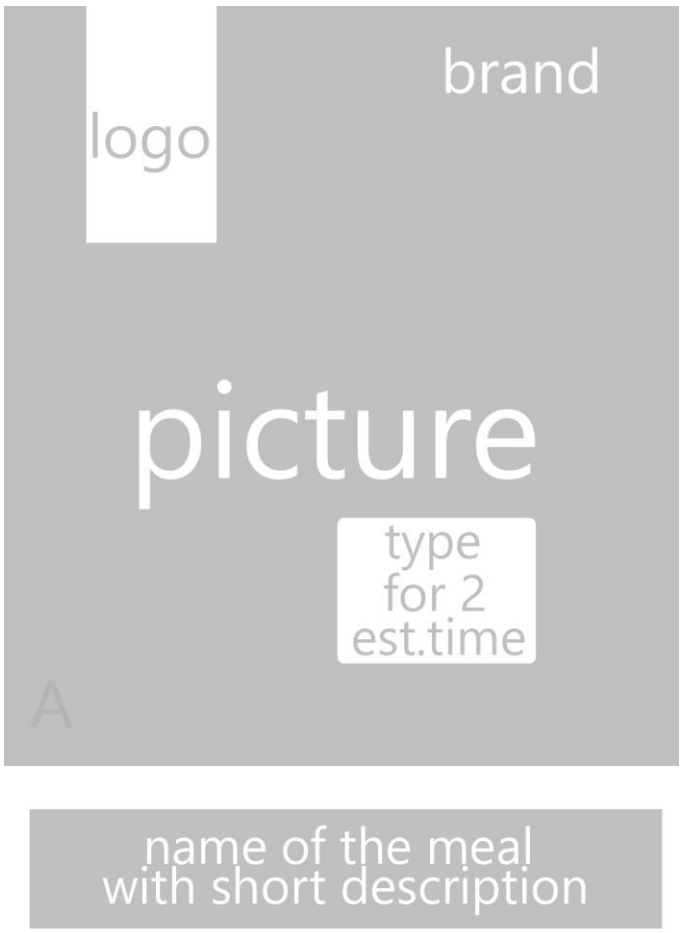


Figure 15 - side A of the learning template of Lidl Kochzauber

Figure 16 – scan side A of the learning templates of Lidl Kochzauber

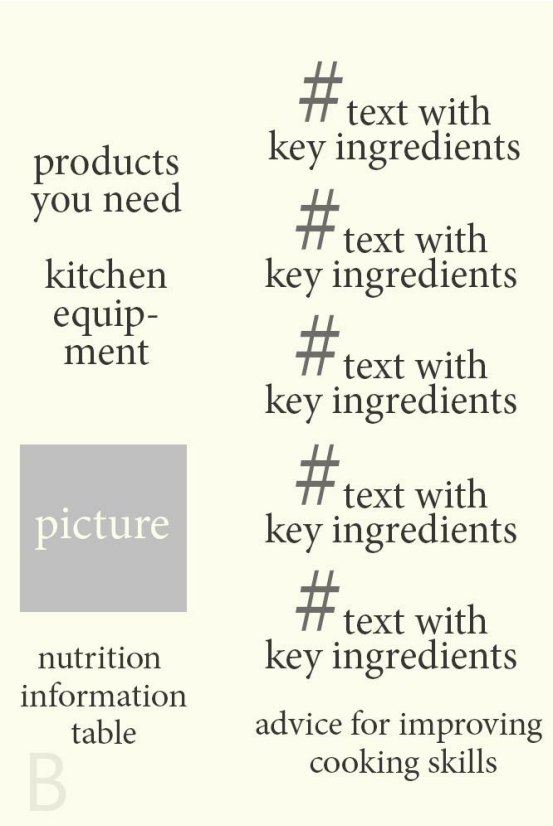
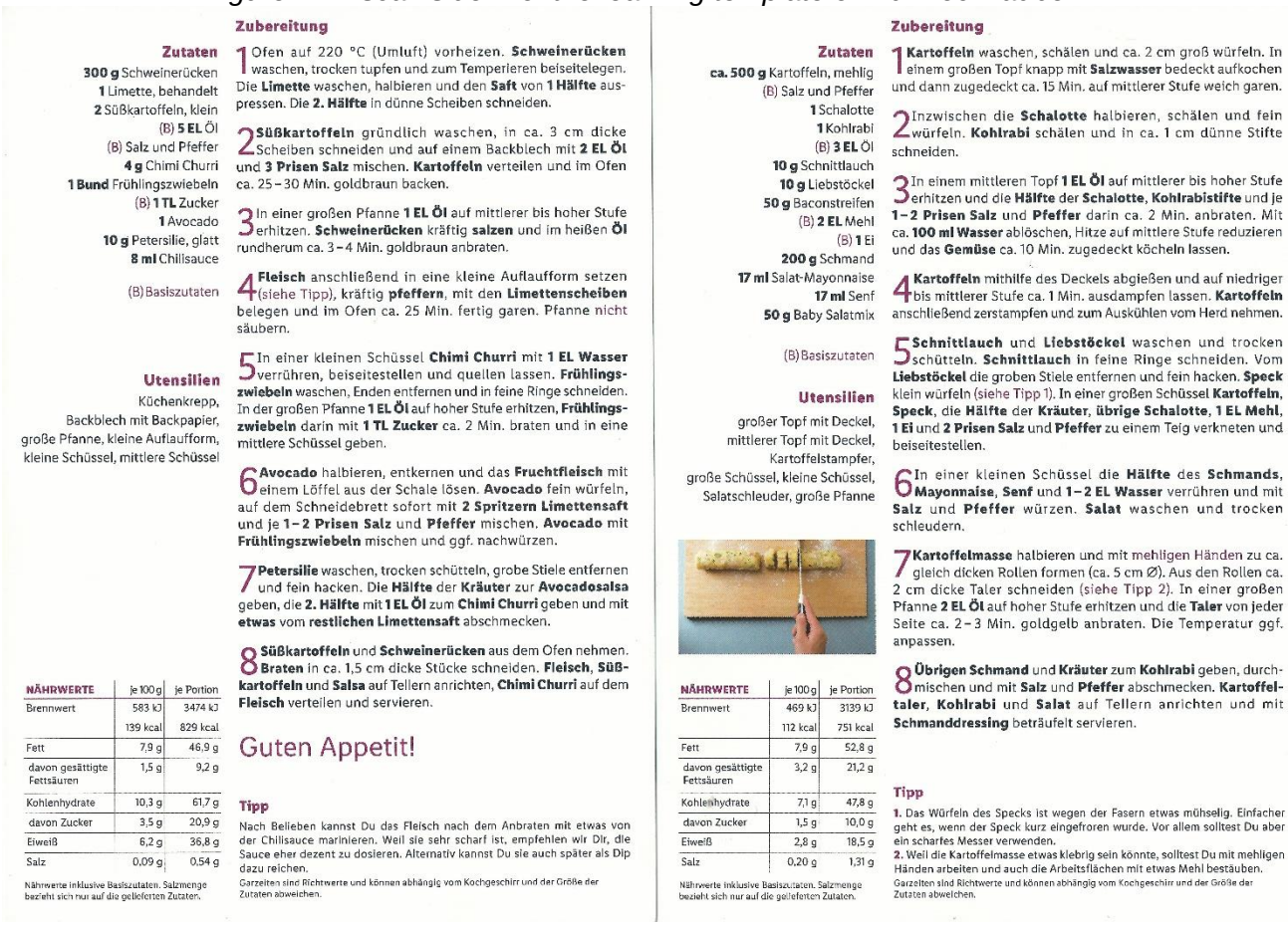


Figure 17 – scan side B of the learning template of Lidl Kochzauber



Zutaten

300 g Schweinerücken
1 Limette, behandelt
2 Süßkartoffeln, klein
(B) **5 EL** Öl
(B) Salz und Pfeffer
4 g Chimi Churri
1 Bund Frühlingszwiebeln
(B) **1 TL** Zucker
1 Avocado
10 g Petersilie, glatt
8 ml Chilisauce

(B) Basiszutaten

Utensilien

Küchenkrepp, Backblech mit Backpapier, große Pfanne, kleine Auflaufform, kleine Schüssel, mittlere Schüssel

Zubereitung

1 Ofen auf 220 °C (Umluft) vorheizen. **Schweinerücken** waschen, trocken tupfen und zum Temperieren beiseitelegen. Die **Limette** waschen, halbieren und den **Saft** von **1 Hälfte** auspressen. Die **2. Hälfte** in dünne Scheiben schneiden.

2 **Süßkartoffeln** gründlich waschen, in ca. 3 cm dicke Scheiben schneiden und auf einem Backblech mit **2 EL Öl** und **3 Prisen Salz** mischen. **Kartoffeln** verteilen und im Ofen ca. 25–30 Min. goldbraun backen.

3 In einer großen Pfanne **1 EL Öl** auf mittlerer bis hoher Stufe erhitzen. **Schweinerücken** kräftig **salzen** und im heißen **Öl** rundherum ca. 3–4 Min. goldbraun anbraten.

4 **Fleisch** anschließend in eine kleine Auflaufform setzen (siehe Tipp), kräftig **pfeffern**, mit den **Limettenscheiben** belegen und im Ofen ca. 25 Min. fertig garen. Pfanne nicht säubern.

5 In einer kleinen Schüssel **Chimi Churri** mit **1 EL Wasser** verrühren, beiseitestellen und quellen lassen. **Frühlingszwiebeln** waschen, Enden entfernen und in feine Ringe schneiden. In der großen Pfanne **1 EL Öl** auf hoher Stufe erhitzen, **Frühlingszwiebeln** darin mit **1 TL Zucker** ca. 2 Min. braten und in eine mittlere Schüssel geben.

6 **Avocado** halbieren, entkernen und das **Fruchtfleisch** mit einem Löffel aus der Schale lösen. **Avocado** fein würfeln, auf dem Schneidebrett sofort mit **2 Spritzern Limettensaft** und je **1–2 Prisen Salz** und **Pfeffer** mischen. **Avocado** mit **Frühlingszwiebeln** mischen und ggf. nachwürzen.

7 **Petersilie** waschen, trocken schütteln, grobe Stiele entfernen und fein hacken. Die **Hälfte** der **Kräuter** zur **Avocadosalsa** geben, die **2. Hälfte** mit **1 EL Öl** zum **Chimi Churri** geben und mit **etwas** vom **restlichen Limettensaft** abschmecken.

8 **Süßkartoffeln** und **Schweinerücken** aus dem Ofen nehmen. **Braten** in ca. 1,5 cm dicke Stücke schneiden. **Fleisch**, **Süßkartoffeln** und **Salsa** auf Tellern anrichten, **Chimi Churri** auf dem **Fleisch** verteilen und servieren.

Guten Appetit!

NÄHRWERTE	je 100 g	je Portion
Brennwert	583 kJ / 139 kcal	3474 kJ / 829 kcal
Fett	7,9 g	46,9 g
davon gesättigte Fettsäuren	1,5 g	9,2 g
Kohlenhydrate	10,3 g	61,7 g
davon Zucker	3,5 g	20,9 g
Eiweiß	6,2 g	36,8 g
Salz	0,09 g	0,54 g

Nährwerte inklusive Basiszutaten. Salzmenge bezieht sich nur auf die gelieferten Zutaten.

Tipp

Nach Belieben kannst Du das Fleisch nach dem Anbraten mit etwas von der Chilisauce marinieren. Weil sie sehr scharf ist, empfehlen wir Dir, die Sauce eher dezent zu dosieren. Alternativ kannst Du sie auch später als Dip dazu reichen.

Garzeiten sind Richtwerte und können abhängig vom Kochgeschirr und der Größe der Zutaten abweichen.

Zutaten

ca. 500 g Kartoffeln, mehlig
(B) Salz und Pfeffer
1 Schalotte
1 Kohlrabi
(B) **3 EL** Öl
10 g Schnittlauch
10 g Liebstöckel
50 g Baconstreifen
(B) **2 EL** Mehl
(B) **1** Ei
200 g Schmand
17 ml Salat-Mayonnaise
17 ml Senf
50 g Baby Salatmix

(B) Basiszutaten

Utensilien

großer Topf mit Deckel, mittlerer Topf mit Deckel, Kartoffelstampfer, große Schüssel, kleine Schüssel, Salatschleuder, große Pfanne

Zubereitung

1 **Kartoffeln** waschen, schälen und ca. 2 cm groß würfeln. In einem großen Topf knapp mit **Salzwasser** bedeckt aufkochen und dann zugedeckt ca. 15 Min. auf mittlerer Stufe weich garen.

2 Inzwischen die **Schalotte** halbieren, schälen und fein würfeln. **Kohlrabi** schälen und in ca. 1 cm dünne Stifte schneiden.

3 In einem mittleren Topf **1 EL Öl** auf mittlerer bis hoher Stufe erhitzen und die **Hälfte** der **Schalotte**, **Kohlrabistifte** und je **1–2 Prisen Salz** und **Pfeffer** darin ca. 2 Min. anbraten. Mit ca. **100 ml Wasser** ablöschen, Hitze auf mittlere Stufe reduzieren und das **Gemüse** ca. 10 Min. zugedeckt köcheln lassen.

4 **Kartoffeln** mithilfe des Deckels abgießen und auf niedriger bis mittlerer Stufe ca. 1 Min. ausdampfen lassen. **Kartoffeln** anschließend zerstampfen und zum Auskühlen vom Herd nehmen.

5 **Schnittlauch** und **Liebstöckel** waschen und trocken schütteln. **Schnittlauch** in feine Ringe schneiden. Vom **Liebstöckel** die groben Stiele entfernen und fein hacken. **Speck** klein würfeln (siehe Tipp 1). In einer großen Schüssel **Kartoffeln**, **Speck**, die **Hälfte** der **Kräuter**, **übrige Schalotte**, **1 EL Mehl**, **1 Ei** und **2 Prisen Salz** und **Pfeffer** zu einem Teig verkneten und beiseitestellen.

6 In einer kleinen Schüssel die **Hälfte** des **Schmands**, **Mayonnaise**, **Senf** und **1–2 EL Wasser** verrühren und mit **Salz** und **Pfeffer** würzen. **Salat** waschen und trocken schleudern.

7 **Kartoffelmasse** halbieren und mit mehligen Händen zu ca. gleich dicken Rollen formen (ca. 5 cm Ø). Aus den Rollen ca. 2 cm dicke Taler schneiden (siehe Tipp 2). In einer großen Pfanne **2 EL Öl** auf hoher Stufe erhitzen und die **Taler** von jeder Seite ca. 2–3 Min. goldgelb anbraten. Die Temperatur ggf. anpassen.

8 **Übrigen Schmand** und **Kräuter** zum **Kohlrabi** geben, durchmischen und mit **Salz** und **Pfeffer** abschmecken. **Kartoffeltaler**, **Kohlrabi** und **Salat** auf Tellern anrichten und mit **Schmanddressing** beträufelt servieren.

NÄHRWERTE	je 100 g	je Portion
Brennwert	469 kJ / 112 kcal	3139 kJ / 751 kcal
Fett	7,9 g	52,8 g
davon gesättigte Fettsäuren	3,2 g	21,2 g
Kohlenhydrate	7,1 g	47,8 g
davon Zucker	1,5 g	10,0 g
Eiweiß	2,8 g	18,5 g
Salz	0,20 g	1,31 g

Nährwerte inklusive Basiszutaten. Salzmenge bezieht sich nur auf die gelieferten Zutaten.

Tipp

1. Das Würfeln des Specks ist wegen der Fasern etwas mühselig. Einfacher geht es, wenn der Speck kurz eingefroren wurde. Vor allem solltest Du aber ein scharfes Messer verwenden.
2. Weil die Kartoffelmasse etwas klebrig sein könnte, solltest Du mit mehligen Händen arbeiten und auch die Arbeitsflächen mit etwas Mehl bestäuben.

Garzeiten sind Richtwerte und können abhängig vom Kochgeschirr und der Größe der Zutaten abweichen.

Figure 18 – scan side B of the learning template of Lidl Kochzauber

2.5.4. Comparison of Case Study cooking boxes

In the following table 01 each of the Casy Study vendors are compared by common criteria's like: recipe-style, type of the learning media, amount of steps, format of the paper, online duplicating media resources, own application, estimated time of cooking, client service contact, amount of pictures, logo, type of icons, photography frame style, colors of typography, social networks icons, hashtag, printing errors, level of difficulty, recycling paper, label mark.

Vendor	***Marley Spoon***	***Hello Fresh***	***Lidl Kochzauber***
Recipe-Style	The user picks up meals from 20 available for 2 - 4 people; each delivery box may contain from 2 to 5 dishes. Every week 7 new recipes with fish, meat, vegetarian and vegan created by professional chefs. For example: "Pork bacon tomato sandwich with bacon sauerkraut and onions".	"Classic", "Veggie", "Family" Plans are available for 2 - 4 people in HelloFresh, each delivery box may contain from 2 to 4 dishes. Recipes: seasoned spicy halloumi tacos, bulgur with Köfte from the oven, but also a hearty steak. Wine delivery subscription and a single delivery of meals as a gift are available.	The "Original", "Little Heroes", "Veggie" or "Weight Watchers Box" are the boxes from Kochzauber. All boxes are designed for 2 or 4 people; each delivery box contains 3 dishes. There are turkey piccata with pappardelle, parmesan, and creamy lemon garlic and baked potatoes with field salad, orange dressing, and mashed cashew, as well as more classic pork fillet with mashed potato. Seasonal boxes such as the grill box, advent box, or valentine's day box.

Description of media	2-sides paper card with instructions	2-sides paper card with instructions	2-sides paper card with instructions
Steps in recipe	6	6	8
Format of paper	A4	A4	A5
Online duplicating resources	+	+	+
App	+	+	-
Estimated Time	+	+	+
Client service contact	hotline	tel. and e-mail	-
Amount of pictures	7	17	2
Logo	1	2	1
Icons			
Photography frame style	in front of the chef, both arms visible or from above, no arms visible, grey background	from above, no arms visible, marble background	from above, with arms, blue background
Colors of typography	1	3	2
Social Networks	Instagram, Facebook, Twitter	Facebook, Instagram, YouTube, Pinterest	-
Hashtag	marleyspooning	HelloFreshDE	-
Printing Errors	broken code printed instead of text	-	-
Level of difficulty	+	-	-
Recycling paper	100% recycling paper	FSC-certified	-
Label sideline	-	+	-

Table 01 – Meal kits vendors' comparison table

In comparison with other meal kits, Hello Fresh learning material is having maximum useful data with no noticeable errors. There are 17 pictures in total and this is giving a maximum impression of color and affect the perception – bright images are always more attractive. The style of photography is shooting from above on the marble background and arms are in the frame. At the template, there are used 3 colors of text/icons. For future improvement, the data about the level of difficulty can be added.

Even if Marley Spoon template has a note about the difficulty level of the meal, there is a room for improvement also. The idea of labeling all bags and learning recipes is rapidly improving the user experience, otherwise, all boxes look identical. In a social network, icons can be added an additional network e.g. Snapchat, Pinterest, YouTube. The color of text preferably should be switched to 2-colors model to underline the header. In client service, contact email can be added or even a QR-code to get quick access to digital material or any other useful data. A programming error in the template recommended being checked twice.

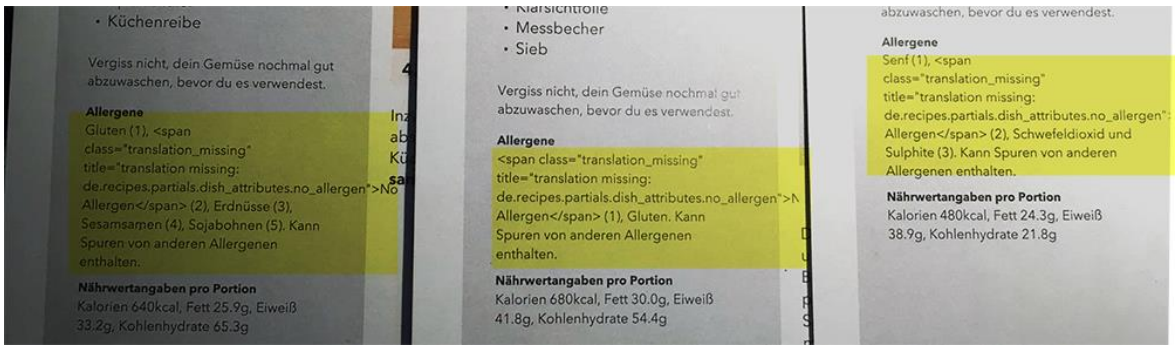


Figure 19 – illustration of Marley Spoon printing error

Lidl Kochzauber A5 format is compact and concise. The unusual paper size makes one consider saving wood and taking care of the environment, even if there is no data about recycling paper. No contact data, no hashtags, no social networks and no application available played a certain role in the degradation of brand awareness popularity.

2.6. Motivation

In all learning programs, and especially in e-learning solutions, motivation is, probably, the most critical element. Learners should know in advance the educational goals of the e-learning program and the benefits obtained from the educational procedure" (Pange, 2011).

The learning impact of digital media is in the cooking field is a new and existing topic to research. The dream of every scientist is to bring something useful to a professional society. The challenge of the research is not the only measure and compare the effectiveness of specific learning materials, and also to learn how to create learning materials with high UX learning cooking capacity.

The research process is affected by the weight of personal learning experience and the fact, that all participants have cooked something in their life, they do not have zero knowledge, which would be ideal for exploring the learning capacity of selected media. As yet, there has been no systematic investigation of the possible interactions.

3. Methodologies to judge cooking skills

To measure cooking competence, one must first define the term “cooking skills”. Cooking skills have been typically defined as a set of mechanical or physical skills used in meal preparation. Instead of looking at stills from a “task-centered” approach, a “person-centered” approach may be helpful to understand cooking skills. This approach divides cooking skills into two different categories: domestic cooking skills and professional cooking skills. Moreover, there is a gap between research about measuring cooking competence and questionnaires which have been created to measure cooking knowledge. Cooking skills have generally been examined as technical skills only.

This research is exploring the effectiveness of using different types of media to improve cooking skills. In a focus-group determination stage of the research, some people agreed to cook with provided materials and their learning ability will be tested before and after the cooking process. Among participants was held an online survey in order to understand focus-groups abilities to cook. Additionally, participants could select attractive groups of recipes, express their attitude about the cooking process and share the information about searching for recipes.

The recipes and notions needed to prepare the meal will be given through learning materials such as classic text instruction, photography-based stop-motion video, long classic video recipe. After the participants cooked the given recipes, their learning experience had been measured with online surveys, personal Interviews, and self-recorded assignments; all which will help to identify the Basic Action Concepts (BACs) of the participants to run an SDA-M (the Structural Dimensional Analysis-Motoric) (Schack, 2004). Such BACs include chopping, frying, boiling, baking, mixing, flipping and also actions with which the participants struggle the most and the less.

Current research suggests using SDA-M as a measurement instrument to show the differences in participants' mental representation structure in long-term memory. This may relate to different perceptual behavior - in order to discover the difference in learning perception I will use personal interviews and surveys. Thus, it will help to understand the effectiveness of used digital materials and track the results, which will improve the quality of measuring cooking skills.

The following chapters will guide the reader through developing stages of each methodology process mentioned above.

3.1. Designing testing materials

In the following chapter, the process of creating testing materials for participants is described. Due to the complexity of analyzing research data, this thesis is focused on three selected media: text, video, and photo. To represent cooking recipes in the research, stop motion technique based photography, video and simple text one-paragraph recipe have been used.

The scope of future research can be broadened for mixed-media testing materials, available in the selected field. For cooking topic, a bigger variety of different media can be used as a learning material: posters, applications, magazines, voice helpers, etc.

During the process of creating learning materials, the following software and equipment have been used:

- Computer Aspire E 17 with Intel Corei7 processor and NVIDIA GeForce GTX 950M video card
- Adobe software: Photoshop CS6 and Premiere Pro CC 2018
- Camera Canon EOS 80D
- Tripod for video recording
- Professional Photography Studio Set OUBO which includes 4 backgrounds and 2 lamps of 135-watt low energy bulb = approx. 675 Watt screw bulb
- Apple iPhone SE

3.1.1 Classic text instructions

To develop classic recipes representation – written text, cooking books have been considered, both printed and online sources. To attract the attention of the reader and stimulate eagerness of reading, 3 types of text has been developed: one-paragraph text with the main ingredients in bold, humorous text description and simple list of ingredients and actions. To test the participant's ability to learn and extract information the simple text has been selected for the experiment.

3.1.2 Photography based stop-motion videos

Stop-motion is a genre of video art, one of the basic principles of animation. The meticulous but spectacular technology of the art is in the sequential connection of individual frames in single video order. In this case, the objects come to life magically, and people begin to fly and pass through the walls.

Stop-motion has been used since the beginning of the 20th century to create advertising, plasticine and puppet animation, music videos ("Plastic Crow" by Alexander Tatarsky, "Bride's Corpse" by Tim Burton, "Fell in love with a girl" by Michel Gondry, "Western Spaghetti" by PES and "Her morning elegance" by Oren Lavie).

Many famous bloggers and TV channels use Stop Motion in online cooking training or for fun, such as PES, delish, Cake and Drake, Afisha.Eda, Food Network, etc.

Figure 20 - PES stop-motion video with non-edible objects

There are preparing to shoot the cooking video recommendations list:

1. Light. To create a stop-motion animation you should use a permanent light source, you can use daylight, but you need to monitor the appearance and disappearance of clouds from the sky, and in the room, there may be reflections of light from you and from the walls.
2. Adjust the camera by making all settings manually. Use Mode M with ISO (50-400) and control White balance manually**.** It is also desirable to use manual focus.
3. Secure the camera to a tripod or any flat surface so that the camera has support throughout the shooting.
4. Fasten the tripod so that the tripod is never moved with your feet or hands
5. Calculate the approximate time of your animation. The video is shot at 24 or 30 frames per second. Calculate how many seconds each movement should last, then multiply by your frequency, so many frames you need to make.

Shooting:

1. Adjust the focus on the subject of the animation. It is better to use a manual focus to avoid light flashing
2. Press the camera shutter with the remote control, or use the 2-second shutter release mode (the camera will suppress vibrations caused by pressing the button in 2 seconds)
3. Always keep in mind how many frames you need to do for a certain action in your animation.

3.1.3 Classic recipes videos

Video is the most popular format to develop learning materials in the field of cooking. One can easily understand the manipulations when it is recorded on video and every single step is illustrated. The challenge of creating learning video material is that you need to cook and make a video at the same time. Without thoughtful preparation and setting up the light, the background, the tripod, charging the camera the video may need a second recording. The videographer needs to have all the ingredients and instruments ready and set up. During the process of cooking, it can be very interesting to record a long process and speed it up.

There are various famous bloggers, who achieved a high level in cooking:

- Rosanna Pansino with 8M subscribers launched the Nerdy Nummies baking show in 2010, inspired by her grandmother. The Rosanna's channel has many famous guests and original recipes for cakes and pastries.
- Channel of the famous British chef Gordon Ramsay, the owner of dozens of restaurants around the world. He has 3.5M subscribers with appetizing master classes, as well as various culinary tricks.
- Laura in the Kitchen with 2.7M subscribers is an Italian woman who lives in the United States. She is not a professional chef, but her recipes are delicious. Laura often cooks Italian dishes, often upon the request of subscribers.
- SORTEDfood with 1.7M subscribers is a channel of 4 people named Ben, Mike, Barry, and Jamie. The guys get together to make jokes, make meals and have a good meal. Ben is the only one with a culinary education.
- Cooking with Dog with 1.3M subscribers. On this channel, a cute Japanese woman cooks with a charming poodle. Some people are embarrassed by the fact that the dog hangs around the food. But most people like it. Even though the videos are in Japanese with English subtitles. The videos on the channel are sorted by categories:

hot dishes, soups, desserts. There you will learn how to make a real lunchbox in the style of a bento, Japanese omelet or steam pies with nikuman meat.

Considering the experience of usability testing, the created learning materials have no sound, no added text so it would be universal and not disturbing. To share the learning materials, the YouTube channel “Pigeon Cooks! Learning videos” the motto “Pigeon cooks and you can!” was created so that all the participants of the research were able to get access to the materials. In the future, the blog can grow and attract more people to learn.

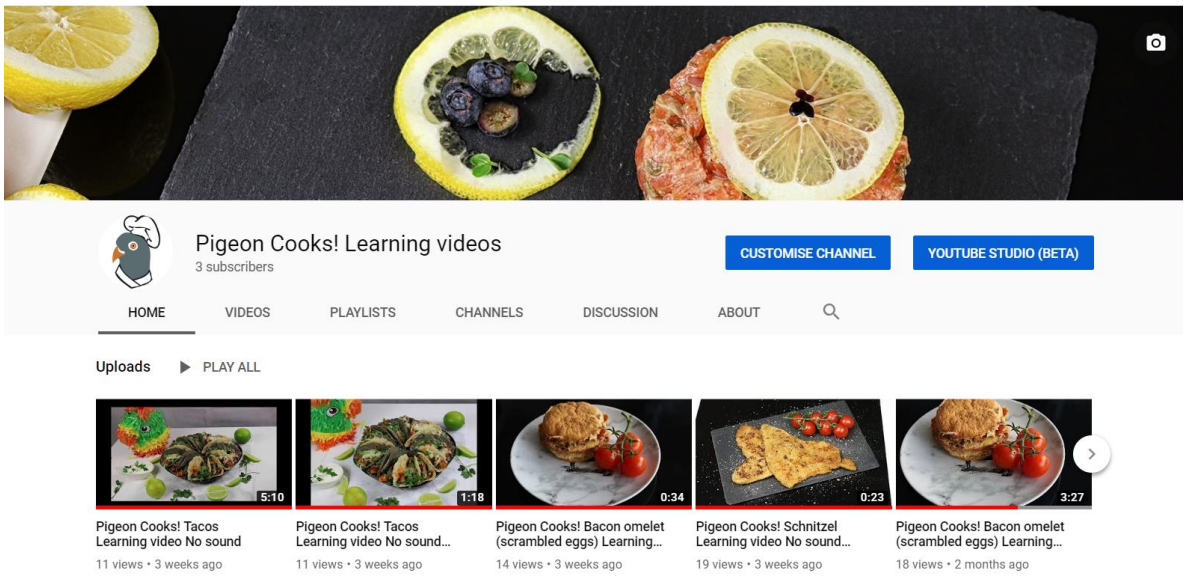


Figure 21 - YouTube channel, created for sharing learning materials

To increase a learning effect and test attention of participants, the cook in the long schnitzel video is wearing a pigeon mask, and in other long videos, the pigeon appears in the frame (see Figure 22). Inattentional Blindness (also "invisible gorilla effect", selective attention or perceptual blindness) is a psychological inability to pay attention to any object which is not related to vision problems and has exclusively a psychological character. The phenomenon can also be defined as an individual's inability to see an unexpectedly developed irritant in sight. Everyone suffers from this kind of blindness from time to time, as it is simply impossible to notice all visual stimuli.

Figure 22 – Cooking videos from the channel with pigeon mask in the frame

3.2 Focus-group determination

After completing the UX survey the group of 20 people is formed. Participants learning skills will be observed according to determined cooking ability:

- Cooking novices with basic or foundation level cooking skills – self-educated people with a need to cook fast and cheap
- Experienced non-professional cooks – self-educated with experience of regular cooking for family and medium income.

3.2.1 Profile inquiries with SurveyMonkey

SurveyMonkey is one of the most popular survey creation services. In 2015, the number of its users was about 25 million people, and the name of the company was included in the list of Forbes Unicorn (this list includes startups that have reached the capitalization of more than 1 billion dollars). Among the regular users of this service are such business giants as Facebook, Virgin America, Kraft Foods and Samsung.

SurveyMonkey allows users to create surveys and polls, get answers to them, and analyze the results in real time. There is a free tariff in the service, as well as three paid tariff plans: Premiere, Advantage, Standard, and Team. The free version has restrictions on the number of questions asked (10) and the number of answers (100), and there are no many features available in paid versions (group work on surveys, branding, A/B-testing, filtering and making tables, etc.).

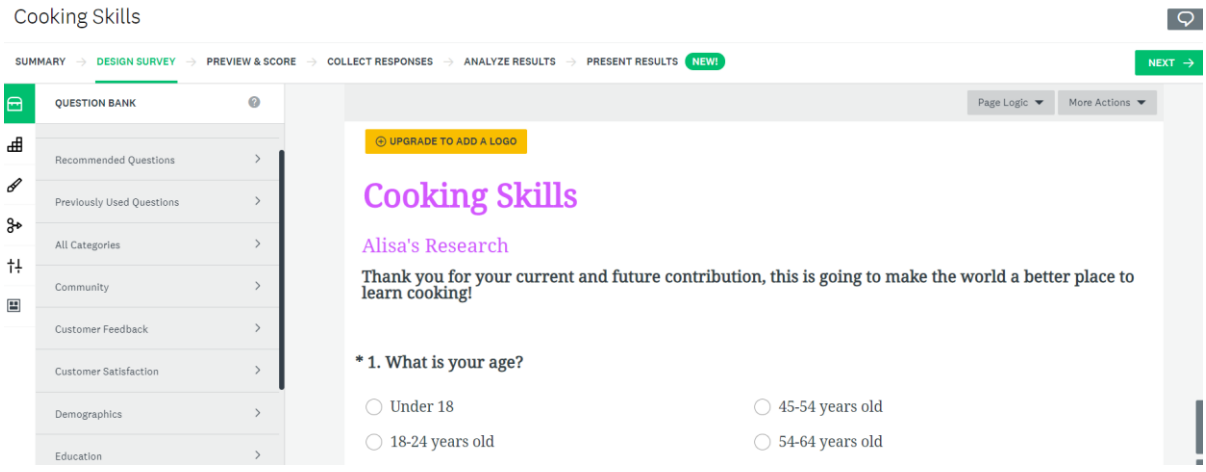


Figure 23 - Interface of creating a survey in SurveyMonkey

Due to the complexity of the research, it was necessary to activate the paid tariff plan for 1 month to be able to design qualities survey and collect all data from future participants.

3.2.1.1 Developing the questionnaire

The questionnaire has 36 questions, including specific information to determinate, how people are judging their own ability to cook. Factors which determine how one acquires their cooking knowledge, skills, and level of competence include gender, age, income, attitude and social-educational class/environment. The list of survey questions used in research can be found in Appendix I.

3.2.1.2 Observing the results

The data obtained from participants is presented in the following graphs. Average time spent on responding to the survey questions was 10 minutes 20 seconds.

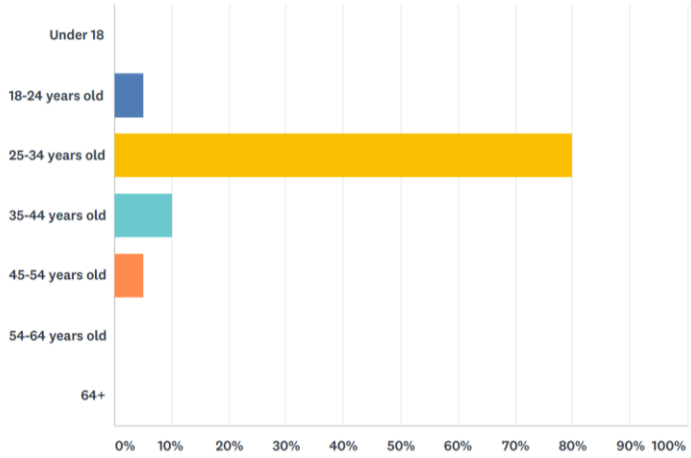


Figure 24 - Q1 Age diagram

80% of participants are between 25-34 years old, 19% are 35-44 years old, the groups of 18-24 and 45-54 are 5%. The research has gender equality: 50% of participants are men, and 50% are women. 55% of participants have a Bachelors' degree or higher. 30% of participants are living with a partner in one household.

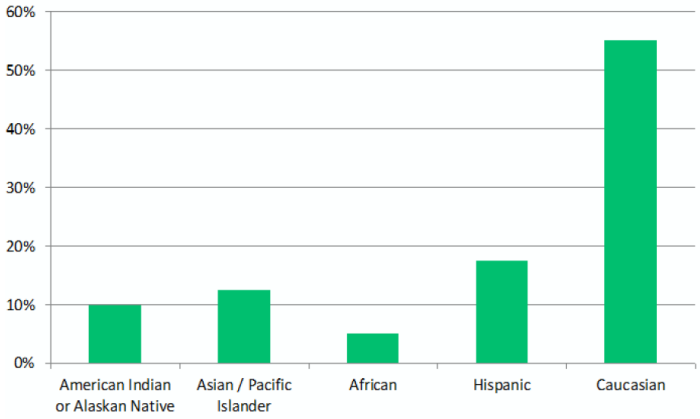


Figure 25 - Q6 Ethnicity diagram

The ethnicity of participants is 55% Caucasian, 18% are Hispanic, 13% are Asian, 10% are American or Indian. 80% are working equally part or full-time and 20% are looking for a job.

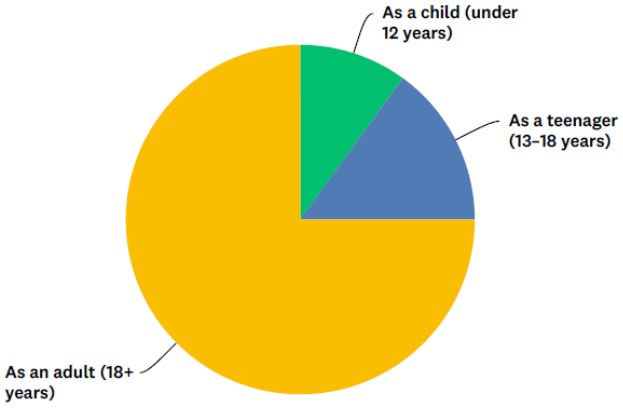


Figure 26 - Q7 the period of obtaining most of the cooking skills diagram

In this particular research, 75% obtained most of their cooking skills as an adult, after 18 years old. 15% learned cooking in the period from 13 to 18 years old and only 10% did that being under 12 years old.

65% consider themselves as experienced in day-to-day cookery, and 35% are preparation novices. 65% are familiar with different kinds of cooking machines and 35% not. 65% of people are regularly following recipes while cooking, the rest do not. Half of the participants are planning meals ahead, but only 45% feel limited by their knowledge. Only 10% are not comfortable preparing food, and only 20% do not have a mental plan for the cooking meal.

Considering the topic of feeling emotions while cooking, 45% find cooking a very fulfilling activity. Although 65% enjoy cooking, 20% of participants are feeling burdened by having to cook for other people, and 20% willing to go through the cooking process as fast possible and 10% are not enjoying cooking at all.

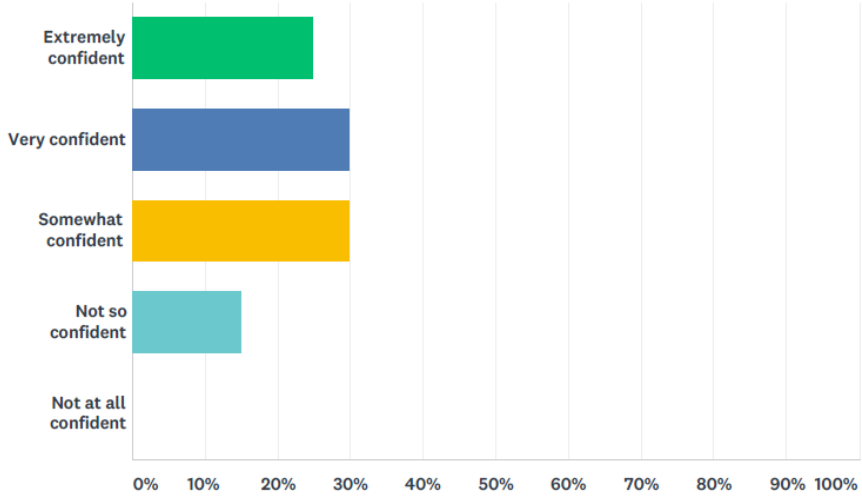


Figure 27 - Q21 confidentiality of participates in their ability to cook from basic ingredients

Digging deeper into cooking knowledge, 80% of participants are strongly interested to know what ingredients the food contains. 25% are extremely confident about their ability to cook from different ingredients, 30% are very confident and 30% are somewhat confident and only 15% are not so confident.

Speaking about the ability to follow a simple recipe, 30% are extremely confident and 45% are very confident accordingly and the rest 25% are somewhat confident about it. Curiosity plays a big role in learning cooking, 55% of participants would taste unknown food very likely, and 35% likely will do the same. The rest 10% are unlikely going to try something new.

Discovering participants' food habits and level of skills shows the pain points of the process. Ingredients pre-cut are considered as a non-desirable action for 15% and somewhat desirable for 50%, rest 30% are positive about and consider this as a very desirable action and 5% go with extremely desirable one. With cooking new food 20% are not so confident and 25% are somewhat confident, 40% are very confident and 15% are extremely confident.

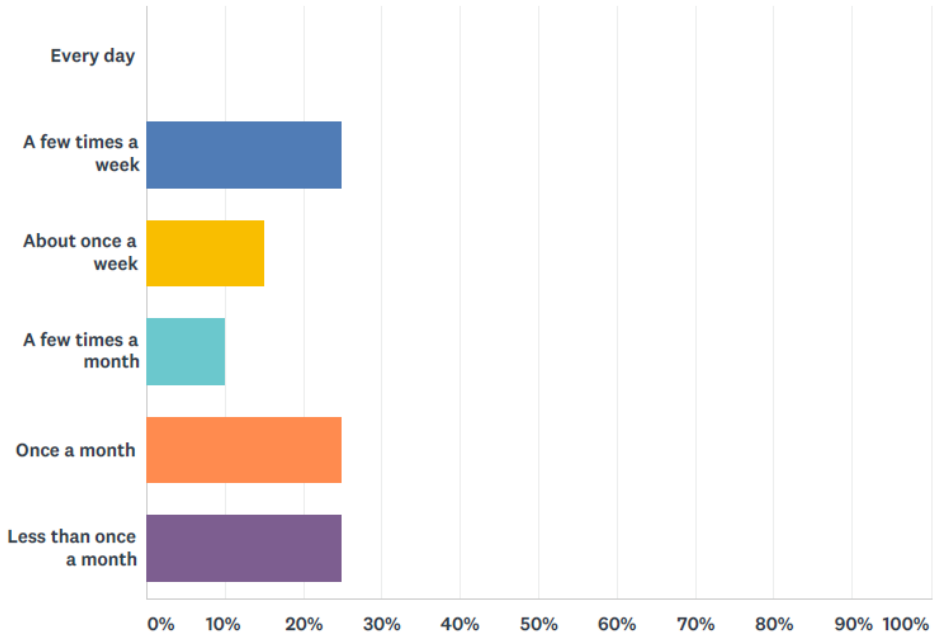


Figure 28 - Q26 the frequency of takeaway fast-food consumption as the main meal

Take-away food is replacing home meal pretty often, 25% of participants equally have fast food meal as a main meal of the day few times per week, once a month and less than once a month. Once a week is regular for 15% of participants, and a few times a month is a routine for 10%.

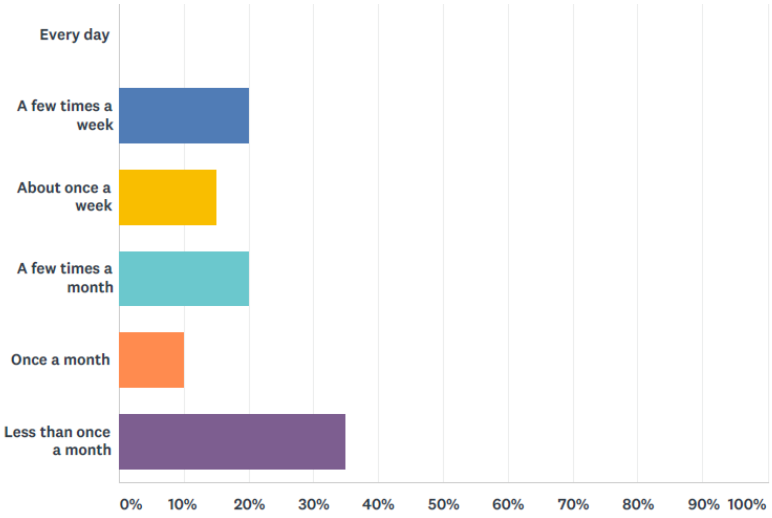


Figure 29 - Q27 the frequency of restaurant food consumption as a main meal

20% of participants are able to eat a meal as the main dish in a restaurant several times a week and a few times per month. Once a week and once per month is relevant for 15% and 10% of participants accordingly. The rest 35% can afford to eat in the restaurant less than once per month.

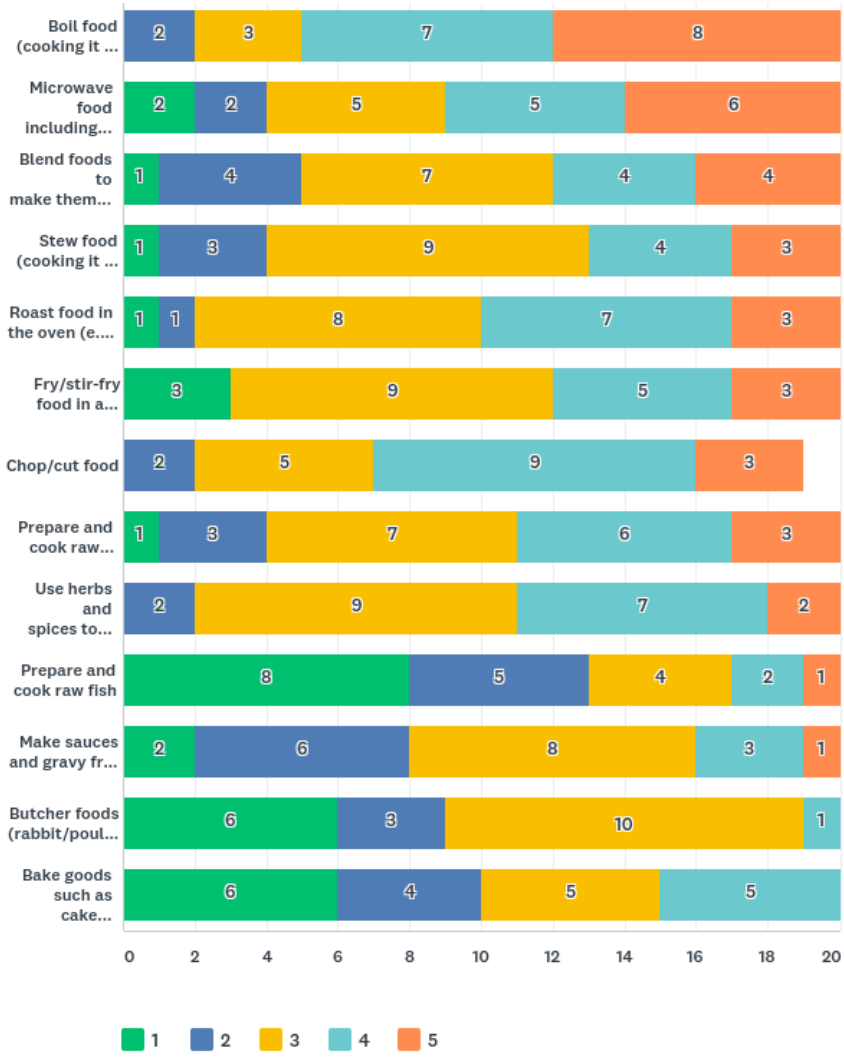


Figure 30 - Q28 Confidential of cooking skills listed from 1 (poor) to 5 (excellent)

Each participant has been asked to judge his or her cooking skills in 13 criteria, with the mark from 1 to 5 with 1 being poor and 5 being excellent. According to the diagram above, orange is representing excellent skills and green – poor. Skills are presented from the most confident skill to less. In color fragments are written the number of participants, selected that skill. Participants are highly confident in boiling food – 70% overall gave themselves 5 and 4. Chopping food is a highly developed skill for 65% of participants. The most unconfident skill is preparing and cooking raw fish with 40% of participants and only 15% being good.

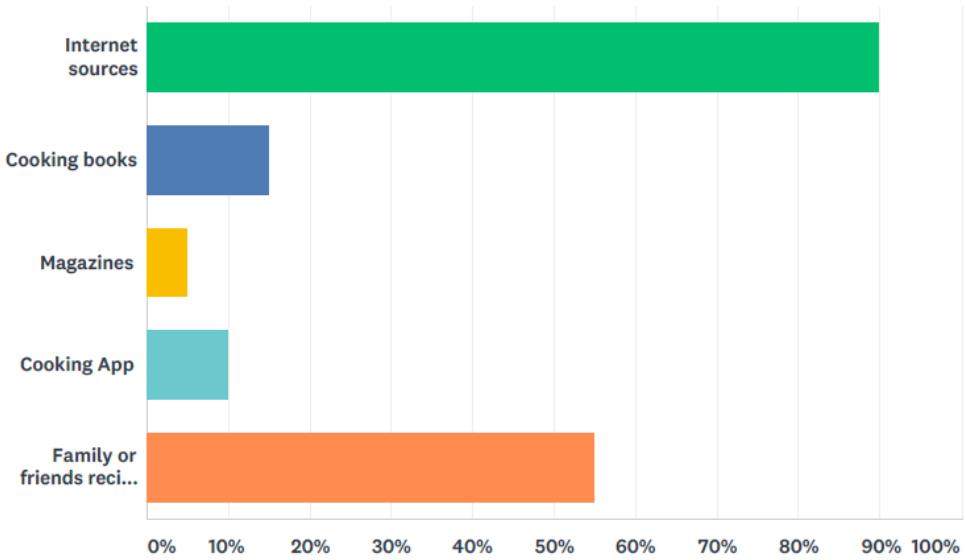


Figure 31 - Q29 the sources of recipes

90% of participants are actively using Internet sources to find inspiration for cooking meals. 55% are asking family or friends certain bits of advice about cooking, cooking books are still in use with 15%, cooking apps have 10% and only 5% of participants are using magazines.

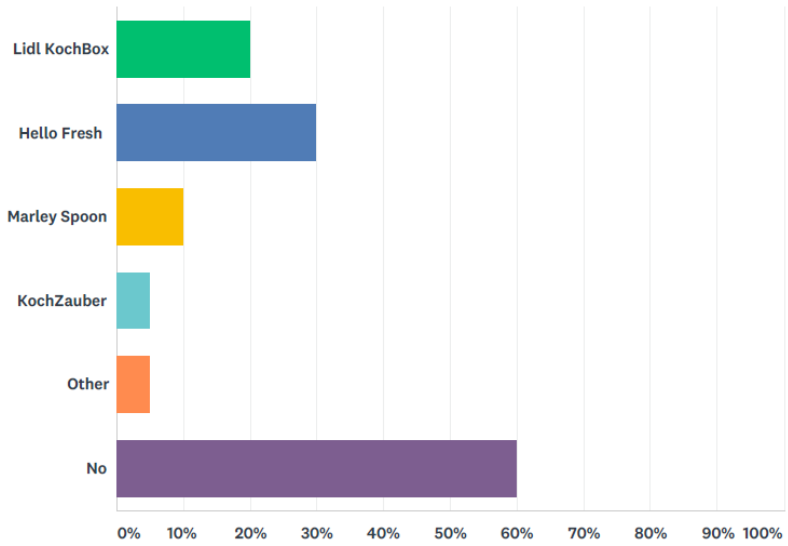


Figure 32 - Q30 recognition of food boxes

Hello Fresh is familiar among all cooking boxes to 30% of participants, while Lidl Kochzauber is recognized by 20%, and 60% of participants are unfamiliar with the topic.

Only 10% of participants have ever paid for a single recipe. 75% of the poll is calmly able to consume the same meal for several days in the row. Further questions are focused on personal data and the availability of participants.

3.2.2 Dividing the participants

The choice of cooking remotely has been given to the participants with low availability or that live far away. To summarize, 10 people can cook remotely; 10 people can cook in the provided studio. In each group, half of the people are considering as novices and half are more experienced in day-to-day cookery. In Q7 people judge themselves differently and only 35% are beginners in cooking, but according to Q11 50% of participants are planning meals ahead and 50% not, and according to Q12 45% feel limited in cooking knowledge.

In the following table 02, participants are divided into groups according to their availability and ability to cook discovered after SurveyMonkey questionnaire analyses. They are marked as Novices (N) and Experienced cooks (E). Due to non-disclosure of private information participants have numbers instead of names.

	Group 1. Studio participants		**Group 2. Remote cooking participants**
N	Participant 1	N	Participant 2
N	Participant 11	N	Participant 12
N	Participant 13	N	Participant 3
N	Participant 4	N	Participant 14
N	Participant 5	N	Participant 15
E	Participant 6	E	Participant 16
E	Participant 18	E	Participant 17
E	Participant 8	E	Participant 7
E	Participant 9	E	Participant 19
E	Participant 10	E	Participant 20

Table 02 – Group 1 and Group participants' distribution

Studio cooking focus-group has a benefit of the possibility of asking for help from the experiment holder, also all kitchen machines are prepared and instructions for them can be provided.

The remote cooking group needs to discover a list of ingredients, kitchen machines replacements on their own. Nevertheless, additional questions and instructions can be asked remotely. For that purposes, the holder of the experiment was available via social networks and telephone.

3.2.3 Selecting the recipes

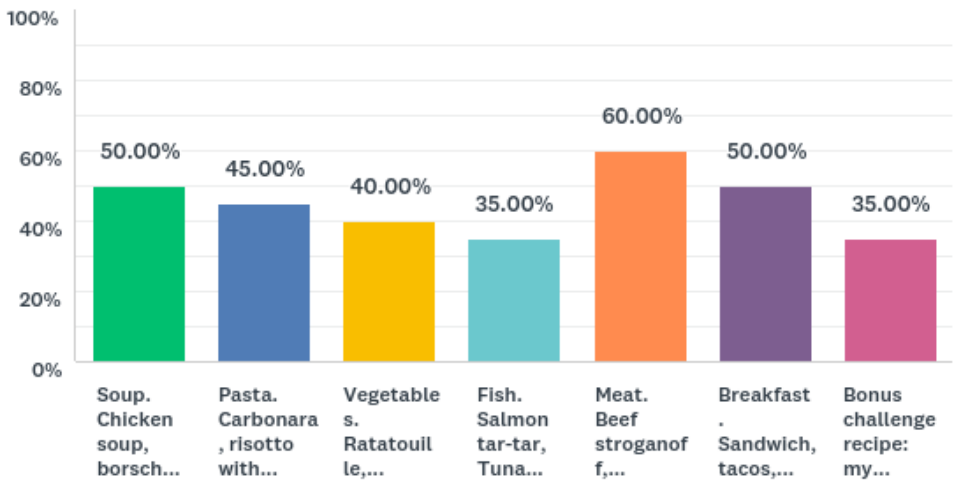


Figure 33 - Q36 Interesting for cooking recipes categories for participants

After analyzing profiles of focus-groups, 3 recipes have been selected due to several factors affecting cooking like baking, using kitchen machines, level of proficiency and time. All participants are cooking the following recipes: taco, schnitzel, and omelet. Each meal has a different level of difficulty – taco is a difficult meal to cook from scratch, the omelet is medium due to the need to use a kitchen machine and schnitzel is easy to cook.

All meals contain meat ingredients according to 60% of participants' interest in that category, according to Q36. The remote cooking group and in-house cooking are receiving the same recipes and instructions.

Distribution of learning materials for recipes is random. Using the random number generator, participants from 1-20 will have the one from each of the group of recipes: Schnitzel group (1 for schnitzel stop-motion, 2 for schnitzel long video, 3 for schnitzel text),

Omelet group (4 for omelet stop-motion, 5 for omelet long video, 6 for omelet text), Tacos group (7 for tacos stop-motion, 8 for tacos long video, 9 for tacos text).

Participant 1 cooks 1, 4, 9
Participant 2 cooks 2, 4, 7
Participant 3 cooks 1, 6, 9
Participant 4 cooks 2, 4, 7
Participant 5 cooks 3, 6, 9
Participant 6 cooks 1, 4, 8
Participant 7 cooks 2, 5, 7
Participant 8 cooks 3, 5, 9
Participant 9 cooks 1, 5, 9
Participant 10 cooks 1, 6, 8
Participant 11 cooks 2, 5, 7
Participant 12 cooks 3, 4, 9
Participant 13 cooks 1, 5, 7
Participant 14 cooks 1, 6, 8
Participant 15 cooks 2, 4, 8
Participant 16 cooks 1, 6, 7
Participant 17 cooks 3, 5, 8
Participant 18 cooks 2, 4, 9
Participant 19 cooks 2, 4, 9
Participant 20 cooks 1, 6, 8

3.3 Apparatus

To devise a learning impact between media one should follow the described model of the research. The first step is creating a focus-group: 50% men, 50% women, age from 20 to 52 and a half participants are novices, half are experienced cooks. The next stage is profile inquiries – an online survey is a suitable UX tool to know participants' cooking habits better. After participants receive an individual self-recorded assignment, including sorting procedure, learning material, and evaluation form. The following stage is cooking and evaluating the experience with the help of personal interviews and previous results.

3.3.1 Interviews

One of the main types of sociological research using direct socio-psychological interaction between the researcher and the respondent is the interview. For a successful interview, the

following aspects are important: the location of the interview, the organization of the interview. While interviewing Group 1 people the conversation will be recorded and focused on following topics, touched before in online survey: which emotions the following learning materials caused, how easy was it to follow the recipes, would it be possible to repeat the recipe on their own, did they use their own cooking knowledge, are these recipes increasing the eagerness to learn cook and is there any room for improvement.

Expecting results of personal interviews are helping to obtain an honest reaction, determinate the perception of learning between different groups of people and develop a pattern of influencing the learning capacity. Thus, different kinds of media could be determinate as more or less effective. Group 2 will go through the same interview questions via Skype-sessions or will write answers down.

3.3.2 Self-recorded assignments

During the research, participants are provided with instruction, which requested them to follow a certain schedule of assignment: first, the participant should make the selecting test via the provided link and copy the results in the file. Then the participant gets access to individual learning material and interacting with it in the process of cooking the meal. After cooking and serving the plate, the participant does a picture of a dish and paste it in the file. The next step is repeating the sorting procedure and copying the results in the document. After placing the personal interview about learning capacity of provided media, the self-recorded assignment is collected and analyzed.

3.3.3 Structural Dimensional Analysis-Motoric (SDA-M)

The Structural Dimension Analysis of Motor Memory (SDA-M) (Schack, 2004) has been developed and implemented successfully in different fields of sports such as volleyball, gymnastics, sky surfing, and dancing (Schack & Ritter, 2009; Bläsing, Tenenbaum & Schack, 2009). It has also already been applied on everyday scenarios, such as *drinking from a cup*, with leisure time activities, using tools, and grasping objects of different sizes (Maycock, Bläsing, Bockemühl, Ritter & Schack, 2010; Braun et al., 2007).

In the cognitive architecture of human action, Basic Action Concepts (BACs) are identified as the mental counterparts of functionally relevant elementary components or transitional states of complex movements. SDA is a well-established procedure in the field of cognitive psychology for ascertaining relational structures in a given set of concepts.

The SDA-M contains four steps: first, a special split procedure involving multiple sorting tasks delivers a distance scaling between the BACs of a suitably predetermined set; second, a hierarchical cluster analysis is used to transform the set of BACs into a hierarchical structure; third, a factor analysis reveals the dimensions in this structured set of BACs; fourth, the cluster solutions are tested for invariance within and between the groups (Schack; Mechsner, 2006).

For setting up the program with the tremendous help of Prof. Dr. Kai Essig, the description of each BAC created. It is a list with sequence description for each recipe where there is image_list[0] ... image_lis[15] followed by a comma an the description in " ", e.g. "Collect all ingredients for schnitzel" in the following example:

```
image_list[0] = new Image_item("split_data/landauer/schnitzel_1.jpg","Collect all ingredients for schnitzel");
image_list[1] = new Image_item("split_data/landauer/schnitzel_2.jpg","Prepare the cutting board and meat mallet aside");
image_list[2] = new Image_item("split_data/landauer/schnitzel_3.jpg","Tenderise the meat");
```

3.4. Documenting experiment issues

The project started in December 2018 and contained 4 stages of research: focus-groups selection (December-January), creating mixed media cooking learning materials based on existing solutions on the market (January-February), testing phase (March-April), analyses and development of the best practices for the effective digital learning of cooking (April).

During the experiment, certain problems occurred:

- Technical issues with remote access to SDA-M procedure
- Not understanding the task
- Not clear how to track the results
- Unpredictable cooking time
- Level of difficulty is too high

3.4.1 Studio cooking focus-group

In a first experiment, we analyzed how subjects clustered the 15 or 16 objects (depending on the recipe) by means of the SDA-M (Schack 2004; 2010). When performing Experiment 1 for the first time, subjects had to cluster the objects using the cooking frames. The images (JPEG) in the SDA-M were shown in color and they had a resolution of 500 x 333 pixels. This experiment took approximately 10 minutes each recipe.

The participants were seated in front of a computer or tablet or mobile device on whose screen they saw one of the 15 or 16 frames, which served as a reference object. The remaining objects were presented underneath the anchoring unit aligned along one column.

Each of these objects was presented and participants had to judge whether each one was "sequentially related" to the anchor object. If the participants decided these objects were sequentially related, they clicked on the button and the current object shifted to the right side of the screen (positive list). Otherwise, the participants clicked the left button and the object was shifted to the left side of the screen (negative list). This procedure repeated until all left objects were compared to the anchor object. Each object occupied the anchor position once.

Studio participants reported some errors with SDA-M testing link while trying to click the buttons. Most participants used mobile devices to go through the sorting procedure. The function of clicking back the frame has been discovered by 15% of participants only, little text instruction can be provided in the screen, as well as a final message at the end of testing. The task confused all participants, everybody got instructed again before starting the experiment. In kitchen studio experiment ingredients for cooking have been provided, which increased the chance to use less or extra ingredients by mistake.

Additionally, participants had all necessary tools, though the replacement of each tool has been suggested e.g. hand whisker, rolling pin. With guidance and assistance, all participants cooked each 3 meals.

3.4.2 Remote cooking focus-group

While cooking remotely, all occurring issues participants should solve themselves. First, the most difficult part of the problem was that links were not working because the web-page is not recognized as safe and a lot of browsers or antiviruses are blocking the functioning part of the website. Sometimes buttons are working for a short time and in 2 minutes the webpage “is frozen”. Android devices are working in most cases, as well as Safari browser on iPad.

The sorting procedure was not clear either for all remote participants. To explain the sorting procedure, personal instruction has been provided to everybody via social networks. The confusing part of the experiment is the equal size of 2 pictures on the screen – not clear, which picture is sorted and which is related. The suggested solution is to zoom the main picture. Due to the usage of kitchen machines and special equipment and unavailability of specific ingredients (e.g. corn flour) not all participants successfully cooked all meals.

In a given choice between the meals, the majority of participants selected easy to cook recipe of schnitzel or medium omelet.

4. Research results

20 participants in 2 groups have been involved in 3 cooking experiments each. Group 1 with 10 participants cooked in the studio with provided ingredients and instruments. Group 2 cooked remotely with their own kitchen equipment. After processing the participants' assignments file (see Appendix III) and placing interviews the capacity of learning impact analyzed and presented in the following chapter.

During the experiment participants successfully cook 41 meals, including 13 times cooking an omelet, 15 times schnitzel and 13 times tacos. Further illustrations are final pictures of the meals, sorted by learning material suggested to participants: stop-motion short video, long video, and 1 paragraph text instruction.

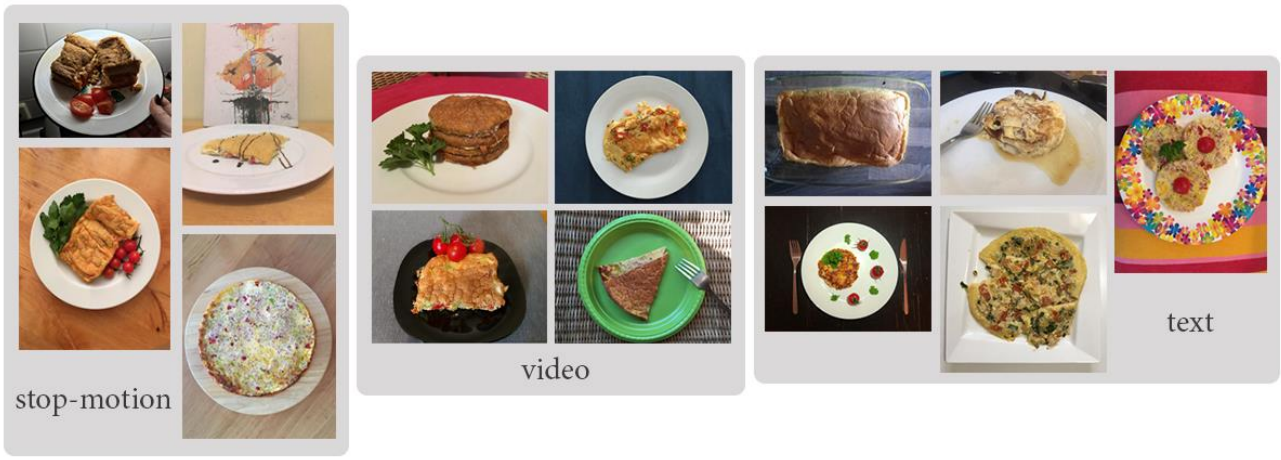


Figure 34 - Final omelet pictures, grouped according to learning material used

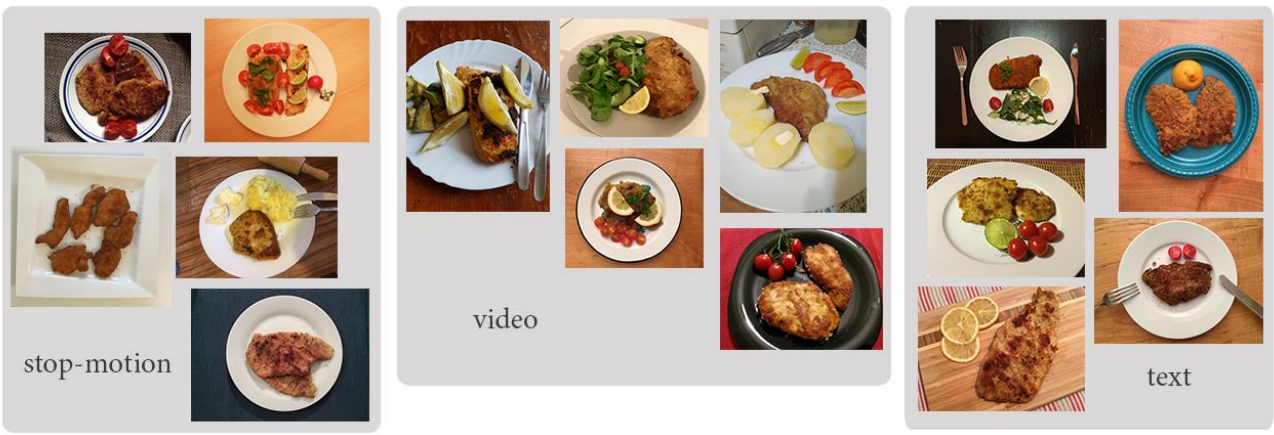


Figure 35 - Final schnitzel pictures, grouped according to learning material used

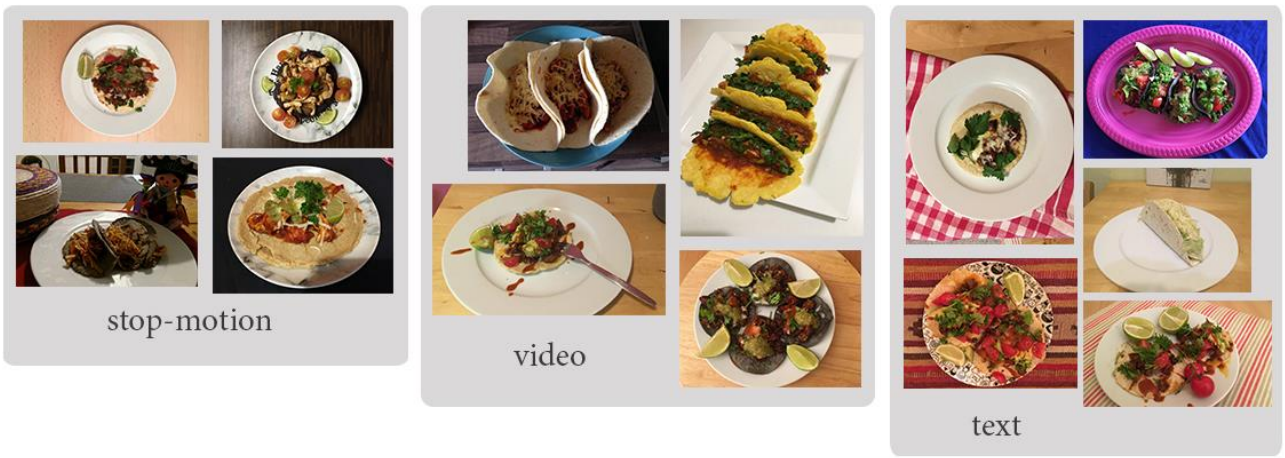


Figure 36 - Final tacos pictures, grouped according to learning material used

4.1 Data visualization

In order to compare the cognitive representation structures before and after cooking the (known and unknown) recipes, the dendrograms of all participants from the results of the first and second-time participants took a part in the research. When comparing the results of the cluster analysis, we can see clear differences in the clustering of the objects between the dendrograms computed before interaction with the objects and after the interaction.

Dissimilarity can be defined in terms of how “far” the instances are in space, based on a distance function. The quality of a cluster may be described by its diameter, the maximum distance between any two instances in the cluster. Centroid distance is an alternative measure of cluster quality that is defined as the average distance of each cluster instance from the cluster centroid (Shack, 2012).

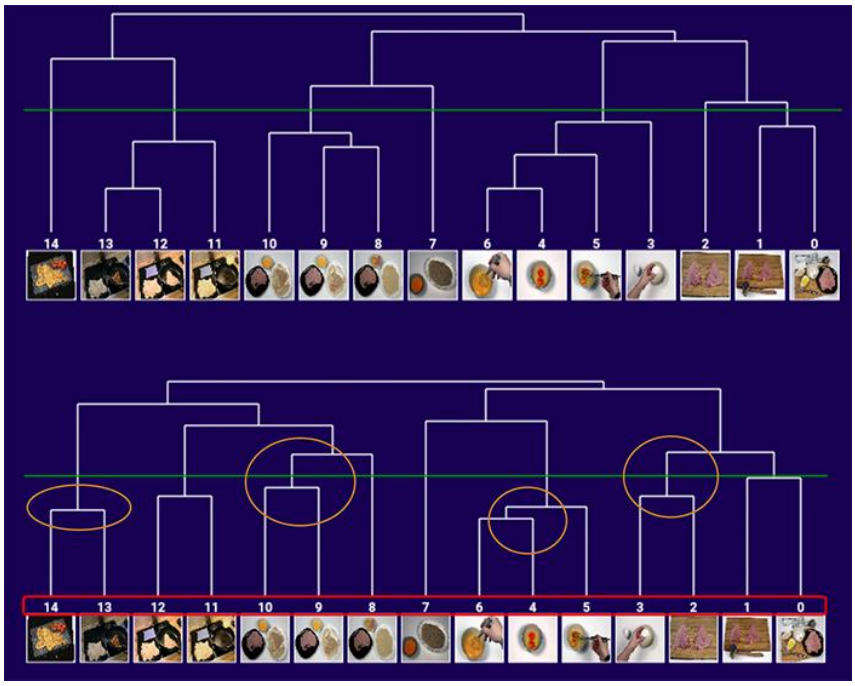


Figure 37 – Participant 11 SDA-M diagrams schnitzel

Participant 11 schnitzel diagram (see Figure 37) of data measured before and after the cooking with referent media long video. We can see that original knowledge of recipe is quite high, and clusterization is done right and the order of steps is correct in both cases. At the second diagram changed clusters are circled. Nevertheless, this result means that the learning capacity of the video is medium, and it helped to organize the existing knowledge and improve the cooking.

During the interview, the participant mentioned the pigeon mask at the video and did not show any Inattentional Blindness. The meal was cooked for 20 minutes and the video has been stopped and watched again for 3 times. Useful improvement will be detecting the name and quantity of used ingredients at the video. All processes were clear except heating temperature. After watching the video and cooking the eagerness of learning is growing according to Participant 11. The missing sound did not catch the attention and has been judged as a minus.

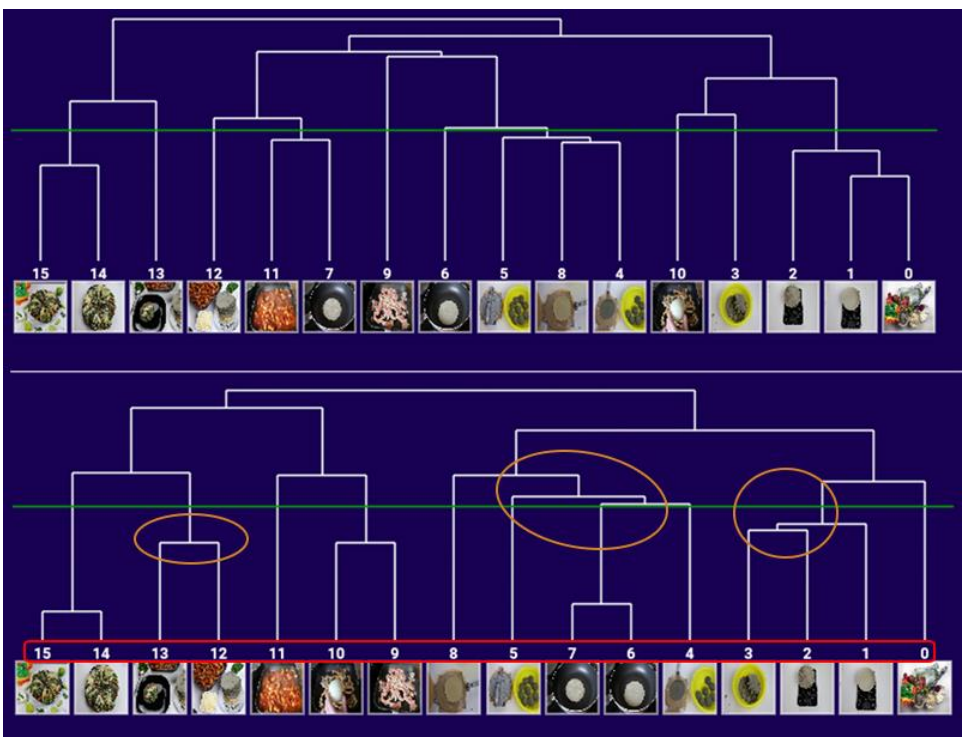


Figure 38 – Participant 11 SDA-M diagrams taco

Participant's taco dendrograms (see Figure 38) shows very similar results to schnitzel, level of difficulty did not decrease the ability to cook. In this case, the personal experience of Participant 11 a lot affected the learning impact and video has been watched only once. The meal took 120 minutes to be done and a missing point is the complete list of ingredients. The learning material used is a stop-motion video.

Figure 39 – Participant 1 SDA-M diagrams schnitzel

Participant 1 used stop-motion video as a learning material for the experiment. Above, at Figure 39 in 2 groups of frames with whisking the egg and frying the schnitzel clusters order did not change, but numbers of frames did. Steps of cooking became more clear. Participant watched video 5 times and felt motivated to cook more.

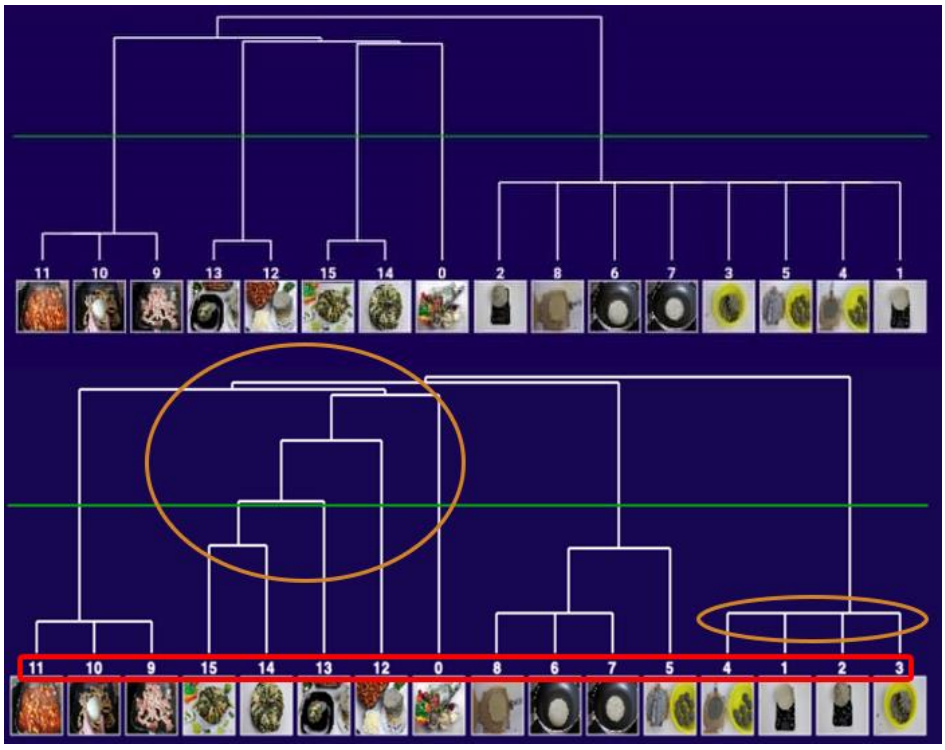


Figure 40 – Participant 1 SDA-M diagrams taco

Participant 1 used as a learning material text recipe, which was read twice and the learning material was clear; time of cooking was 80 minutes. Personal hobby affected the cooking process in terms of making the dough correctly. The hierarchy of clusterization changed after cooking, the changed segments are highlighted in orange circles in Figure 40.

Figure 41 – Participant 18 SDA-M diagrams schnitzel

Participant 18 has advanced cooking skills and used the long video as the learning material provided. Recipe video has been watched twice, cooking time was 40 minutes. Figure 41 illustrates changes in clusters organization after cooking, which are highlighted in red circles. According to the interview feedback, learning eagerness is not increasing, if you are familiar with the recipe.

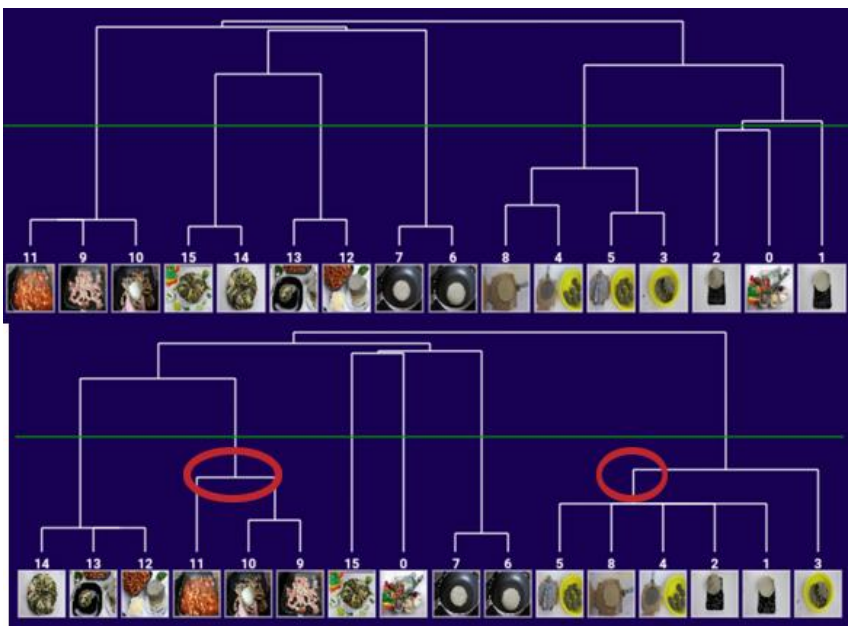


Figure 42 – Participant 13 SDA-M diagrams taco

Participant 13 watched stop-motion video as learning material. The diagram above (see Figure 42) shows changes in the clusterization process in red circles. Frames after cooking become better structured and order become more clear. It was easy to follow the recipe, even though the participant has never done tacos. To cook a taco from scratch, participant spent 40 minutes. During the cooking, the problem of too wet dough occurred and it will be useful to include it in the video instruction.

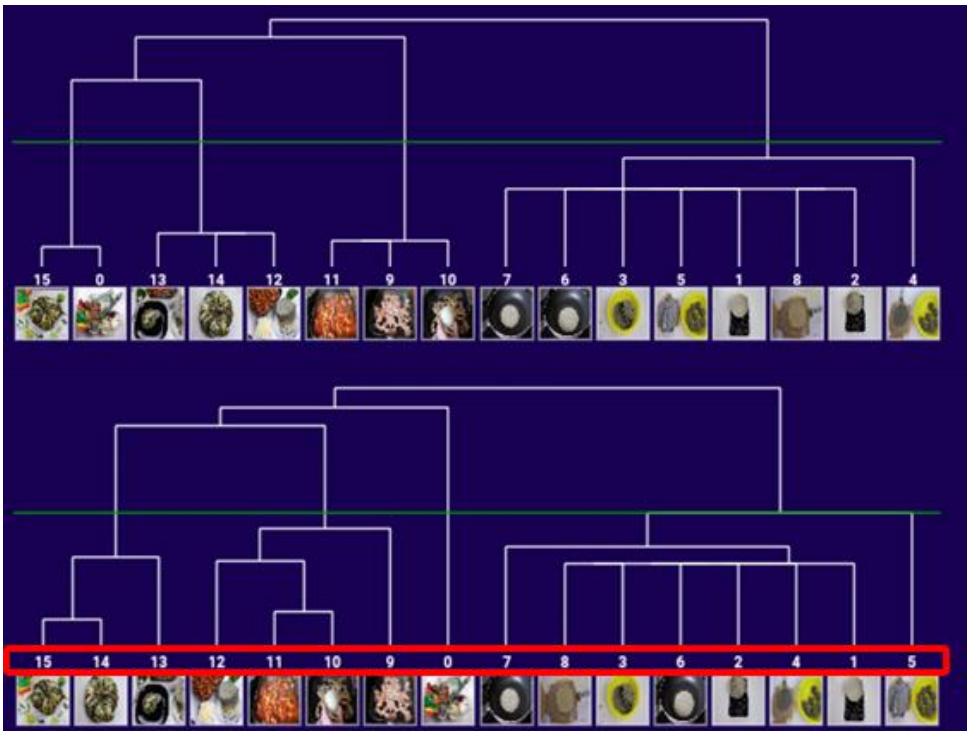


Figure 43 – Participant 4 SDA-M diagrams taco

To participant 4 it took 30 minutes to follow the stop-motion video which was watched 3 times. All steps, measurements, and instruction were clear. Video is increasing the eagerness to learn cooking. The only complain is about the speed of the video – it is too slow for Participant 4, who is a complete novice.

Summarizing all above, the individual clusters of BACs revealed that, in experts, the cooking steps were virtually always represented distinctly in the form of significantly separated partial trees. The individual clusters were rather similar between individuals. Significantly distinct subclusters could be seen in individual dendrograms of non-experienced cooks, though they were not as experienced as experts. In novices, significantly distinct subclusters were rare in comparison with experienced cooks. The structures of the clustering trees, which varied greatly between persons, revealed to clear sequences grouping principle.

Due to technical problems, all results for omelet have been accessible only as a matrix of numbers. As a way to creatively represent the clustering, Box and Whisker Plot or Box Plot diagram seems to be a convenient way to visualize groups of numerical data through quartiles. The straight lines coming from the box are called "mustache" and are used to indicate the degree of dispersion outside the upper and lower quartiles. Emissions are sometimes displayed as individual points on the same line as the mustache. Width diagrams can be arranged horizontally or vertically. Width diagrams are usually used in descriptive statistics and allow one or more datasets to be quickly examined graphically. Although this graph may seem primitive compared to a histogram or density graph, it has the advantage of saving space, which is especially useful when comparing distributions between large numbers of groups or datasets.

The types of observations that can be made from the mustache box diagram: whether the data is symmetrical or not and how densely grouped the data is. In a comparison of omelet cooking results, the difference between schemes is noticeable. The following diagrams have been created after transferring the data from cooking omelet SDA-M results into an Excel table with 15 rows and columns representing the steps of the experiment. Further figures are visual representations of the omelet cooking data from participants, presented with the usage of Box and Whisker diagram.

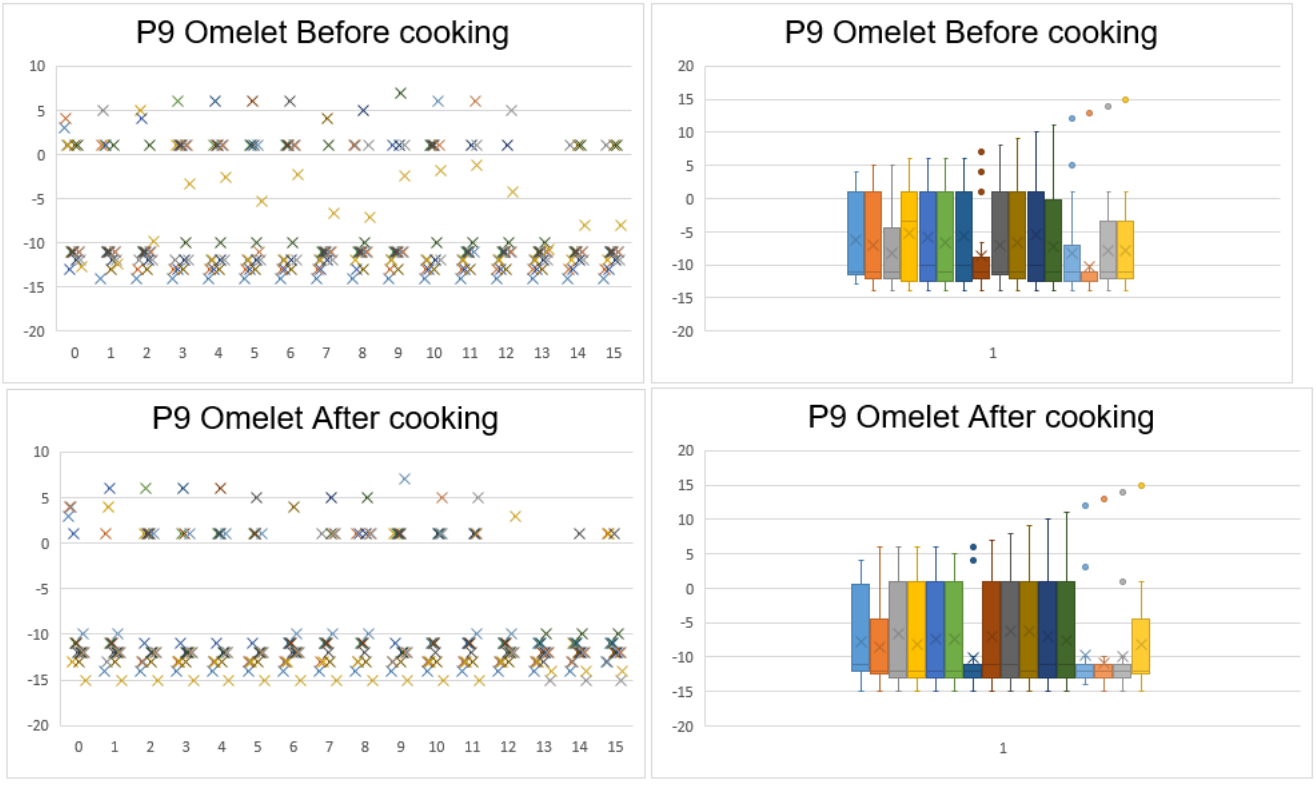


Figure 44 – Participant 9 SDA-M omelet data visual representation

Participant 9 used long video as learning material, watched 3 times and took 30 minutes to cook taco. It is increasing the eagerness of cooking, but it is helping to learn only partly. Used amounts are clear for experienced people, for others it may not be so easy to follow the steps. Watchers aren't prepared what they will see in the video. Participant 9 had to concentrate and focus because all steps appeared surprising. An overview of all ingredients and gadgets used can fix this problem. In the visual interpretation of SDA-M results in Figure 44, some differences in patterns are clearly noticeable. The difference is not that big, the meal was easy and changes after cooking in the graph are not radical.

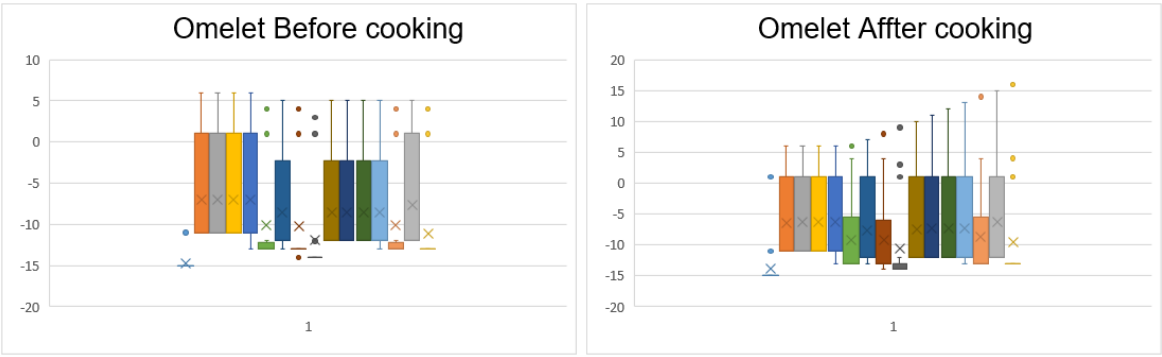


Figure 45 – Participant 13 SDA-M omelet data visual representation

Participant 13 cooked omelet with text learning material, it took 40 minutes and 6 watching times. Text is helping to learn but not increasing the eagerness to cook. Figure 45 is a creative visualization of the sorting procedure of participant 13 and it shows different clusters placement.

4.2 Analysis of learning ability capacity

After comparing the SDA-M results combined with the obtained knowledge about preferences, skills, cooking processes and struggles, the following conclusions were drawn:

- The best learning capacity has long **video** learning material, due to improving the results of SDA-M procedure combined with interview observations. Analyzing the appearance of sound in the video it can be testified that 40% of participants disliked the idea of missing sound among them 10% would prefer music playing, and other 30 would prefer audio instructions. 60% liked the absence of sound and they would be happy to learn cooking in silence and do not disturb other people.
- Stop-motion video can be slowed down, especially in cases of novices. Icon images help to understand the key points of instruction. Photography is stimulating people to decorate the plate.

- Text instructions are very clear, they should have as many details as possible, including tips and historical data.

After participants cooked with learning materials provided, they were more familiar with all objects and managed to cluster also the previously unknown objects into adequate clusters (shown by the clear clustering of the objects into functionality classes at Figures 37-43).

4.3 Discussions

The study demonstrates a correlation between the ability to learn and 3 types of learning media: text, video, and photo. The analysis of data confirms that the difference in experience between novices and experienced cooks improves the quality of learning materials, e.g. experienced person does not need to see pictures to understand how the finished meal should look. Even simple learning material like text can be enough to successfully cook the meal.

The results might suggest that the usage of sound is learning materials is necessary. However, based on the findings of similar studies, only 40% of research participants prefer sound, which can be entertaining music or a voice, reading measurements. The majority preferred video without any sound. 90% of participants noticed a pigeon mask in the video, which proves that watching learning video requires and gets very high attention to maximum details.

The media showed the highest learning impact is video and it is highly recommended to use it in learning. Photography is also helpful in learning, and text will work only in case of repeating the past experience.

4.4 Future work

Infographics of this research and list of the recommendations are helpful for learning content creators and the provided data can be used in the future development of services like cooking boxes, which is a rapidly growing sector on the German market. As shown in the Results chapter, integration of video in cooking templates will rapidly increase the learning impact.

As a suggested future concept of Augmented Reality cooking template, which contains all used technics, according to revealed effectivity of upgrading cooking skills. Smiles can be used as a hint and even for cataloging the database of recipes and improve search function. For developing AR and VR as a suggested programmatic language can be used Viro React.

The future concept may look like illustrated at the figure below, where recipe stages are described with emojis and presented as a photo of the video-frame, decoded behind:

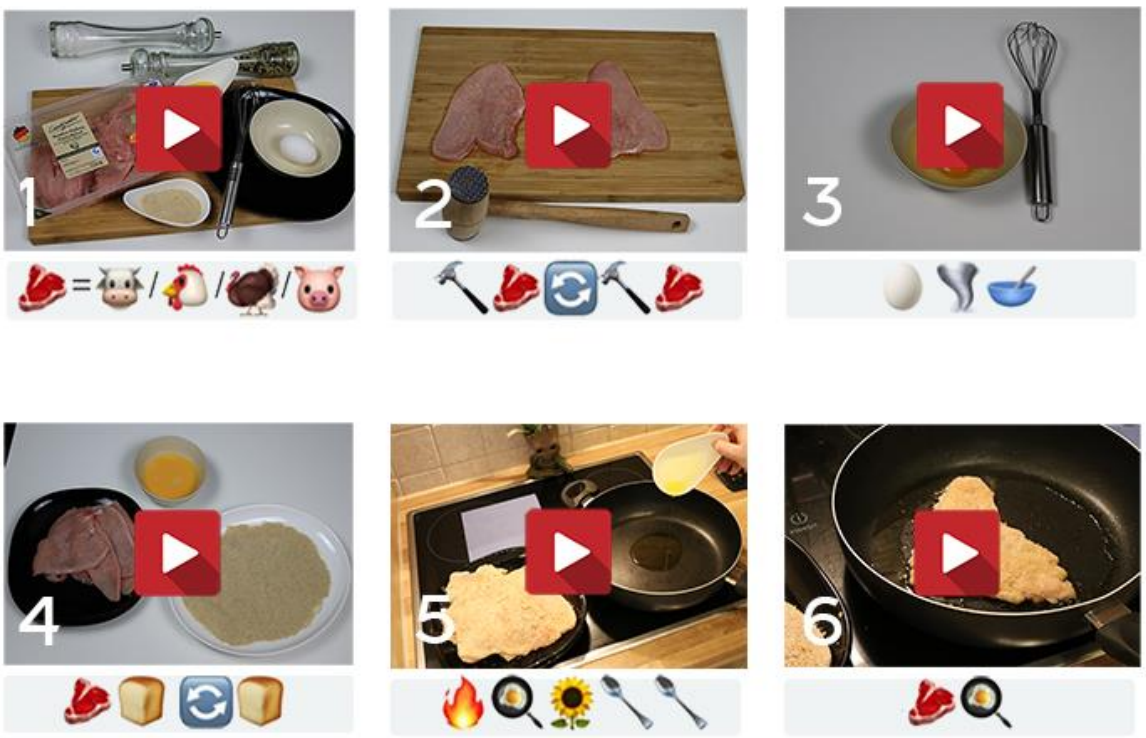


Figure 46 – AR learning template concept

The picture is working as an anchor and starts to play a video of a step in a loop. It is still possible to read the data and several pictures can be moving at the same time if they fir the screen. Smiles can be used as tags and recipes can be sorted in an emoji library.

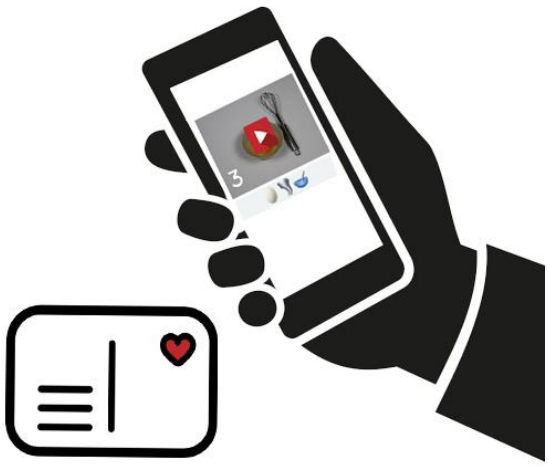


Figure 47 – working scheme of learning template concept

As a future concept and sustainable solution are to create one sheet of white paper or other material, which will work with an application and will be constantly renewed. In AR-mode the sheet will be activated via the app and it will show new recipes weekly, will basically work as a screen. The mechanics of the suggested process demonstrated in Figure 47.

5. Conclusion

The suggested complex of methods can be used in testing and evaluating learning materials for cooking in the future. In combination with other UX methods, interview and survey, SDA-M can be used to measure the difference in learning perception of the media. The best learning impact was showed by long educating videos, scrupulously illustrating steps.

These findings raise questions about the validity of survey research on learning to cook. This study relies on self-reported cross-sectional data, asking people to reflect back on their cooking acquisition and identify, in retrospect, the importance of various points in the life span.

The approach has been evaluated with a simple experiment in which participants did follow the sorting experiment before and after cooking with a learning material provided. The results clearly reveal differences in the mental representation structures for the objects in the long-term memory before and after the experiment. First, participants were not familiar with all recipes and clustered them according to happening process, picture descriptions or ingredient features. Later, after they cooked the meal, they became familiar with the frames – resulting in a higher number of objects clustered according to their sequence. Finally, the investigation of mental representations in the learning cooking revealed that applying SDA-M to appropriately determined BACs produces hierarchical clustering structures whose characteristics can be related systematically to performance on different levels of expertise.

These results reflect differences in the grouping of BACs in long-term memory and its determinants. Movement-related mental representations seem to be much better structured and adapted to functional and biomechanical demands in more experienced people compared with novices. Depending on the provided learning material and level of cooking experience the learning impact varies. For experienced cooks the learning material was equally useful – they were able to show for text instructions the same clustering experiment result as for long video. For novices, otherwise, the best and effective learning impact was showed by long video materials. Even people, cooked meal or similar meals at least once, are recognizing steps of recipes better than complete novices. Interviews reveal distinctions between people's automatic associations with learning to cook (i.e., tied to the schema) and their more detailed elaborations that reveal the importance of learning earlier in life.

If the suggested recommendations and experience can be considered while teaching anybody cooking, we will surely see the growth of video content development, the most desirable content on the market.

6. List of references

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7. Declaration of Authenticity

I, Alisa Gron, hereby declare that the work presented herein is my own work completed with- out the use of any aids other than those listed. Any material from other sources or works done by others has been given due acknowledgement and listed in the reference section. Sentences or parts of sentences quoted literally are marked as quotations; identification of other references with regard to the statement and scope of the work is quoted. The work presented herein has not been published or submitted elsewhere for assessment in the same or a similar form. I will retain a copy of this assignment until after the Board of Examiners has published the results, which I will make available on request.

8. Appendix materials

I. Survey questions
II. Participants instructions
III. Learning materials
IV. Interview questions

I. Survey questions

Q1 What is your age?

Q2 What is your sex?

Q3 What is the highest degree or level of school you have completed? If currently enrolled, the highest degree received.

Q4 Which of the following best describes your current relationship status?

Q5 Which of the following categories best describes your employment status?

Q6 Which race/ethnicity best describes you?

Q7 At what stage of your life did you learn most of your cooking skills?

Q8 I consider myself as Experienced in a day to day cookery

Q9 Do you use kitchen machines?

Q10 Do you follow recipes when cooking?

Q11 Do you plan meals ahead? (e.g. for the day/week ahead)

Q12 I feel limited by my lack of cooking knowledge.

Q13 I am comfortable preparing food.

Q14 Before I start cooking, I usually have a mental plan of all the steps I will need to complete.

Q15 I find cooking a very fulfilling activity.

Q16 For me, cooking is just something to get through as quickly as possible.

Q17 I enjoy cooking.

Q18 I wish that I had more time to plan meals.

Q19 I feel burdened by having to cook for other people, like my family or friends.

Q20 I want to know what things are on the food I eat.

Q21 How do you feel about being able to cook from basic ingredients?

Q22 How do you feel about following a simple recipe? Very confident

Q23 Would you taste foods that you have not eaten before?

Q24 How do you feel about ingredients pre-cut? Somewhat desirable

Q25 How confident you feel about preparing and cooking new foods and recipes?

Q26 How often do you eat takeaway foods or fast food which are ready to eat as your main meal (McDonald's, Döner, Sushi, Thai, Chinese etc.)?

Q27 How often do you eat in the restaurant as your main meal? (steak-house, pizza, pasta, curry, burgerhouse etc.)?

Q28 How good you are at each of the listed cooking skills? Please rate the following skills on a scale of 1 to 5, with 1 being poor and 5 being excellent.

Butcher foods (rabbit/poultry carcass, the whole fish etc.)

Blend foods to make them smooth, like soups or sauces' (using a blender/food processor etc.)

Boil food (cooking it in a pan of hot, boiling water)

Stew food (cooking it for a long time (usually more than an hour) in a liquid or sauce at a medium heat, not boiling) e.g. beef stew

Roast food in the oven (e.g. raw meat/chicken, fish, vegetables etc.)

Fry/stir-fry food in a frying pan/wok with oil or fat

Microwave food including heating ready-meals

Bake goods such as cakes, buns, cupcakes, scones, bread etc., using basic/raw ingredients or mixes

Chop/cut food

Prepare and cook raw meat/poultry

Prepare and cook raw fish

Make sauces and gravy from scratch (no ready-made jars, pastes or granules)

Use herbs and spices to flavor dishes

Q29 Where you find the recipes to follow?

Q30 Have you heard about or used following cooking boxes/food constructors?

Q31 Have you ever paid for recipes?

Q32 Can you eat the same food several days in a row?

Q33 What’s your favorite product?

Q34 I want to participate in student research

Q35 I want to contribute via Cooking on my own with provided assignment

Q36 I am interested in following recipes category: Soup. Chicken soup, borsch, cream-soup broccoli/cauliflower

Pasta. Carbonara, risotto with seafood/mushrooms, Bolognese

Vegetables. Ratatouille, Guacamole, Zucchini fried with garlic sauce

Fish. Salmon tar-tar, Tuna steak with ruccola and pear-orange sauce, leek-wrapped salmon

Meat. Beef stroganoff, Schnitzel, Picadillo, Veal Orloff,

Breakfast. Sandwich, tacos, pancakes, omelet,

Bonus challenge recipe: my granny's Napoleon cake

II. Participants instructions

Hereby is the letter sample, which each of participants received via e-mail or social networks.

“Dear participant, welcome to the cooking skills assessment!

Some time ago you filled the survey monkey form and subscribed to help me, Alisa Gron, to discover the learning capacity of different media in the field of cooking.

I am kindly asking you to follow my instructions in this research. Time is critically important for me to be able to compare the research results.

You will cook 3 times 3 different recipes which are schnitzel, taco, and omelet.

Right before and after the cooking you should go through sorting assignment called SDA-M. You need approx. 6 minutes to finish the each of SDA-M sorting assignments. During this assignment, you will be asked to sort pictures, representing each recipe. During task execution, you need to decide for each pair of actions representing cooking steps whether they are directly associated with the picture above or not. NB: please, repeat the sorting experiment not later than 24 hours after cooking each meal.

You will get access to learning materials, which varies for each participant and include just a simple text description and 2 types of videos: video of the cooking process and stop-motion.

Attached to this letter you will find a file with instructions and questions, which I will ask you to answer.

My great thanks for your help. If you have any questions, do not hesitate to contact me.
Please, keep in mind, that this request is a very urgent need. If you cannot do it the next 7 days, contact me immediately, please. You can just simply respond this letter or contact me any other comfortable for you way.
Alisa.”

III. Learning materials

1. Schnitzel

stop-motion video https://youtu.be/gzN7x96--Kw

long video https://www.youtube.com/watch?v=3EMjK3Acflo&t=2s

text

Take **400 grams** of tenderloin **meat**. You can take any type of meat, preferably in your daily menu. Classic wiener schnitzel is made from veal, diet menu presumes chicken or turkey, the German version is made from pork. Prepare breading – you can take **breading mixture** or make it yourself from flour and dry bread. Put meat on the wooden or plastic cutting board. Take a meat mallet and soft the meat by hitting it with a tenderizer from both sides. Take **2 eggs** and scramble them in a separate bowl. Pre-heat on a medium or high medium fire the pan. Put on it 2 tablespoons of **vegetable oil**. Take the meat cutlet, dip it in mixed eggs, then put it in the breading mixture, press, flip and put it in the pre-heated pan. Depends on meat selected, fry it in a pan from 3 to 6 minutes. Then flip the meat and fry it on the other side. Repeat the procedure with each piece of meat. Let cooked meat rest for 5 minutes. Add **salt** and **pepper** according to your taste. Serve with cut **lemon**.

2. Omelet

stop-motion video https://www.youtube.com/watch?v=0jk-7-xwauU

long video https://www.youtube.com/watch?v=kIS2fMScJ54&t=5s

text

Chop the **leek** and **shallot onion**. Fry **bacon** on medium heat for 3 minutes. Mix with onion and leek and fry for 4 minutes more. Break **4 eggs** and separate egg whites from egg yolks. Ad **100 ml of milk** to egg **yolks**, **salt**, and **pepper** and whisk it with the hand mixer. Use a mixer for whisking egg whites, until they will turn into a foam. Chop **fresh tomatoes**. Use the piece of **butter** to grease the glass throw to prevent sticking. Mix tomato with fried bacon, onion, and leek and distribute it at the bottom of the glass throw. Gently mix whipped whites and yolks in the same bowl. Place omelet mixture on the top of bacon and onion, gently distribute the foam across the tray. Bake omelet for 15 minutes in pre-heated to 200 Celsius degrees' oven. To serve it beautifully you can use the cooking ring and build a burger from cut layers of the omelet.

3. Tacos

stop-motion video https://youtu.be/Qfez7bEphs4

long video https://youtu.be/vIYgm6a5mG8

text

Take **300 grams** of pork or chicken **meat**. Prepare dough for tacos - sift **230 grams** of **corn flour** through a sieve and mix with **200 grams** of warm **water**. Knead the dough with your hands until

it falls into a large tight ball. If the dough is too dry, add some warm water. Divide the dough into 9-10 balls the size of a ping-pong ball. Use a Mexican tortilla press to flat tacos. Alternatively, you can use a rolling pin while flatting tacos or even a bottle. Put taco in a high-temperature pre-heat pan and wait for 3 minutes, then flip taco, and wait for another 3 minutes. Repeat the procedure with each taco. Prepare the stuffing for tacos: fry meat for 5 minutes for chicken and 10 minutes for pork at the medium heat, add chopped **onion** and **tomato sauce** and cook for 10 minutes more. Add **salt, pepper** and **chili powder**. Fill each taco with meat, fresh onion, **cilantro**. Place tacos tightly on a plate so that they do not fall apart. Sprinkle tacos on top with **grated mozzarella cheese**. Microwave tacos till cheese will melt. Serve with **lime** and **cream**.

IV. Interview questions list

Questions, marked with 1 are used with the long video, 2 with the stop-motion video, 3 with text.

1. Have you noticed something unusual? (1)
2. Have you noticed a pigeon mask? (1)
3. How long it took you to cook the meal? (1,2,3)
4. Was the process of chopping/cleaning clear? (1,2,3)
5. Was the process of mixing ingredients clear? (1,2,3)
6. Did you stop the video and re-watch some steps? (1,2)
7. How many times do you watch the video (1,2) / read the instructions? (3)
8. Did you like the fact that there is no sound? (1,2)
9. Do you think that this video (1,2) / text (3) is helping you to learn cooking?
10. How easy was it to follow the recipe? (1,2,3)
11. Can you repeat the meal without the learning material again? (1,2,3)
12. Did you understand the measurements? (1,2,3)
13. Did you understand the required heating temperature? (1,2,3)
14. Have you used extra sources (internet, asking to advise from friends, cooking books) to understand the recipe? (1,2,3)
15. How much your own cooking experience affected your process of cooking? (1,2,3)
16. Do you think that there is missing information? (1,2,3)
17. Is this recipe increasing the eagerness to learn cooking? (1,2,3)
18. What can be done to improve the video/instructions provided? (1,2,3)