eTryOn - Virtual try-ons of garments enabling novel human fashion interactions

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Abstract	This deliverable presents the analysis of the user requirements for the eTryOn applications, which were collected with the help of surveys and interviews. In more detail, the methodology for generating and distributing the questionnaires is presented, while the answers of the participating users are analysed both statistically and qualitatively.
Keywords	User requirements, survey, questionnaire, interview, piloting

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List of abbreviations and Acronyms

Abbreviation	Meaning
Q	Question
VR	Virtual Reality
AR	Augmented Reality
SM	Social Media
PM	Product Manager
TP	Tech-Pack
GM	Garment Maker
UI	User Interface

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1.   Executive summary

The Deliverable D6.1 shows how we set ourselves the task of finding out and defining the user requirements of the 3 apps in the eTryOn project. The actual usage scenarios will be determined based on this user requirement analysis.

This document shows the methodology for extracting the user requirements, including the structure of the different surveys / questionnaires used for the different eTryOn apps and an insight into an interview that was conducted with fashion designers to facilitate the best preparation of the survey questions to be distributed at scale. Moreover, this deliverable includes the qualitative and statistical analysis of the survey results as well as the findings that were drawn from them. This knowledge serves as the basis for the development of the three applications in this project.

The three applications which will be developed in the eTryOn project are:

- A creative fashion app, called the Designer App which is a VR application targeting fashion designers, facilitating them throughout the creative process of garment design by offering realistic fitting of the digital garments on photorealistic 3D avatars
- A social fashion app, called the DressMeUp App which is a mobile application for social media users (e.g. influencers), allowing them to virtually change their outfit in an image/video by selecting from a pool of digital garments and then upload it to social media
- An ecommerce fashion app, called the MagicMirror App which is a mobile-based AR magic mirror enabling virtual tryons of garments during online shopping that aims to recreate at home the experience of buying clothes from a physical store.

2.   Introduction

The aim of the D.6.1 is to pinpoint the user requirements for the three eTryOn applications. More specifically, eTryOn will develop three different applications for different target users; i) a VR application for the fashion designers (Designer app from now on), ii) a mobile application for fashion lovers (DressMeUp app from now on) and iii) a mobile AR application for online fashion shoppers (MagicMirror app from now on). In order to get relevant and useful user requirements, we have reached the end user base to get clear responses to questions such as, which is the target persona, what do they like to have, what is important to them, what are the chances for the acceptance of the applications, etc. The questions range from demographic background to the description of problems and functionality requirements.

For the first application, where the target audience is fashion designers, an interview with 2 designers from ODLO personnel was performed in order to get a clearer idea on what are the current practices in garment design and what are the problems they are facing and the shortcomings of their current workflow. This domain knowledge was used in order to identify the most important questions to pose to a larger scale of fashion designers via a questionnaire. The questionnaire was delivered to 22 fashion designers within and outside the consortium partners (ODLO, Puma, Otto group). Considering that most were open questions to get a variety of opinions and views, the responses were analysed in a qualitative way and their analysis is presented in the following sections.

Due to the obvious correlation between the DressMeUp and MagicMirror applications and because they both target the same end user group (fashion lovers can be consumers and vice versa, i.e. the general public), a single questionnaire for these two applications was formulated. For this, we have chosen the tool of digital surveys / questionnaires, which were distributed openly to anyone interested and disseminated to Mallzee's user base, ODLO's base of influencers, as well as social media and the employees of the consortium partners, resulting to 143 answers. Due to the expected large scale of answers, we used closed questions and we applied statistical analysis to get the results.

3.   Questionnaire for the Designer App

The Designer App is a VR application targeting fashion designers, facilitating them throughout the creative process of garment design by offering realistic fitting of the digital garments on photorealistic 3D avatars.

3.1   Focus group

This focus group is very clear and small and targets designers in the fashion and sports industry. We have focused on the designers who work for Odlo, Puma and Otto group. Also, the pool of freelancers of the two main 3D design software providers Browzwear and Clo3d have got an invite for answering the survey.

Before we define how the questionnaire for the designer app should be built up, we decided to have a one-hour interview with two Designers from Odlo to get a first insight about the current design workflow, as well as the problems the designers are currently facing. In summary they mentioned several times, that sketching and finding first design ideas and silhouettes in 3D is slow, counter-intuitive and time consuming, because 3D garments are based on actual patterns which the designer does not necessarily have in the beginning of the design phase. The largest challenge is creating totally new designs without having any already existing base of a similar style or base pattern. This gives them the feeling of being restricted and dependent on patterns, where they do not have knowledge about. In general, while in the design phase the quality and accuracy of the 3D garment does not need to be super high, fastness and flexibility are much more important. High quality and true to life visuals are unavoidable when it comes to presentation for Sales/ Marketing and of course for E-commerce. In all their presentations, they never show their designs on avatars, because the avatars are not realistic enough and people judge the avatar instead of the garment. They present ghost shots, so that the whole focus is only on the garment. It can be a benefit to show the 3D garment in dynamic poses, but then these poses have to be accurate and reproduce the exact pose of real human. Also VR can help in convincing sales people for a prototype. However, if a new designer application is too time-consuming and not intuitive to handle, it won`t be used by designers, since the time is rather important and the timeline for a production is limited and defined.

Based on this interview we have defined the questionnaire for the designer app.

3.2   Interview partners

The first interview partner was a Designer for the Categories of Outdoor Performance and Nordics at Odlo. For this, she designs a lot of complex puffy garments and multilayer clothes. She has worked in Lotta and Vstitcher from Browzwear for about one year.

The second interview partner was a Designer for the Category of Running, Underwear and Nordics at Odlo. He designs a wide range of products, from one-layer pieces to multilayer and puffy garments. He is also working in Lotta and Vstitcher from Browzwear for a bit longer than one year.

The Interview was planned to give us a base on how we could build the questionnaires for the designers. It did confirm to us that we will keep the designer questionnaire with open questions, to not restrict their answers and really get their open opinion. Even knowing, that it will be much more time consuming to evaluate later on.

3.3 Structure of the questionnaire

For this questionnaire we expected less answers, as the focus group is much smaller, and in order to get a variety of answers and allow the designers to provide us with ideas on how to best create an app for them we chose to use open questions.

Based on the interview with the two designers, we decided to ask the following ten questions:

1. How long have you been using 3D design software (e.g. Browzwear, CLO3D, Optitex)?

0 years / 1-2years / 2-4 years / 4-6 years / more than 6 years

This question is to find out how experienced the Designers, who are answering the questionnaire, are. Did they just start the journey of 3D? Or they are already trained and have a certain routine using 3D design tools?

2. What are you trying to accomplish at work when using 3D design software? Please list the top 3 most important activities.

Answer text

This question is to find out what the most important activities, for which the designers are using 3D software at work, are.

3. Let`s pick the most important activity from the question before. How often do you need to complete this activity?

Answer text

This question is to find out how often they have to complete this important activity in 3D. Is this something which happens several times per day, or per week?

4. How did you use the 3D design software when you last completed this activity?

Answer text

This question is to find out how the designer works in the 3D software.

5. Did you encounter any frustrations or limitations with the 3D software? If yes please specify.

Answer text

This question is to find out if the 3D software, the designer is currently using, does not fulfil all the expectations and functionalities the designer would like to have.

6. Can you think of functionality from any other software or previous experiences which you think would be helpful to you? Please list as many ideas as you can think of!

Answer text

This question is to find out if the designer knows functionalities from other software or tools which are extremely powerful and helpful for their work and are missing in the 3D software they are currently using.

7. Have you ever used Virtual Reality (VR) or Augmented Reality (AR) applications?

Yes / No and I wouldn`t / No and I would like to try

This question is to find out if the designer has already experience in VR or AR technologies and if they are interested in it and open to try it out.

8. Can you think of any problems in your current process that could be helped with AR or VR? This could be either during the design process itself, or sharing designs (within your team or outside).

Answer text

This question is to find out if the designer already knows or has an idea where in their workflow AR or VR could be a huge help. Do they see a potential use there?

9. How important is animation (seeing the avatar move) to your work? And if you don`t currently use animation, what problems could it help with when designing in the future?

Answer text

This question is to find out if the designer has already experienced the power of animation and if they see a potential in using it.

10. Would it help your design process if you were able to receive end consumer feedback at certain points during design? For example, if the AR/VR application was able to show consumer reaction to early designs.

Yes it would help / No it would not help / I do not know

This last question is to find out if the application could improve the designing process while the communication with the consumer could be better and earlier

3.4   Framework conditions for questionnaire

The questionnaire for the Designers app was sent to more than 200 Designers and Freelancers. After waiting for 2 weeks for responses we were able to get 22 answers.

3.5   Summary of the results of the questionnaire

Here you can find the answers from the 22 Designers. We have only a few missing answers, for which, either the participant did not understand the question or he/she did not answer because of other unknown reasons. For the analysis, qualitative analysis was employed. The individual answers were summarized, sorted and categorized under topics. In each one of the topics, we created subcategories in order to create a more clear and precise analysis. With the help of the resulting structure and overview, a more precise statement could be made. A challenge originated from the fact that some answers were not clear and there was ambiguity on the meaning. Except for three questions all the other questions are open and this resulted to a wide variety of answers, as expected. As a solution for these very diversative answers, we have worked with sticky notes and tried to cluster the answers in semantically related topics. When the sticky notes are not presented, it means that the answers were very similar. Moreover, if a topic/category has many different subcategories, we present them in a pie chart, along with the frequency of each (sub)category. Finally, given the very small sample size (only 22 designers), any statistical test will not give valuable conclusions. Therefore, we preferred to use only qualitative analysis.

1. Q1: How long have you been using 3D design software (e.g. Browzwear, CLO3D, Optitex)?

How long have you been using 3D design software (e.g. Browzwear, CLO3D, Optitex)?
22 Antworten
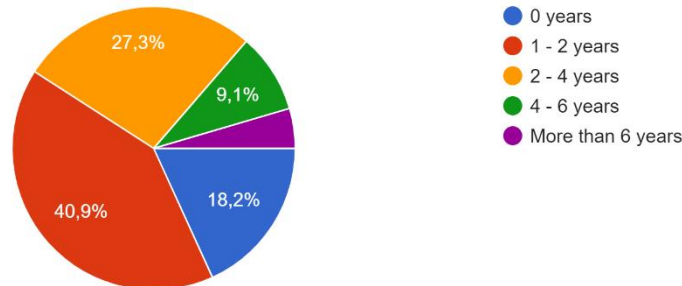
The majority of Designers have used 3D design software between 1 - 6 years (77,3%/17 participants). Only 4.5% has longer than 6 years of experience in it, which shows that designing in 3D is a rather recent achievement. Almost a fifth (18.2%) does not even work with 3D design software for a full year.

2. Q2: What are you trying to accomplish at work when using 3D design software? Please list the top 3 most important activities.

What are you trying to accomplish at work when using 3D design software? Please list the top 3 most important activities
Number of answers:58
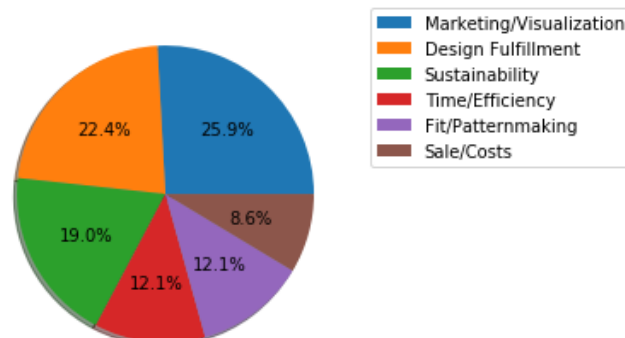
Out of all the answers we were able to define 6 main categories which the participants are trying to accomplish at work. In total, we would expect 66 activity answers (22 participants multiplied with 3 activities), but out of their answers we were able to define 58 activity answers which are most important for them. Not all participants have listed three activities; some have only one or two which they have noted down. A pie chart is included for analysing a category in subcategories only when it is needed.

Therefore, it seems that the designers are more interested in being capable of trying their ideas in a different manner and achieving better visualizations and designs rather than reducing the cost or the time efficiency. It should be mentioned though that some of the answers and the topics may overlap to each other. For example, it can be the case that a better visualization may lead to the increase of the sales (without the designer stating that in his/her answer)

Let`s have a deeper look into the 6 categories to better understand what the designers have replied.

3. Category: Marketing / Visualization

create salesmen pictures	obtain renders	easier visualization of my design ideas	realistic representation of the outfit	realistic view	present realistic designs which could be produced	High end visualization
creative material for marketing	create attractive marketing content for fashion industry	Better presentation	the garment real outlook and draping. the fabric texture, color accuracy	To show realistic design sketch to cross functional teams	Create realistic garments	expression of textile character

very interesting way to showcase your designs

This is the most important Category for desingers (15 answers). They want to achieve more realistic looking designs which can be directly used for marketing purposes. Better looking visuals gets also better sales and reduces costs by for example not spending money for extra photoshootings. As already mentioned above, it could be the case that the designers mentioned "having realistic looking desing" is important to them without further down noting that this could increase the sales. Visualised on the sticky notes, we can see the different answers from the designers which we combined in the Marketing/Visualization category.

4. Category: Design Fulfilment

Subcategory of Question 2: Design Fulfillment
Number of answers:13

Legend:
- Expression of creativity
- Technical 3D product design
- Test new designs
- Design communication & desicion

38.5%
23.1%
15.4%
23.1%
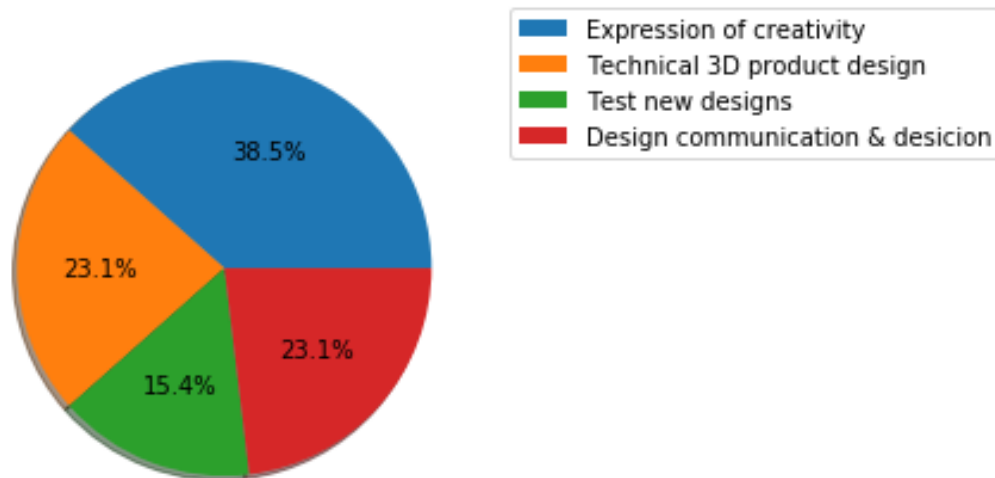
This is the second most important category for the designers and a very important for us to understand what the designers like when they feel their full power of creativity and design freedom. If we understand this category it is a massive help for our application to be really appreciated by the designers. There are a lot of different answers in this topic, which we tried to cluster into 4 different subcategories. The majority of the designers believe that a 3D software will help them increase their creativity and create something that will be presented in a realistic manner. On the other hand, in this subcategory, we have only 13 answers in total, which is a very low number to help us make concrete conclusions.

5. Here you can see the different answers from the Designers (presents in the same color as the categories in the pie chart).

Body/scale design for esthetic	try and do something miraculous and interesting to me	naturalness based on gravity	Harmony of analog skills(pattern, design, process) and digital technologies	Technical Design	to test my ideas/colors/shapes with a more realistic approach before finalising the design	design lines visibility	decide in real time the final look of the garment
express my creativity	I want to express my ideas and meet my personal requirements		better 360° product design with a help of designing directly on a 3D human body		test new design ideas	Design ideas communication	

6. Category: Sustainability

Reduce waste of fabrics	eliminate need to make physical samples	Reduce waste, avoiding devepment of several samples	prototypes	zero waste	More sustainability
less samples	Reduce the quantity of same style sample making	reduce waste made by creating proto samples	reduce prototypes	Reduce the sampling and waste of fabrics	
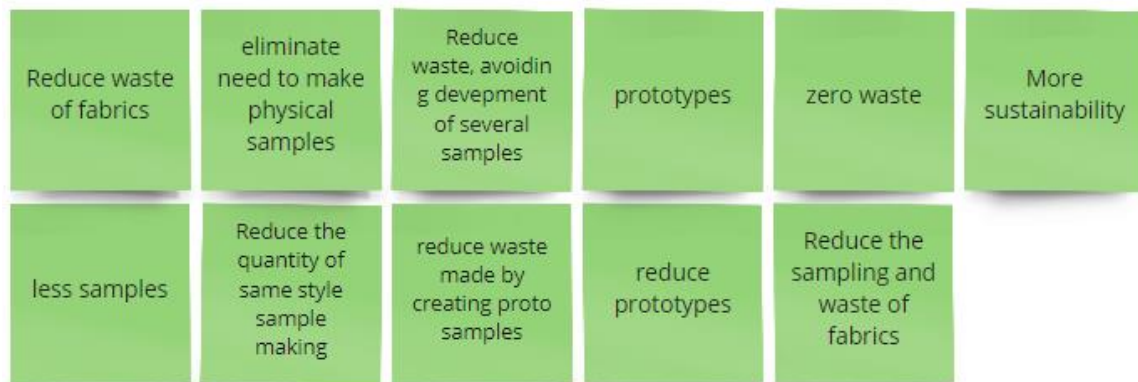
With this being the third most important category, it clearly shows that designers also care about the sustainability (11 answers out of 22 designers). The majority of them wants to reduce the waste of fabrics or samples they create. This can be also seen as reducing the cost though, because if they do not need physical fabrics/samples they will reduce their expenses as well. The sticky notes show the answers from the particpants which we clustered in the Sustainability category.

7. Category: Time / Efficiency

Preview the differences between similar styles in virtual way	More lean process	Reduce time, avoiding devepment of several samples	efficient designs
Reduce time	fast designs	shorten the design cycle	
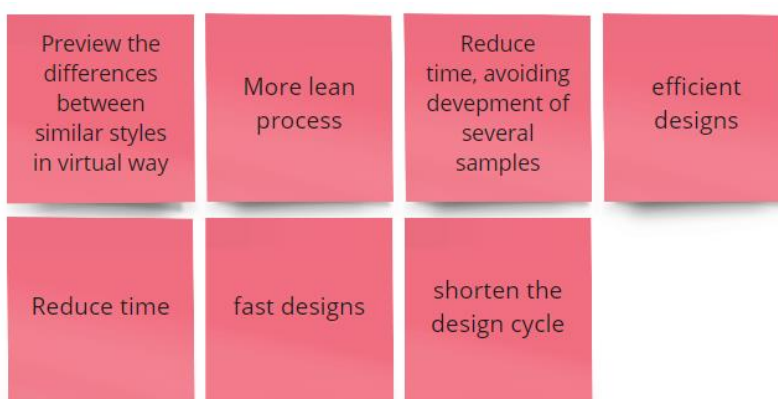
In this category the answers were very similar and for that reason we are not presenting them in a separate pie chart. More efficient designs means a reduction of time in the design process, which is also more cost-effective. As you can see on the sticky notes the answers are very similar.

8. Category: Fit / Patternmaking

manipulating pattern	Accurate flat pattern	See how the fitting goes with slightly pattern changes	Fit education / fit values
optimize pattern	more accurate patternmaking	test fit	
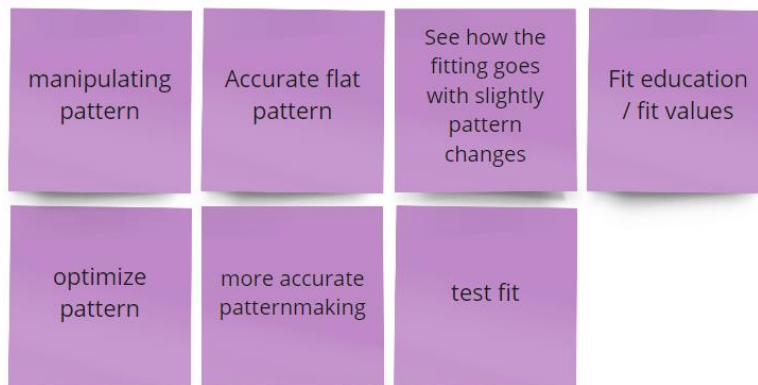
Most of the designers do not have pattern knowledge, these answers could come from designers who could have experience in pattern making as well, because of previous studies or jobs. As most of the designers don`t have this experience it is not a surprise that this category does not appear many times.

9. Category: Sale / Costs

create digital clothes for sale	Better Sale	Reduce cost	cheap designs	zero cost
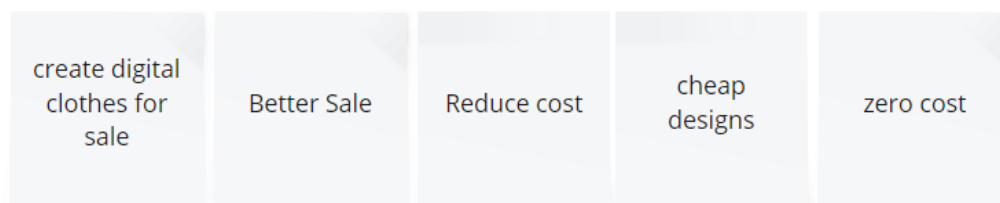
The less mentioned category for designers is about costs and sale. In this category we can see that the designers believe that a 3D software will help them from a financial perspective (either by reducing the cost of the procedure or by increasing the sales of their products). But as mentioned twice already we should not underestimate this topic about costs as the most important topics can indirectly leed to better sales and less costs.

10. Q3: Let`s pick the most important activity from the question before. How often do you need to complete this activity?

Let's pick the most important activity from the question before. How often do you need to complete this activity?
Number of answers:16

Legend: Every Day, Weekly, Occasionally

62.5%
18.8%
18.8%

In this question we were able to categorize the answers into three main categories. Also, here not all participants have written down an answer which made sense. We got 16 answers which we were able to fit in a category.

Clearly showing here that 62,5% are using the 3D design software every day to complete their most important activity. Weekly and occasionally working with 3D to complete their main activity are 37,5%.

A limitation here though is that we do not know in which activity they are referring to in order to further comment on that.

11. Q4: How did you use the 3D design software when you last completed this activity?

For this question we got 20 answers. Two participants abstained from answering. We could define four categories out of all the answers. The answers which were ambiguous or not relevant to the question, were not considered during the evaluation. Therefore, we took only 16 answers into consideration for our analysis.

The answers are balanced and there is no strong tendency in any particular direction. It is a bit surprising that only 3 (18.8%) answers are about taking design decisions. Also, the fact that 4 answers are about pattern creation is surprising, since it is mostly the job of a pattern maker than a designer. We could ask ourselves if with the use of the 3D software, the work has shifted and more designers are also interested in creating patterns as these are necessary for the base of every 3D created garment.

Again, in this case the answers are similarly distributed, which means that all of the above topics are considered to be important for the designers. Once again though, we are not aware of the specific activity that each designer is referring to, which makes it impossible to get additional insights. Moreover, the sample is too small to make any concrete statistical conclusion.

Let's have a deeper look into the 4 categories to better understand what the designers have replied specifically.

12. Category: Garment Creation

| modified garment in VS | create garment in VS | create garment in CLO | create entire capsule collection | made garment |

In this category, the designers are using different software to create and modify their garment, but only three out of five named the software (VS (Vstitcher): 2 and CLO:1).

13. Category: Rendering

| render images | rendered it in Blender | rendering | renders |
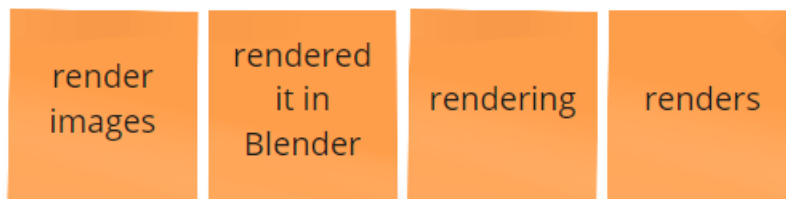
Creating renders seems to be important but only one designer has mentioned with what software he/ she achieves the render (Blender).

14. Category: Pattern Creation

| drawing flat pattern in software | made patterns in 3d software | making pattern tests/ adjustments | creating first pattern |
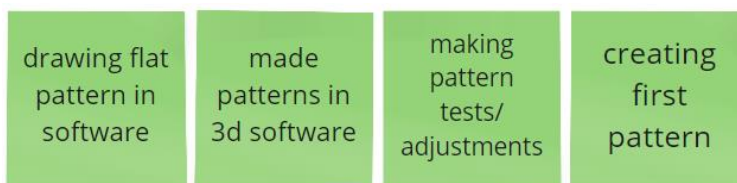
Here creating first patterns was mentioned several times (means probably first draft of a pattern, as most of the desingers don`t have pattern skills) and also making pattern adjustments (this could be the answer of a technical designer who has slight pattern making experience. But normally the patterns created from design in the 3D software need to be reworked from a professional pattern maker and after that they can be used for production.

15. Category: Design Decision

| making design decisions | checking graphics/ prints positioning | checking on different colors |
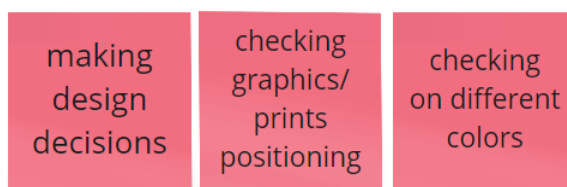
In this category the designers have mentioned the following points: checking graphics, print positions, and checking colours. We can assume that these are the most common things they check on the 3D garment and take decisions on it.

16. Q5: Did you encounter any frustrations or limitation with the 3D software? If yes please specify

Did you encounter any frustrations or limitation with the 3D software? If yes please specify
Number of answers:40
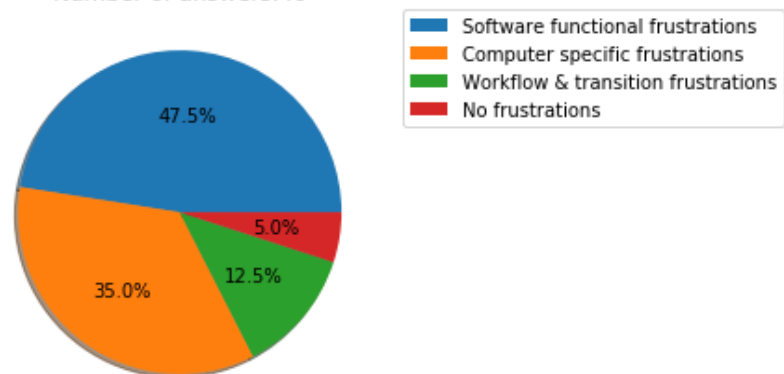
Here we got in total 40 points mentioned and these can be clustered into four main topics. Given the fact that we asked 22 designers, the majority of them gave more than one frustration/limitation.

It is not easy to get strong conclusions from these free-text answers, but given the final clustering we can say that the majority of the designers are having problems with specific functionalities of the software they use (almost 50%). This is a great insight, because we can explore these functionalities in the mentioned software and adjust our application to the designers' requirements. Moreover, 35% of them have faced computer specific frustrations, given the fact that most of the 3D software are computationally heavy and the designers may not have the computer power to work with them. This is a challenging problem to solve, but it should be taken into consideration when we are building the application. In summary, it can be said, that the designers need better functionalities aligned with less computational requirements rather than workflow and transition functionalities.

Let's have a deeper look into the 4 categories to better understand what the designers could have meant.

17. Category: Software functional frustrations
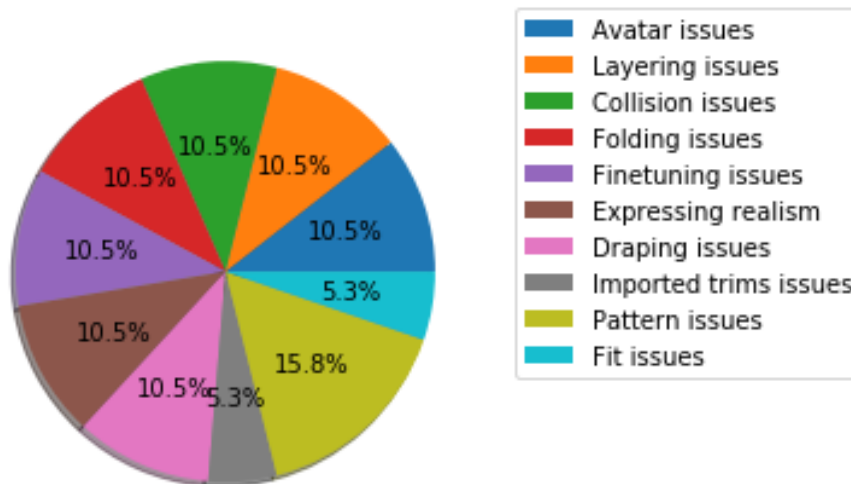
This is a crucial question in order to see what problems the designers faced in similar applications and try to solve them in ours. It seems that a lot of participants (almost 50%, as you can see in the pie plot from the last page of Q5) have problems regarding the software functionalities. In general though, we can see that all the issues mentioned from the designers are equally distributed. Given that we have different answers in these subcategories, it is hard to make a specific conclusion, but we can observe that many of the participants complained about the functionalities of the software regarding the visualization and fitting of the clothes (such as "difficult to make folds", "does not drape as required", "layering", etc. This is consistent with previous questions, which the designers answered that visualization is very important activity for them.

18. Category: Computer specific frustrations
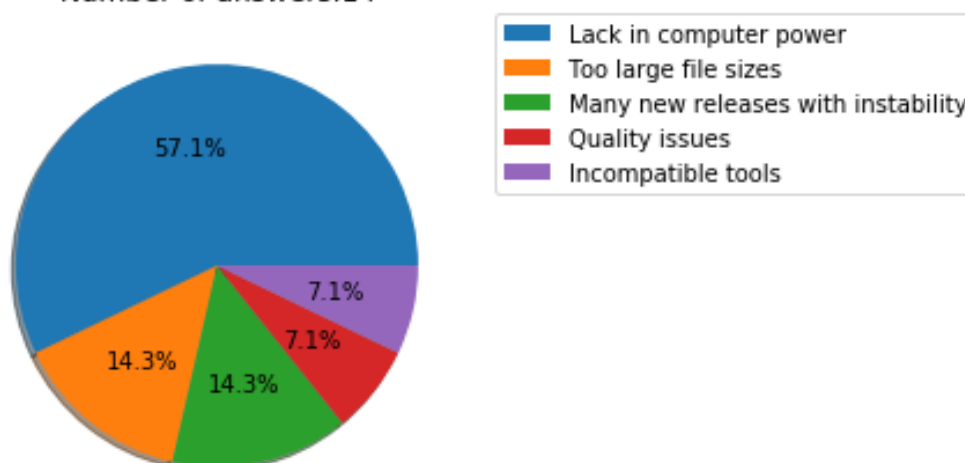
It is known that this kind of software is computationally expensive. This is verified from this question as well. We should consider that while formulating our application and be aware that not all of the designers have computers with high specifications.

It could be the case that the program is slow due to low computer specifications. In any case, we should consider that designers care about speed.

19. Category: Workflow & Transition Frustrations
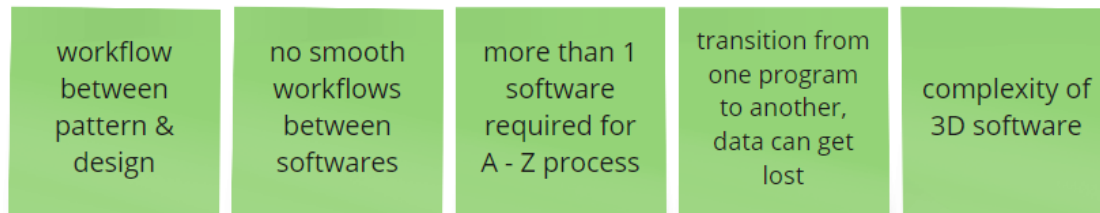
In this category we can observe that the designer process requires more than one software in order to compete the designers' task. Different Software for rendering, software for trim creation, software for building 3d garment, software for animation, software for material creation etc. Therefore, this made the procedure hard and complex for them. **It is worth noting that this problem was intensely mentioned by the two designers during the interview**.

Q6: Can you think of functionality from any other software or previous experiences which you think would be helpful to you? Please list as many ideas as you can think of!

Given the answers we got, it seems that this question was not so clear to the participants. There were a lot of "No" or "-" answers. Therefore, we decided not to include them in the analysis. The majority of the participants just mentioned a software that they have used without any specific functionality. For that reason, we decided to split the analysis into two parts. One for mentioning the software that is used from the designers and one for the functionalities that they stated (with or without a specific software).

Mentioned software`s:

Adobe (3)

DAZ (2)

UVs in Marvrus (1)

Marvelous Designer (1)

Rhino (1)

Z-Brush (1)

Max (1)

Maya (1)

Lectra (1)

Polytropon (1)

Regarding the software, we can see that the number of different software mentioned is quite wide, coinciding with the previously mentioned problem of needing to use too many software suites for achieving their objective.

Mentioned functionalities:

Pen functionality (2)

Better rendering (2)

Improving options of shader (1)

Texture application like creases from any sculpting program (1)

Layer function (1)

Avatar posing (1)

Marker making (1)

Grading function (1)

Better user interface (1)

Regarding the functionalities of these software, there are not many insights. Except for the "pen functionality", the "better rendering" also occurred more than once. But still this is not enough for concrete conclusions. For more functionalities, it may be useful to check the specific software that the designers included in their answers. For example, given that the participants gave a range of functionalities, it may be useful to see if these functionalities exist in the main-voted software such as DAZ or adobe. That will help us to fulfil all the requirements of the participants.

20. Q7: Have you ever used Virtual Reality (VR) or Augmented Reality (AR) application?

Have you ever used Virtual Reality (VR) or Augmented Reality (AR) applications?
20 Antworten
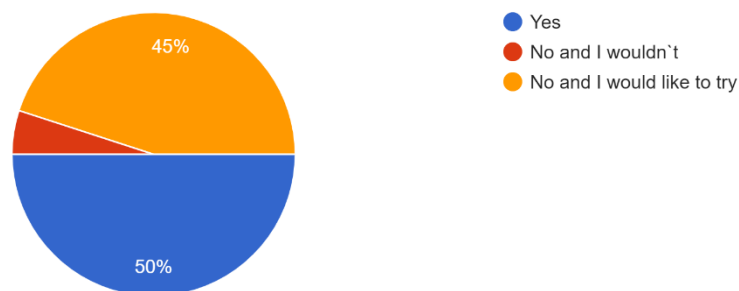
It is clearly shown that VR and AR have been used before from a lot of the participants (50%), while for those who haven`t, they are strongly interested in trying it out (45%). Only a small percentage of 5% doesn`t want to try it. This gives us a strong idea about the acceptance and interest of VR and AR which is very good for the eTryOn project.

21. Q8: Can you think of any problems in your current process that could be helped with AR or VR? This could be either during the design process itself, or sharing designs (within your team or outside).

Can you think of any problems in your current process that could be helped with AR or VR?
Number of answers:16
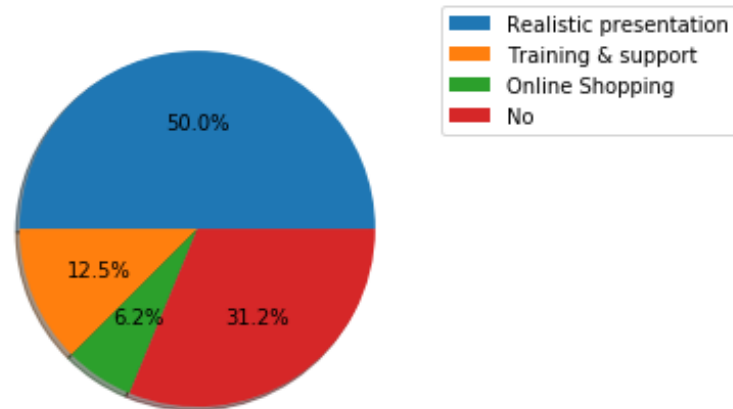
In this question, they were 16 participants whose answers are related to the question. Half of them believe that AR/VR will give them the chance to create more realistic presentations. This is quite important insight for our application (too small sample size to make a statistical test though).

There were three participants, who did not really mention any specific process, but they proposed a AR/VR application. We excluded them from the categories, but we added their answers because their suggestions may be useful.

3 designers have suggested an AR or VR application which they already use:

22. Suggestion of AR or VR applications from the Designers
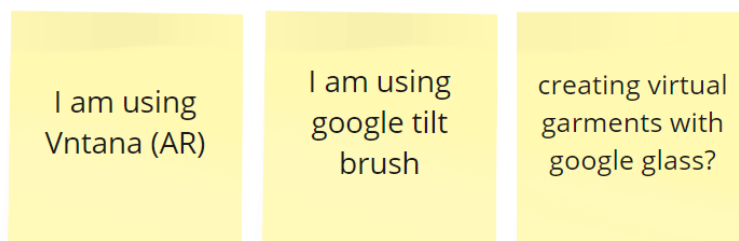
The suggestions provided from the designers are interesting and it may be usefull to explore them as individuals in order to add some of their functionalities in our application.

23. Category: Realistic presenting

sharing designs - jpg has his limitation	interactive way of presenting	realistic movement	display new graphics with AR
great potential of presenting interactive designs	3D presentation of designs	3D could help consumer understanding about fit	seeing design sketch in real scale in VR
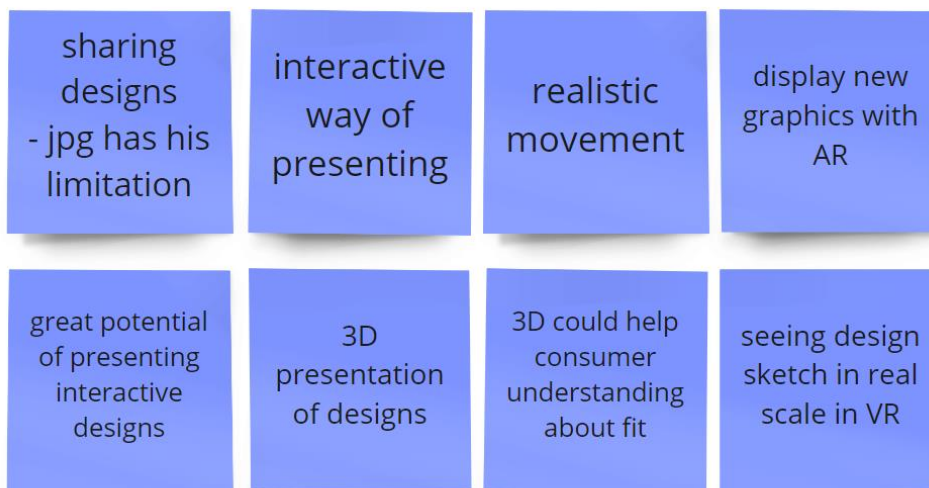
The above sticky notes show the answers which have been clustered as "realistic presentation". As can be seen, there are all about realistic and interactive presenting.

24. Category: Training & Support

training	support

In this category the participants think that training by using 3D software or any other way of support 3D software users can be done in a better manner while using VR or AR.

25. Category: Online Shopping

adapting VR or AR for online shopping?
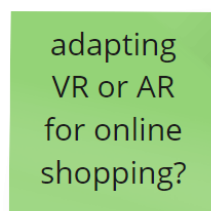
One designer thought outside of their design workflow, and proposed that VR or AR can lead to a better online shopping experience.

26. Category: No

A quite big number of participants (31.2% or 5 out of 16) answered that they cannot think of any problem in their current process that can be solved with AR/VR. The limitation here is that we cannot connect these answers with any other question in order to see if these answers mean that designers are not aware of the AR/VR functionalities or there is another reason for which they answered "No".

In the next question 9 we actually have two questions here. For better evaluation of each question we split the answers to have one analysis for each question.

27. Q9: How important is animation (seeing the avatars move) to your work?
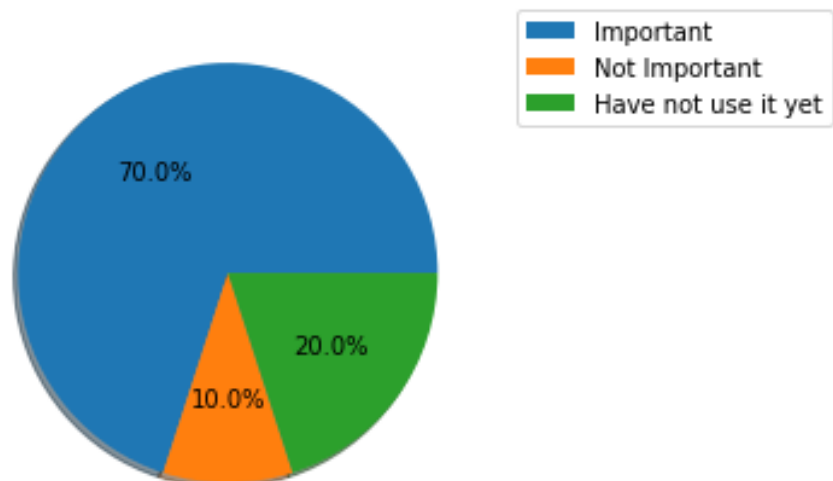
For this question we got 20 answers. 2 designers have not answered this question and we just ignored them for the analysis.

One of the features that our application may have is the animation. With that question we can comment on how important that feature is for the designers. This is a great insight which tells us that we should probably include such a feature in the app.

28. Q9: And if you don`t currently use animation, what problems could it help with when designing in the future?

animation adds realism and engaging	animation is important to see fabric drape	Nice to have - can tell design story better
animation is important for visual expression	Animation is important it gives the clothes dynamic	

would be helpful to better evaluate fit	Very!! The ride up factor for crotch rise
animation is important - fit issues can be seen better	
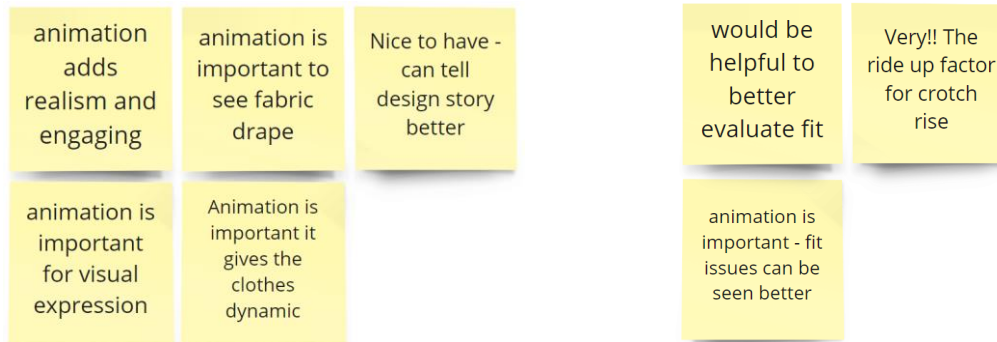
Supports realistic visualization (5)   Supports fit evaluation (3)

Only 13 designers have also answered the second question in question 9. When it comes to specific applications of the animation feature, most of the designers believe that it will help them in the visual representation of the clothes and make the fitting easier and better. We were able to define 2 main categories of answers for this question.

There were some participants who did not understand the question and they answered regarding the problems that they may face while using animation. Even if these answers are unrelated to our purpose, we decided to include them separately in order to comment on their concerns regarding animation. As we can see, even if most of them believe that animation is important, they have doubts, which are mostly related to computational power, time efficiency and software's complexity.

Concerns about usability of animation (5)

animation is important - needs too much render time	it is nice, but too complex	the time = the price
Animation is important current way to show it is too time-consuming and expensive	long time to render	
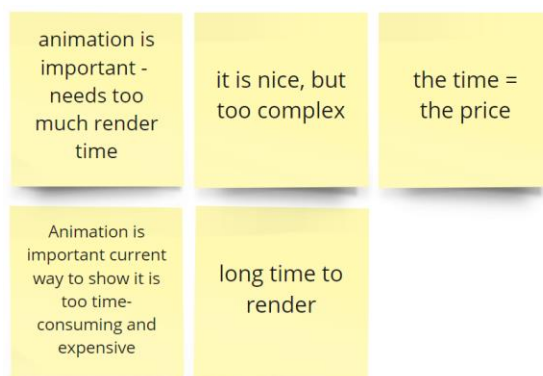
While building an application, it is important to comment on the problems that the participants may have already faced using other similar apps. Similar to question 5, participants think that animation is computationally expensive, time consuming and quite complex.

29. Q10: Would it help your design process if you were able to receive end consumer feedback at certain points during design? For example, if the AR/VR application was able to show consumer reaction to early designs

Would it help your design process if you were able to receive end consumer feedback at certain points during design? For example, if the AR/VR ap...s able to show consumer reaction to early designs
22 Antworten
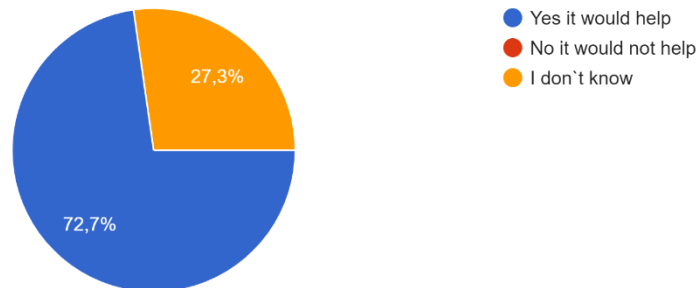
Also here in this last question we can see a very strong outcome. No one of the 22 participants has answered that he/she thinks that it would not help to receive consumer feedback during her/his design process. Moreover, 16 of 22 participants (72.7%) think it is helpful to receive consumer feedback in certain points of their design process.

3.6   Brief Summary of the findings

As mentioned before, given the nature of the questions (open answer questionnaire), it is quite hard to have concrete insights. Moreover, only 22 designers participated, which makes it hard for any statistical test to give credible insights. For that reason, we tried to qualitatively analyse every question in order to get an idea of the designers' requirements. One other limitation of that approach is that we were not able to combine questions as we will perform in the following questionnaire. Despite that, we were able to get some ideas regarding the features that the designers want and the problems that they have faced in other software so far (in order to make our app better). Moreover, it may be useful to check the UI of the 3D software provided by the designers in order to get more ideas regarding the functionalities that they are mentioning.

4.   Questionnaire for the DressMeUp App and the MagicMirror App

The DressMeUp Application is for social media users (e.g. influencers) allowing them to virtually change their outfit in an image or video by selecting from a pool of digital garments and then reupload this image or video to social media. The Magic Mirror Application is a mobile-base AR magic mirror enabling virtual tryons of garments during online shopping that aims to recreate at home the experience of buying clothes from a physical store.

4.1   Focus Group

The focus group of the DressMeUp and the Magic Mirror applications are influencers, social media users and online shoppers. This could be all the same person or a person could only be a social media user but not an influencer, or only shop online but not a very active social media user. But for sure this focus group targets the average adult person from today who does a bit of all. A logical conclusion of that was to create one survey for both applications. This focus group has a wide range as almost everybody has ever shopped online or has a social media account. It is targeting almost every human being.

4.2   Structure of the questionnaire

Initially, for structuring the questionnaire, the first important thing to consider is the number of questions that can provide insightful feedback but is not too much so that a lot of people can answer. This is due to the fact that people tend to dismiss surveys that require more than 15 minutes to fill. On the other side, it is important to find out what the focus group thinks about the application, e.g. what are these people looking for when they shop online, how do they visualize themselves during online shopping, where do they struggle, what do they like already and what not, what can help them to give a much better digital shopping experience, etc. As it is expected to get many answers, since the range of the focus group is very wide, we decided to ask closed questions only, which makes it easier and more efficient to evaluate and analyse the responses. Based on the above, we came to the conclusion that we should include around ten questions. The following questions were selected for this questionnaire:

1. What is your gender?

male / female / other

This question is to find out about the gender of the people who have it answered

2. How old are you?

under 16 / 16-24 / 25-34 / 35-44 / 45-54 / 55+

This question is to find out in which age group they are

3. How often do you use social media?

Every day / more than once in a week / less than once in a week

This question is to find out about their activity level on social media

4. How likely would you be to use an app that allowed you to change your outfit and then share a picture of this?

Very Likely / Likely / Not Likely / I would use it but not share the picture

This question is to find out if they would use the app we want to develop and share this on social media, especially targeted to the influencers

5. What do you think would be the most important feature of this app?

How the clothes looked on you/ The clothes you could try out/ How quickly it created a picture/ Being able to change image in an existing photo/ How the clothes fit you

This question is to find out what kind of features they think are important having in the app

6. Knowing your own body measurements can be extremely helpful in finding the right size for yourself. Have you ever scanned yourself with an app to determine your body measurements (finding the right size, perfect fit, fit finder etc)?

Yes / No and I wouldn`t / No and I would like to try

This question is to find out if the focus group has experience in scanning themselves and if this is something which they think is important and would like to try it out

7. How interested are you in seeing new products before they are released for sale and trying them on digitally?

Very interested / Interested / Not Interested

This question is to find out if the target people are interested in seeing products which are still under development and if there could start an exchange with the brand / designers before the item is finally developed and is ready for sale

8. Digitally created clothing also means less physically produced garments which can be more sustainable. How important is sustainability for you?

Very Important / Fairly Important / Not Important

This question is to find out what the focus group think about sustainability and if they care or not, which can stay in relation to digitally created garments

9. Do you visualize yourself wearing something before buying something?

Yes / No / Sometimes

This question is to find out if the focus group try the items they want to buy before they are buying it, so they need a visualisation of themselves wearing the garment or not

10. If you could see yourselves wearing a new product in an app what would be the most important things for you be when doing this?

Be able to rotate yourself to see how it looks all around you/ Making your online avatar move -> running, cycling, yoga poses, walking, fashion poses etc./ Viewing the item whilst wearing something else as well/ View yourself in realtime in the item – like in a mirror

This question is to find out what would they like to have in the app when they are wearing the garment and which features are the most important to them

11. Have you ever used another app to do something similar to this? If so what was it called?

Yes / No

This question is to find out if they have already experience in something similar like our app or if this is totally new for them

4.3   Framework conditions for the questionnaire

The questionnaire ran as a link from the Mallzee mobile app for around one week, from which we were able to get 55 answers from Mallzee customers. Moreover, it was sent to Odlo influencers (20), employees from the consortium partners and it was disseminated on the project's social media (together 68 participants). Here we would like to add that most of the consortium employees are not professionals in garment production, but in areas like finance, HR, IT, customer service, fitting models, receptionists which are normal active social media users and shop online from time to time without having background knowledge about garment creation process or designing virtually at all. In total we got answers from 143 participants. This gives us the following overview of how the answers are distributed among the different participant groups in percentage; 38.5% were Mallzee customers, 14% Influencers and 47.5 % from employees and regular social media users.

4.4   Summary of the results of the questionnaire

Here you can see the analysis of theanswers from all the received responses combined. We only have very few missing values (1 or 2 in some questions), where participants have skipped the answer, which were filled with the mode of each column. Given that the sample size we have is small, we did not want to remove the entire response if just one question has not been answered. Therefore, we filled them with the mode of each column. For instance, if the participant did not answer the question "How old are you?", we compute the mode of the entire column and use that value for his/her age. There were not any outliers. The results are further analyzed by using:

1. Univariate analysis (check each answer on its own)
2. Bivariate analysis (combine the most interesting questions)

4.4.1 Univariate Analysis

We first start with the univariate analysis, in order to analyse each one of the questions independently.

In an effort to get more answers, already mentioned before, there were formulated two questionnaires sent out through different means and at different times. The first questionnaire (named as MLZ questionnaire in the analyisi) was sent out to Mallzee's customers through their app with an incentive to enter a draw to win credit in their app. In order to get more replies, a second questionnaire was generated to send out to non Mallzee customers (named as ODLO questionnaire in the analysis).

30. Q1: What is your gender? (ODLO + MLZ questionnaire)
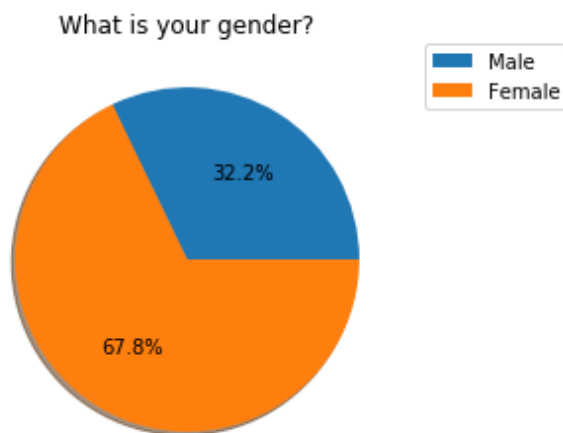
We can see that our sample seems unbalanced in terms of gender with 67.8% of females (97 females and 46 males). This is normal as fashion-related concepts regularly attract more females than males. The split we are seeing here is in line with the gender split we see across the whole Mallzee customer base.

We also conducted a proportional statistical test (Binomial test) with the hypothesis:

H0: The true proportion of males is 0.5

H1: The true proportion of males is less than 0.5

This test will help us denote how likely is that there is an equal proportion of male and females in the original population given our sample. The p-value of this test was $1.2*10^{-5}$, which is much less than the significance level alpha 0.05. Therefore we can reject the null hypothesis and conclude that the proportion of males is significantly less than 0.5 (as expected).

31. Q1: What is your gender? (ODLO questionnaire)
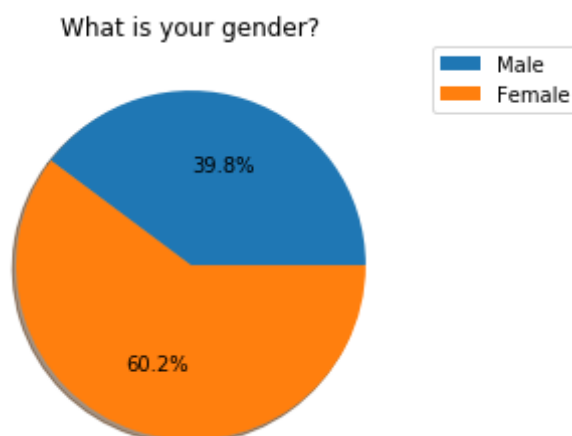
For ODLO we have in total 88 answers, 53 females and 35 males.

32. Q1: What is your gender? (MLZ questionnaire)
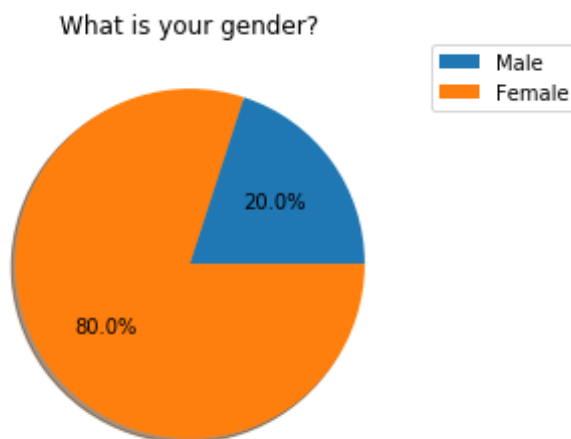
Similar for MLZ, the female candidates are more than males. Specifically, 44 out of 55 candidates are female with only 11 out of 55 males.

33. Q2: How old are you? (ODLO + MLZ questionnaire)
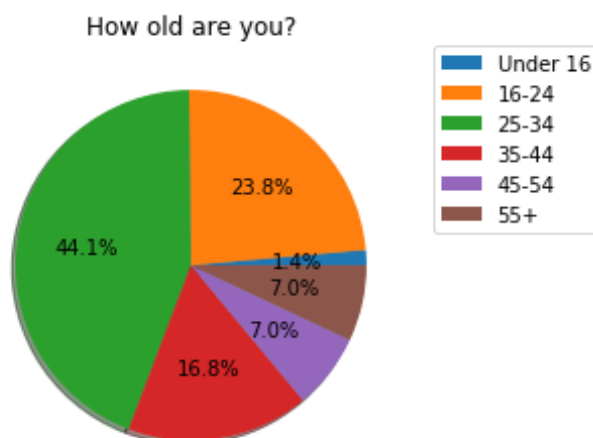
Under 16:   2

16-24:   34

25-34:   63

35-44:   24

45-54:   10

55+:   10

As expected, the younger people are more involved in digital technologies (since the questionnaire was distributed digitally). Therefore, it makes sense that almost 85% of the participants are between 16 and 44. Given that the percentages may be misleading, we also presented the frequencies for each category. As we can see above, there are only 2 participants in the category "Under 16" and 10 for the categories "45-54" and "55+". Therefore, the sample for these particular categories is not sufficient enough to draw any valuable conclusion.

34. Q2: How old are you? (ODLO questionnaire)
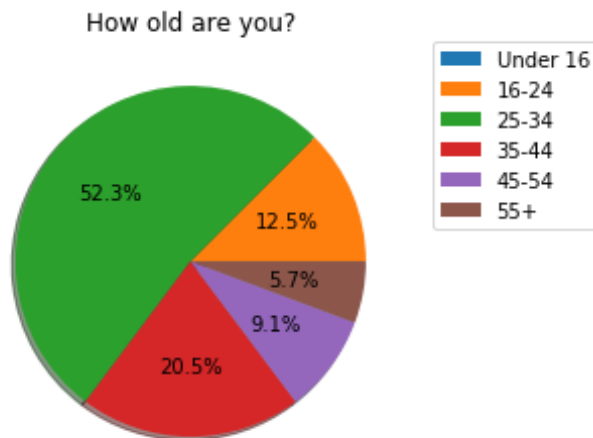
For the ODLO questionnaire, the majority lies in the interval of 25-34 with 46 answers, followed by the 35-44 with 18 answers. The category 16-24 was third with 11 answers. Moreover there were not many more older participants with 45-54 and 55+ categories getting only 8 and 5 answers respectively. Finally for ODLO there was no participant under 16.

35. Q2: How old are you? (MLZ questionnaire)
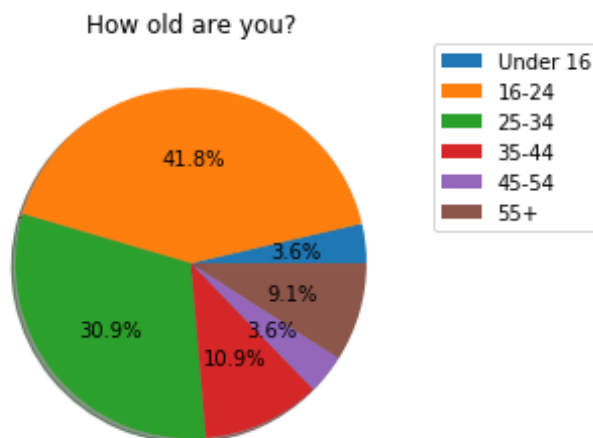
Regarding age categories for MLZ, we can observe that the answers are differently distributed in comparison to ODLO. Specifically, here the majority of the participants lies in the 16-24 category with 23 participants, followed by 25-34 with 17 participants. The rest of the categories have low numbers of participants with 6 answers for 35-44, 5 for 55+ and 2 answers for both 45-54 and Under 16.

36. Q3: How often do you use social media? (ODLO + MLZ questionnaire)

How often do you use social media?
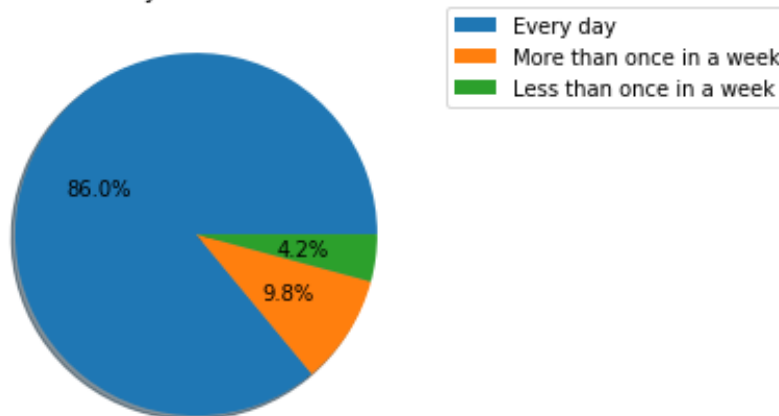
As expected, almost all participants use social media in an everyday basis (123 counts), while only 4.2% of them use social media less than once in a week (6 counts).

We performed a chi-square test under the null hypothesis that the three answers are equally distributed. The statistic was 179 (much higher than the critical value of 5.99 for two degrees of freedom and 95% level of significance) with p-value almost zero. Therefore, we can conclude that the answers are not equally distributed. In order to comment on which answers are significantly different, we conducted a post hoc analysis, which showed that every day usage significantly differs in 95 significance level with the other two answers. On the other hand, due to the small sample for the other two answers, the post hoc analysis showed that there are not significantly different (p-value with Bonferroni adjustment equal to 0.22).

37. Q3: How often do you use social media? (ODLO questionnaire)

How often do you use social media?
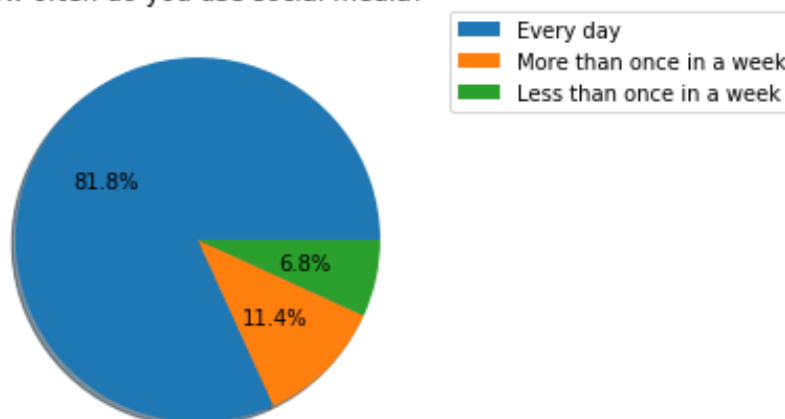
For ODLO, here we can clearly observe that the majority of the participants (72 out of 88) use SM every day, while only 10 use them more than once a week. Finally, there are 6 participants who use SM less than once a week.

38. Q3: How often do you use social media? (MLZ questionnaire)

How often do you use social media?
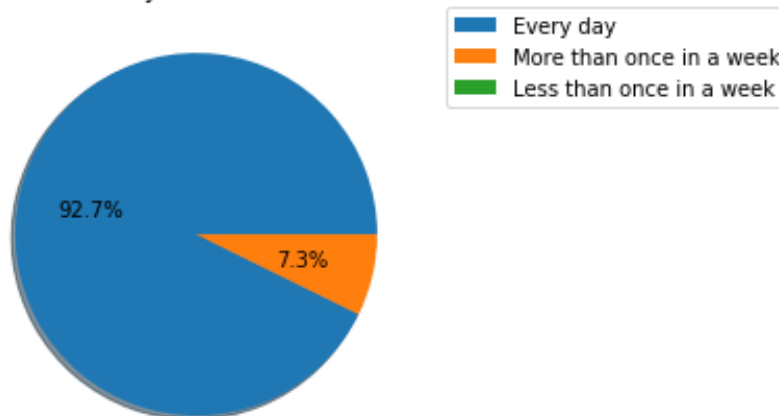
Similar to ODLO the majority of the participants uses SM every day (51 answers out of 55) with only 4 answers for "More than once a week". Finally there was not any participant who answered "Less than once in a week".

39. Q4: How likely would you be to use an app that allowed you to virtually change your outfit and then share a picture of this?

How likely would you be to use an app that allowed you to virtually change your outfit and then share a picture of this?
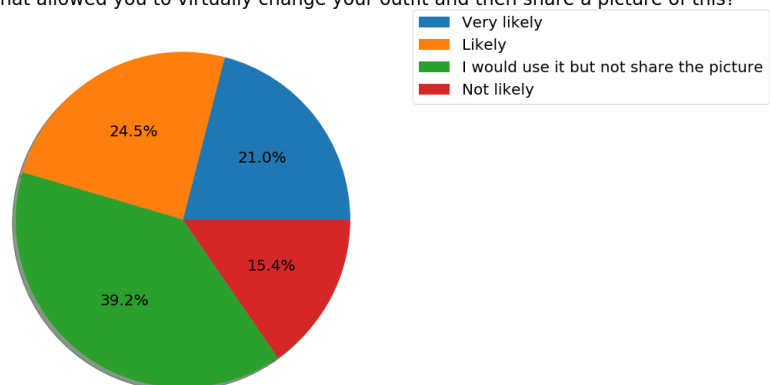
Trying to evaluate if people are willing to try the eTryOn application, the results are promising. Only 15.4% of the participants (22 people out of 143) voted that it is "Not likely" to use such an app. That means that 84.6% participants (121 people out of 143) are willing to try it (in different probability scales though). It is also worth noting that 39.2%, the biggest part of the pie chart, would like to try virtually an outfit without sharing it with social media but for their own personal liking.

We also conducted a chi-square statistical test to check if the differences in the proportions are significant for 95% significance level. The chi-square statistic was 17.699 (more than the critical value of 7.8 for 3 degrees of freedom) with p-value equal to 0.0005 (less than 0.05). Therefore, we should reject the null hypothesis and conclude that there is a significant difference between the answers.

We also used a post hoc analysis with pairwise comparisons and Bonferroni adjustment in order to see which one of the categories is significantly different. The results showed that the only statistical difference is between the answer "I would use it but not share the

picture" and the answers "Very likely" and "Not likely" (with adjusted p-values 0.03 and 0.00071 respectively). These results give a valid indicator that the users are willing to try such an app, but we should consider to leave the decision of posting their picture to them (as a feature in the app).

In the next question, there was a slight difference between the two questionnaires. In the ODLO questionnaire, the participants could choose more than one answer, while in Mallzee's, only one. Moreover, during the resend of the questionnaire (ODLO), an additional answer was added (how clothes fit to you), as it seemed interesting to see the difference between fit and looks of a garment (compared to the question how the clothes look on you). For this reason, we split the analysis for question 5 in each one of the questionnaires.

40. Q5: What do you think would be the most important feature of this app? (ODLO questionnaire)

What do you think would be the most important feature of this app?
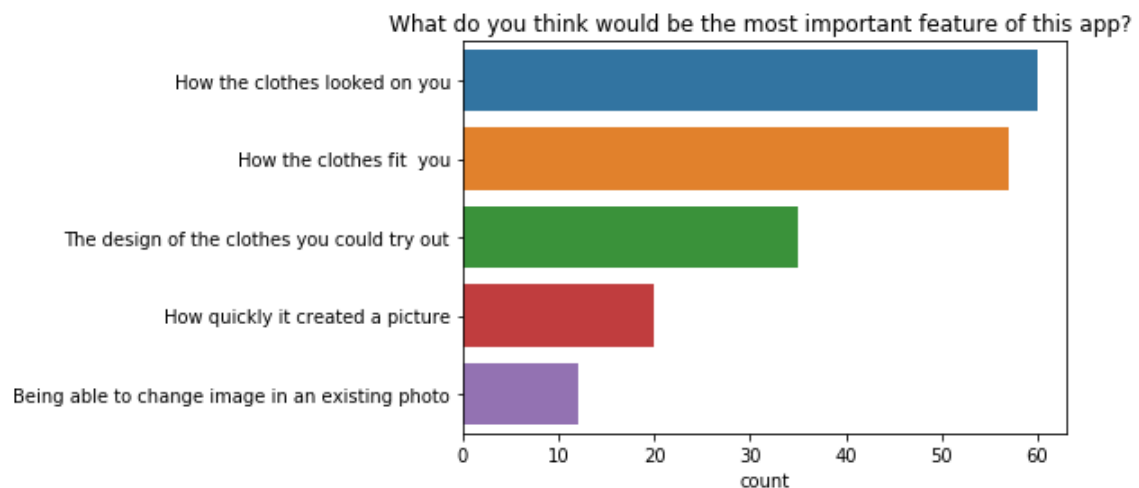
For the ODLO questionary, the participants could choose as many answers as they wanted. The total number of answers was 184. The answer with the highest frequency is "How clothes looked on you" close to "How the clothes fit you" On the contrary, "Being able to change image in an existing photo" has the less votes.

We also performed a Cochran's Q test to conclude if there is a significant difference between the possible answers. The test showed that there is one between at least two of the possible answers. Specifically, the statistic was 79.9 (more than the critical value of 9.488 for four degrees of freedom and 95% level of significance) with a very low p-value ($1.7*10^{-16}$).

The above test helps us conclude that there are at least two answers that are significantly different, but without knowing which ones are different. For that, we conducted a post hoc analysis with pairwise comparisons and Bonferroni adjustment in the p-values.

41. Heatmap of p-values for Cochran`s Q test for Q5: What do you think would be the most important feature of this app? (ODLO questionnaire)
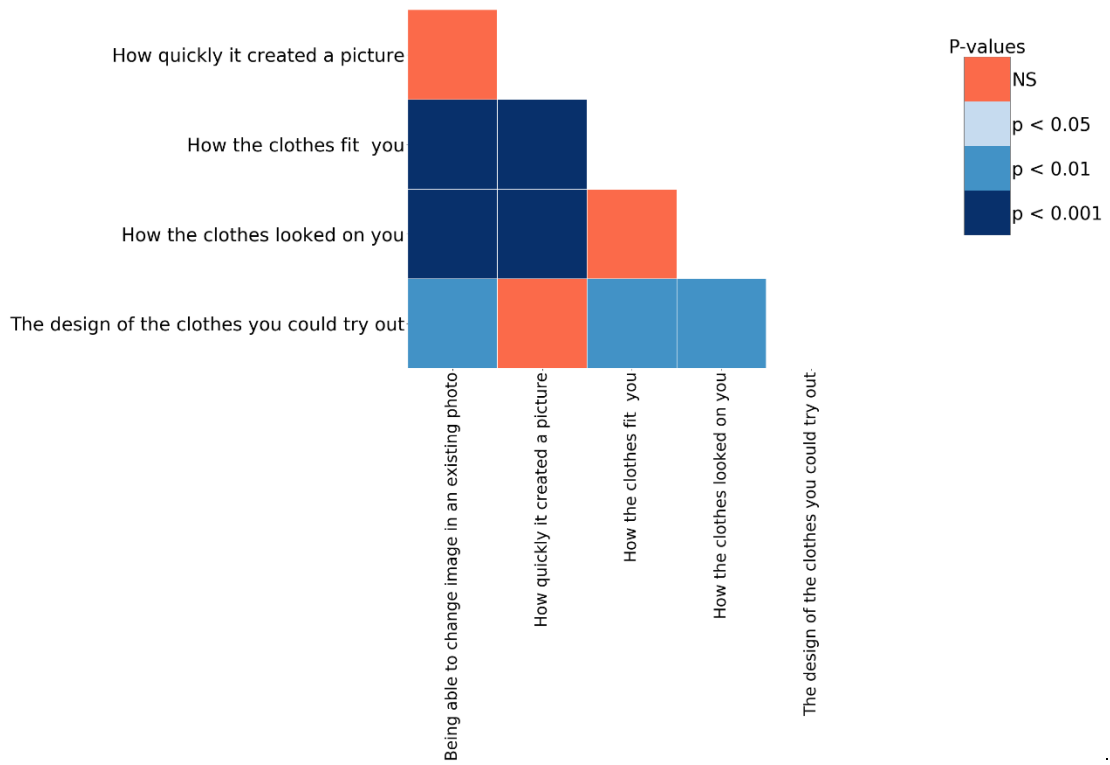
By observing the plot above (which shows the statistical difference in several levels of significance), we can verify our expectations. That is, the less frequent answer ("Being able to change image…") is significantly different with the rest of the answers except for the answer "How quickly it created a picture". The latter is also not significantly different with the answer "The design of the clothes you could try out". Finally, as expected, the answers "How clothes looked on you" and "How clothes fit you" are not significantly different.

In the next case, the participants could only choose one answer. For that reason, we plot the results in a pie chart. Moreover, this questionnaire had one less possible answer (does not include the answer "How the clothes fit you").

42. Q5: What do you think would be the most important feature of this app? (MLZ questionnaire)

What do you think would be the most important feature of this app?

Legend:
- How the clothes looked on you
- The design of the clothes you could try out
- Being able to change image in an existing photo
- How quickly it created a picture

65.5%
29.1%
3.6%
1.8%
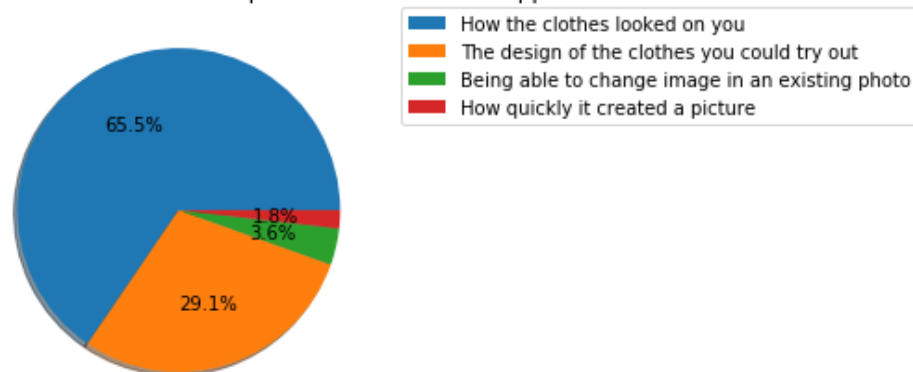
Despite the fact that this specific question has different aspects among the two questionnaires (ODLO and MLZ), we can observe, that the answers agree in some cases. For example, "How clothes looked on you" is also here the most frequent answer with 65.5% (36 answers). Also the answer "The design of the clothes you could try out " is quite high with almost 30% (16 answers) of the people answering it. As in the previous questionnaire, the options "Being able to change image in an existing photo" and "How quickly it created a picture" are not considered to be so important for the participants. Given the low number of frequencies here, a statistical test will probably not be valid.

43. Q6: Knowing your own body measurements can be extremely helpful in finding the right size for yourself. Have you ever scanned yourself with an app to determine your body measurements (finding the right size, perfect fit, fit finder, etc)?

Knowing your own body measurements can be extremely helpful in finding the right size for yourself. Have you ever scanned yourself with an app to determine your body measurements (finding the right size, perfect fit, fit finder etc) ?

Legend:
- Yes
- No and I would like to try
- No and I wouldn't

15.4%
69.9%
14.7%
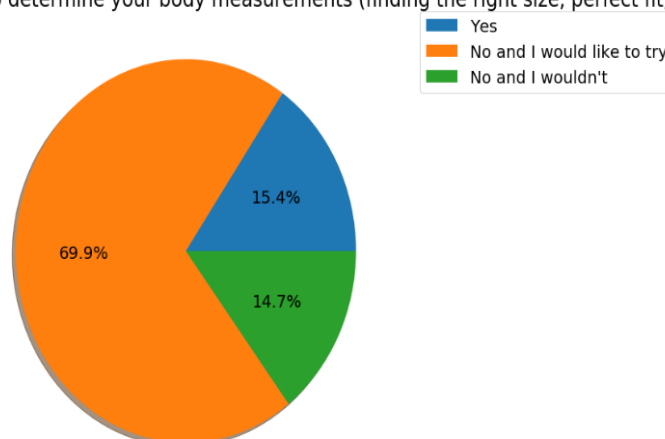
We also asked the participants if they had ever used an application to scan themselves and determine their body measurement. Despite the fact that most of them have not done that before (84.6%), an approximately 70% (100 answers) of all participants would like to try such an application.

The chi-square test here showed that there is statistical difference between the categories (p-value was even less than $2.2*10^{-16}$). The post hoc analysis showed that only the answer "No and I would like to try" is significantly different from the answers "Yes" and "No and I wouldn't" with p-values $4.9*10^{-12}$ and $2.1*10^{-12}$ respectively. Given the results of the statistical test, we can conclude that participants are willing to try an app for scanning themselves.

44. Q7: How interested are you in seeing new products before they are released for sale and trying them on digitally?
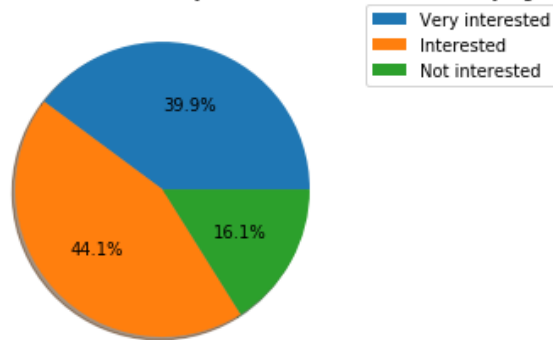
Moreover, the majority of the participants were interested in trying products digitally before their release (84% of them in two different scales of "Very interested" and "Interested"). From the post hoc analysis, we can conclude that "Very interested" and "Interested" are statistically different from "Not interested" with adjusted p-values 0.00043 and 0.000048 respectively.

45. Q8: Digitally created clothing also means less physically produced garments which can be more sustainable. How important is sustainability for you?
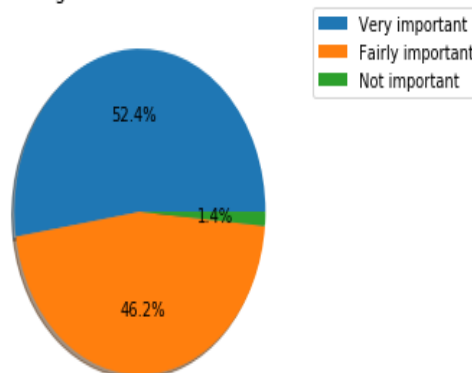
As expected, the sustainability of a garment plays a vital role for customers. In fact, only 1.4% (2 participants) believes that sustainability is "Not important".

46. Q9: Do you visualize yourself wearing something before buying it?

Do you visualize yourself wearing something before buying it?
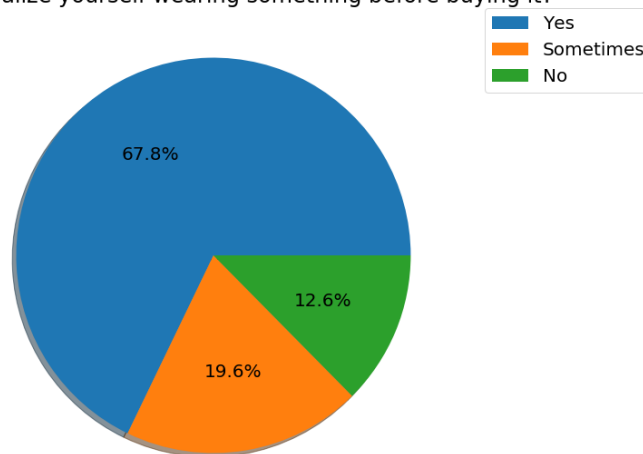
It was also expected that people are going to visualize themselves before buying a garment. The results showed that almost 88% will either certainly visualize themselves (67.8% / 97 answers) or they sometimes do it (19.6% / 28). On the other hand, only 12.6 (18 participant) answered that they do not visualize a garment before buying it.

From the chi-square statistical test, we can conclude that the answer "yes" is statistical difference with "Sometimes" and "No" with adjusted p-values $2*10^{-9}$ and $5.2*10^{-13}$ respectively.

47. Q10: If you could see yourself wearing a new product in an app what would be the most important things for you when doing this?
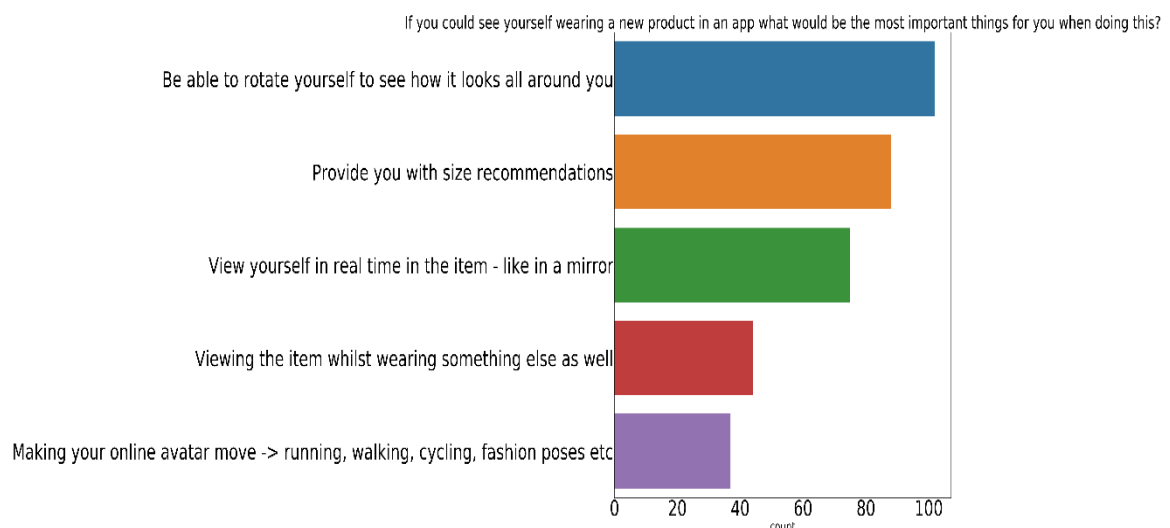
The above bar plot gives us a good indicator of the participants' preferences regarding wearing a new product in an app. For that question, the participants could choose more than one answer. That gives us a total of 346 different answers. We can see that 71.3% of the participants chose "Be able to rotate…", followed by "Provided with size recommendations" with 61.5%. On the contrary "Making your online avatar.." took the fewer votes with only 38 (26.6% of the participants).

48. Heatmap of p-values for Cochran`s Q test for Q10: If you could see yourself wearing a new product in an app what would be the most important things for you when doing this?
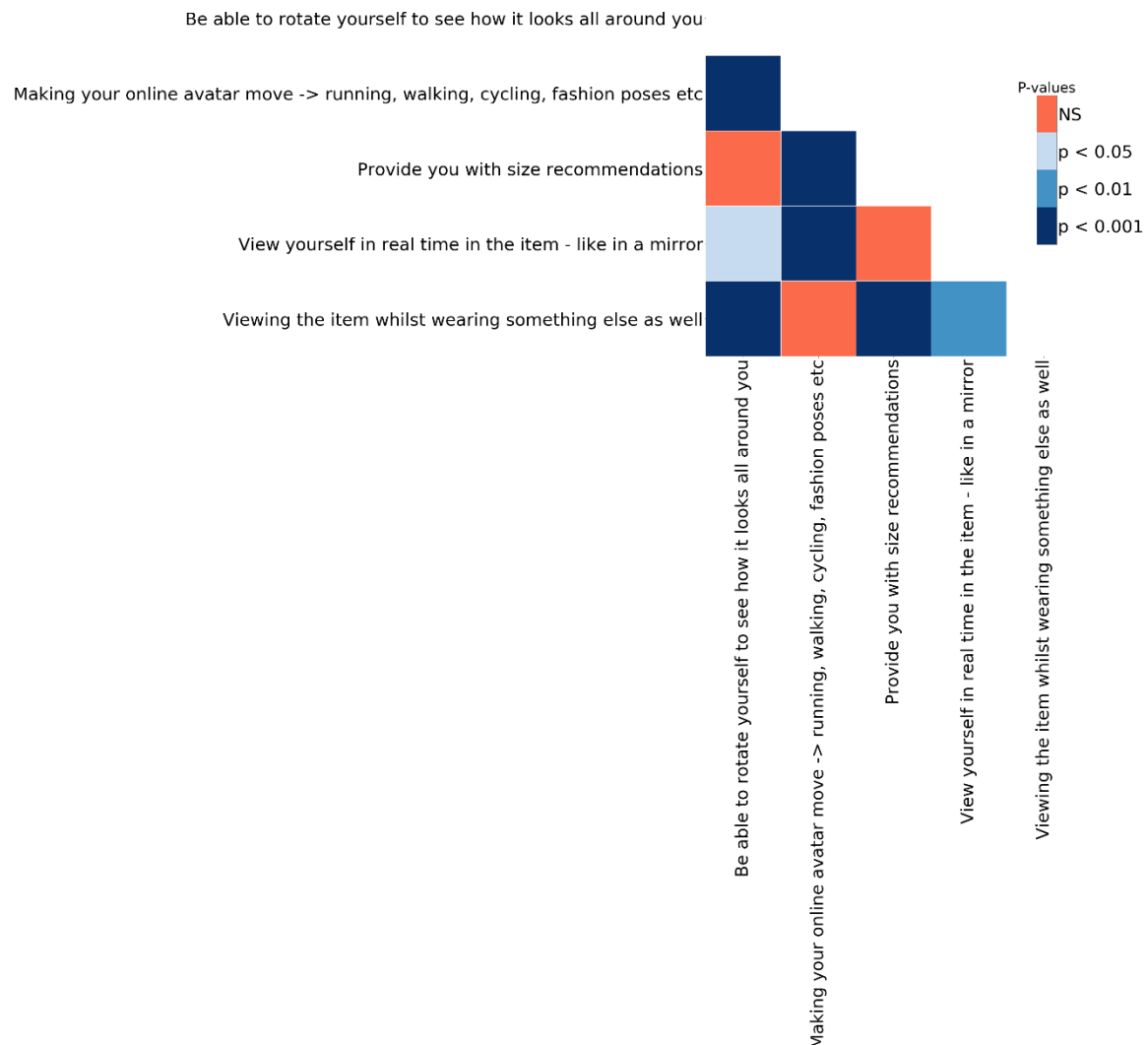
Similar to Question 5 (for ODLO), the participants could choose more than one answer. For that reason, we conducted a Cochran's Q test again, with null hypothesis that there is not any statistically significant difference among the answers. The statistic was 87.5 and the p-value $4.33 * 10^{-18}$, which is much less than 0.05. Therefore, we should reject the null hypothesis and conclude that there are at least two features that are significantly different.

In order to find the specific features, which are significantly different, we performed a post hoc analysis. We can again verify our hypothesis regarding the differences in the features. That is, the two answers with the fewer answers ("Making your online…" and "Viewing the item…") are significantly different with the rest of the answers except for between them. Moreover, there is not significant difference between the two most frequent answers ("Being able to…" and "Provide you with size…"). Finally, "Provide you with size "recommendations" is not significantly different with "View yourself in real time…".

49. Q11: Have you ever used another app to do something similar to this?

Have you ever used another app to do something similar to this?
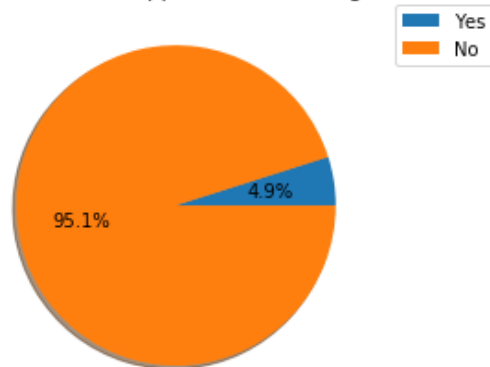
It was also interesting the fact that the majority of the participants have never used a similar app, which gives eTryOn a very good chance of success.

The participants that have tried similar apps, gave the following examples:

Kiko, Try it on, trying on makeup virtually: https://www.kikocosmetics.com/de-ch/neuigkeiten/try-it-on.html

Mister Spex, trying on glasses virtually: https://www.misterspex.ch/brillen/brillen-online-anprobieren

Lenskart, trying on glasses virtually: https://lenskart.us/pages/compare-looks

In summary, the first results obtained were expected. The main statement of the results is that most of the participants have not used such an app and most of them are willing to try it out. We should consider leaving the choice of sharing a picture to the user though.

Regarding the features of the app, the choices "How the cloth looked on you" and "How the cloth fits you", were significantly different from the rest, which makes them the most important features for the participants. Finally, for the features that the participants prefer when they are seeing themselves wearing a new product, "Being able to rotate yourself…" and "Provide you with size recommendations" were the most important.

4.4.2 Bivariate Analysis

As a next step of our analysis, we compare two questions as a pair in order to comment on any insights. In most cases, we preferred to use stacked bar plots instead of ordinary bar plots. The reason for that is in some questions there are imbalanced answers. By using stacked bar plots, we normalize each answer in a percentage range between 0 and 100, making the results easier to interpret. In many cases, due to the limited sample, the counts in some subcategories are very low. For that reason, we also provide the contingency tables, which will give a better idea of how trustworthy the findings are.

Given the fact that the sample is imbalanced in favour of female participants, it might make more sense to normalize the frequencies in term of gender rather than the answers in the social media question.

50. Q3: How often do you use social media? Vs Q1: What is your gender?
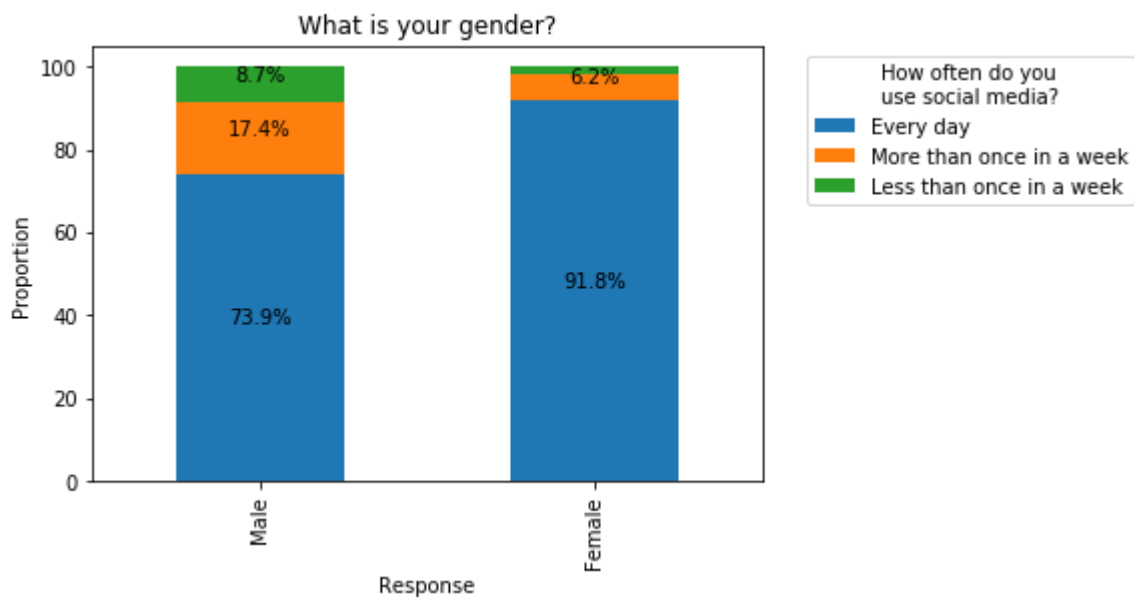
As expected, the majority of both genders use social media on a daily basis. There is an almost 25% of male participants that they do not use SM every day. On the other hand for females, this percentage is very low.

51. Table of Q3: How often do you use social media? Vs Q1: What is your gender?

How often do you use social media? What is your gender?	Every day	More than once in a week	Less than once in a week	Total
Male	34	8	4	46
Female	89	6	2	97
Total	123	14	6	143

As we can see from the contingency table above, there are a few cells with low number of observations. For that reason, in order to see if there is an association between the gender and the usage of SM, we used a Fisher exact test instead of Chi-square test of independence. The results showed that there is an association between the gender and the usage of SM with p-value equal to 0.0129. Therefore, we should reject the null hypothesis that there is not relationship between gender and usage of SM. After the post hoc analysis, the only significant difference between males and females was the "Every day" answer with adjusted p-value 0.0246.

The bivariate analysis continues with "How likely would you be to use an app that allowed you to virtually change your outfit and then share a picture of this?" as the main question. We compare it with several other questions to comment on their correlation.

52. Q4: How likely would you be to use an app that allowed you to virtually change your outfit and then share a picture of this? Vs Q1: What is your gender?
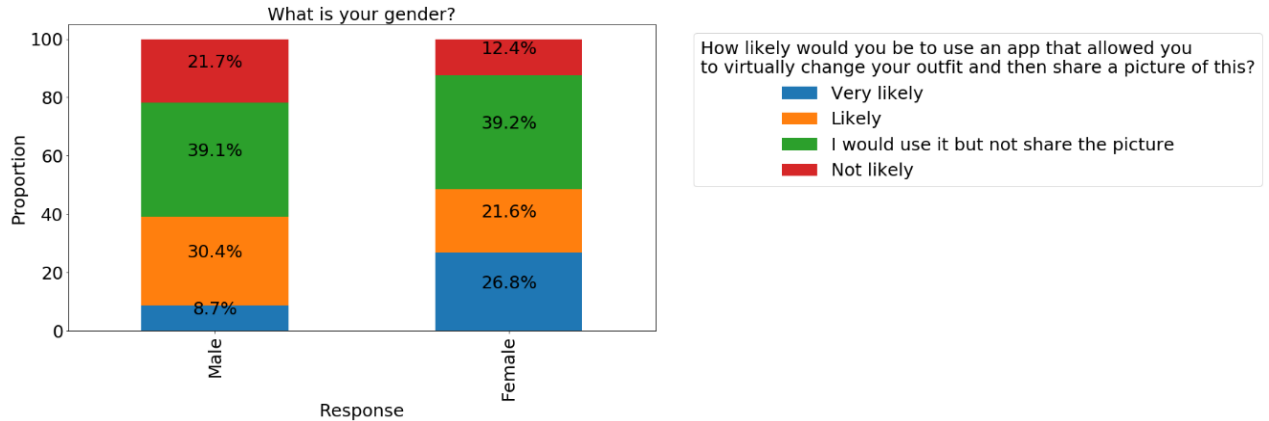
In the above plot, we split the answers regarding the gender. We can see that in both cases the most frequent answer is "I would use it but not share the picture". Moreover, we can see that the male candidates are less likely to share a picture of them (answer "Very likely" has the least answers among males), while for female candidates it is the second most frequent answer. Finally, the percentage of "Not likely" for the males is almost double than the one for the females.

53. Table of Q4: How likely would you be to use an app that allowed you to virtually change your outfit and then share a picture of this? Vs Q1: What is your gender?

How likely would you be to use an app that allowed...? What is your gender?	Very likely	Likely	I would use it but not share the picture	Not likely	Total
Male	4	14	18	10	46
Female	26	21	38	12	97
Total	30	35	56	22	143

We have to note here, that the chi-square test did not show any significant association between the gender and the question "How likely…" in a 95% significance level (The statistic was lower than the critical value and the p-value of the test was 0.054>0.05). Therefore, we fail to reject the null hypothesis that there is not any relationship between gender and the question "How likely…". It seems that participants are willing to try such an app, with males being more sceptical without statistical significance though.

54. Q4: How likely would you be to use an app that allowed you to virtually change your outfit and then share a picture of this? Vs Q2: How old are you?

55. Table of Q4: How likely would you be to use an app that allowed you to virtually change your outfit and then share a picture of this? Vs Q2: How old are you?

How likely would you be to use an app that allowed...? How old are you?	Very likely	Likely	I would use it but not share the picture	Not likely	Total
Under 16	0	0	2	0	2
16-24	10	5	13	6	34
25-34	13	17	23	10	63
35-44	3	7	10	4	24
45-54	0	3	5	2	10
55+	4	3	3	0	10
Total	30	35	56	22	143

From the above plot and contingency table, we can comment on the probability of using such an app for different age scales. We can see that among all ages, participants are willing to use the app (with or without sharing the picture). An interesting observation is that none of the oldest people (55+) voted "Not likely", while all the people under 16 would use it but would not share a picture.

It should be stated though, that the sample for "Under 16", "45-55" and "55+" is too small to draw any valuable conclusion. Therefore, we should only focus in the rest of the categories. Finally, given that most of the cells have very low number of observations, a statistical test was not performed.

56. Q4: How likely would you be to use an app that allowed you to virtually change your outfit and then share a picture of this? Vs Q3: How often do you use social media?

57. Table of Q4: How likely would you be to use an app that allowed you to virtually change your outfit and then share a picture of this? Vs Q3: How often do you use social media?
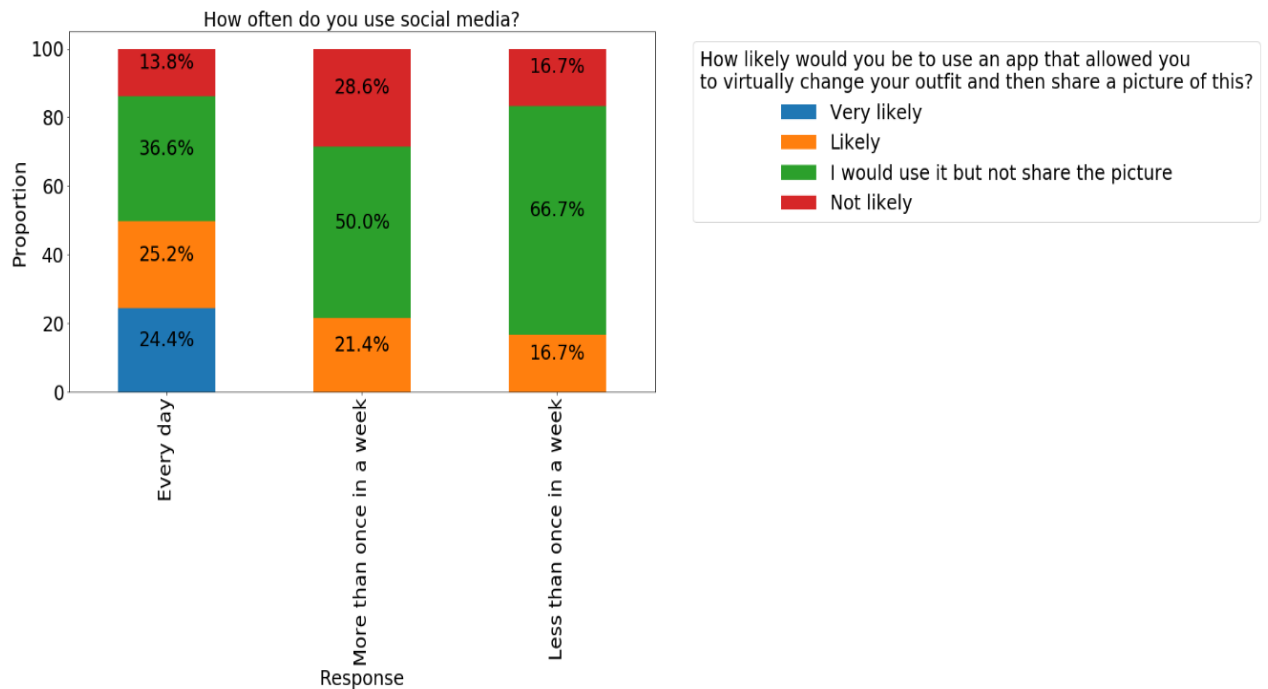
How likely would you be to use an app that allowed...?	Very likely	Likely	I would use it but not share the picture	Not likely	Total
How often do you use social media?					
Every day	30	31	45	17	123
More than once in a week	0	3	7	4	14
Less than once in a week	0	1	4	1	6
Total	30	35	56	22	143

As we saw in the pie charts, the everyday users are dominating among all other answers. The majority of these users are willing to try such an app, with only 13,8% of them to vote "Not likely". On the other hand, the participants without every day usage of SM have very few observations to draw any valuable conclusion. The Fisher exact test here showed no association between the two questions with p-value 0.126.

58. Q4: How likely would you be to use an app that allowed you to virtually change your outfit and then share a picture of this? Vs Q6: Knowing your own body measurements can be extremely helpful in finding the right size for yourself. Have you ever scanned yourself with an app to determine your body measurements (finding the right size, perfect fit, fit finder etc)?

59. Table of Q4: How likely would you be to use an app that allowed you to virtually change your outfit and then share a picture of this? Vs Q6: Knowing your own body measurements can be extremely helpful in finding the right size for yourself. Have you ever scanned yourself with an app to determine your body measurements (finding the right size, perfect fit, fit finder etc)?

How likely would you be to use an app that allowed...? Knowing your own body measurements can be extremel...?	Very likely	Likely	I would use it but not share the picture	Not likely	Total
Yes	8	9	4	1	22
No and I would like to try	19	25	40	16	100
No and I wouldn't	3	1	12	5	21
Total	30	35	56	22	143

From the above plot we can observe the behaviour of the participants regarding two similar questions. An interesting observation can be done for the participants that had never scanned themselves in an app and they are not willing to do it. Despite that answer, 76.2% of these people who would not scan themselves (adding the Very Likely, Likely and I would try it but not share the picture), would like to use the application for changing their outfit (i.e. this means they would use it as long as it works without having to scan themselves).

On the other hand, the participants who had already tried a scanning app, are willing to try a similar app with high probability (more than 95% is between "Very likely", "Likely" and "I would use it but not share the picture"). In both cases though, as we can see from the contingency table, the sample is too small to provide any statistical valuable insight.

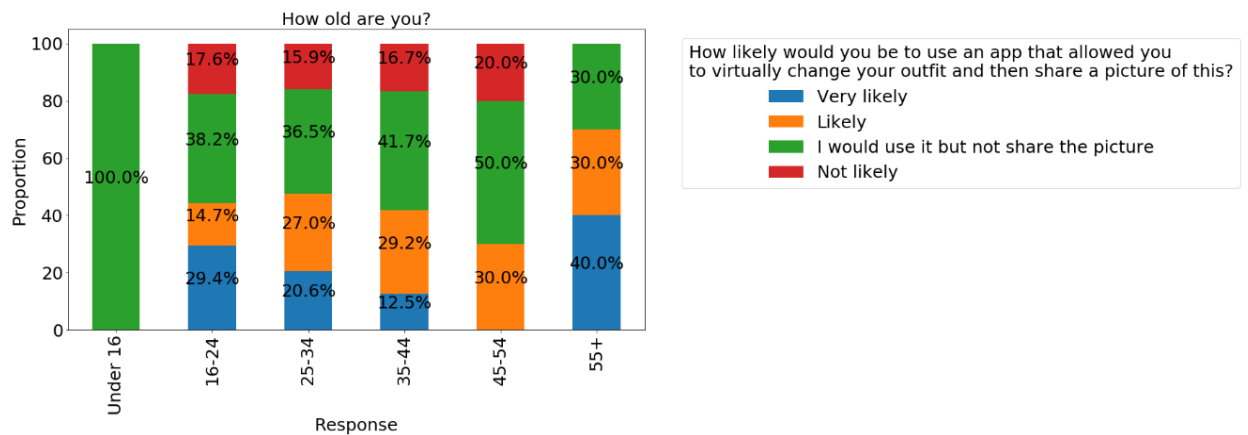**60. Q4: How likely would you be to use an app that allowed you to virtually change your outfit and then share a picture of this? Vs Q9: Do you visualize yourself wearing something before buying it? (first plot)**

In the first plot, we can observe an interesting fact. For the participants who sometimes visualize themselves wearing a garment before buying it, it appears to be less likely to use the app (in different scales), with the answer "Not likely" to be the second more frequent (28.6%). In order to check if there is such an association, we conduct a Fisher exact test.

61. Q4: How likely would you be to use an app that allowed you to virtually change your outfit and then share a picture of this? Vs Q9: Do you visualize yourself wearing something before buying it? (second plot)
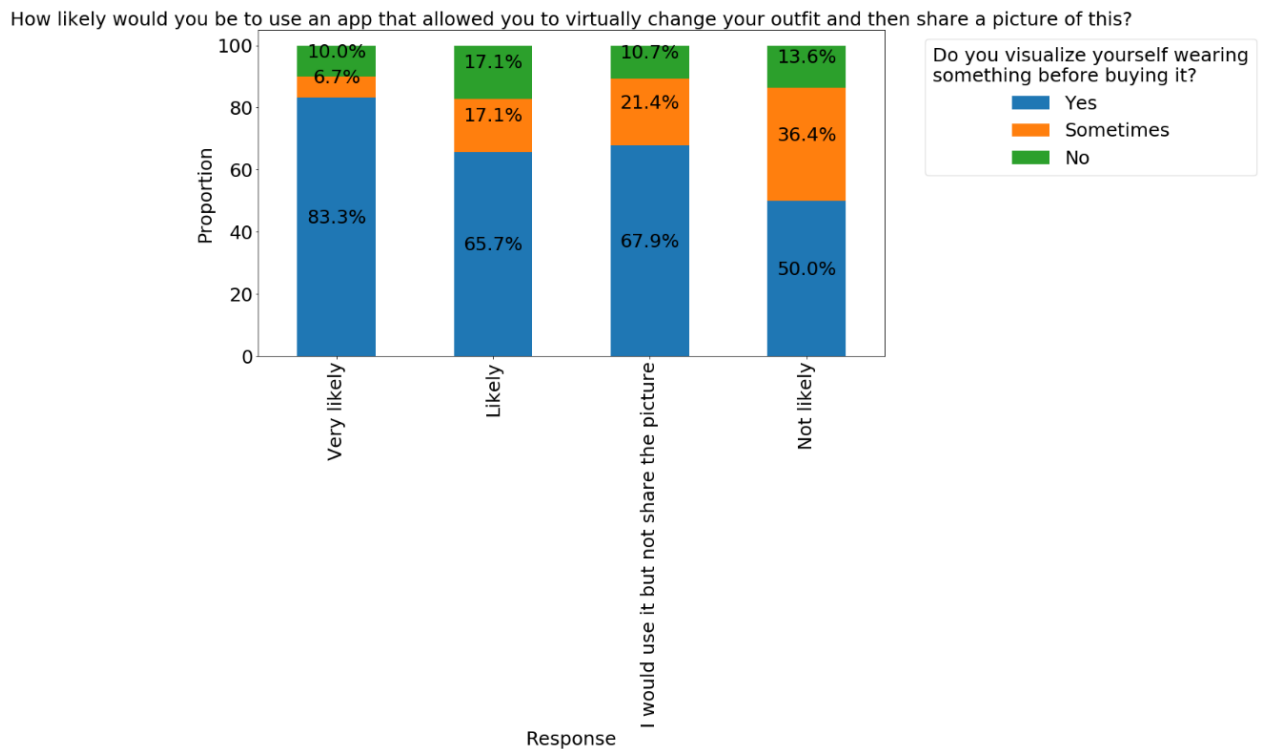

In a similar manner, we use the same question, but now the normalization is done to the other question (second plot). The probability of using such an app seems to be associated

with the visualisation of wearing something before buying it. In the scale "Very likely", the majority (83%) answered "Yes" on whether they visualize themselves wearing clothes, while for the scale "Not likely" there is a balance (50-50) between "Yes" and "No"/ "Sometimes".
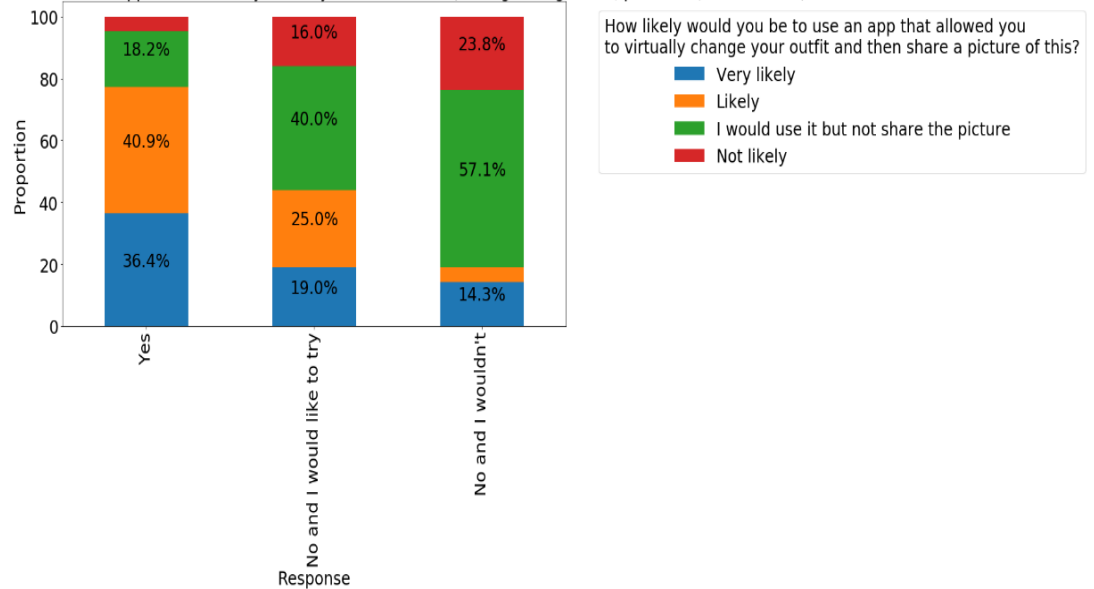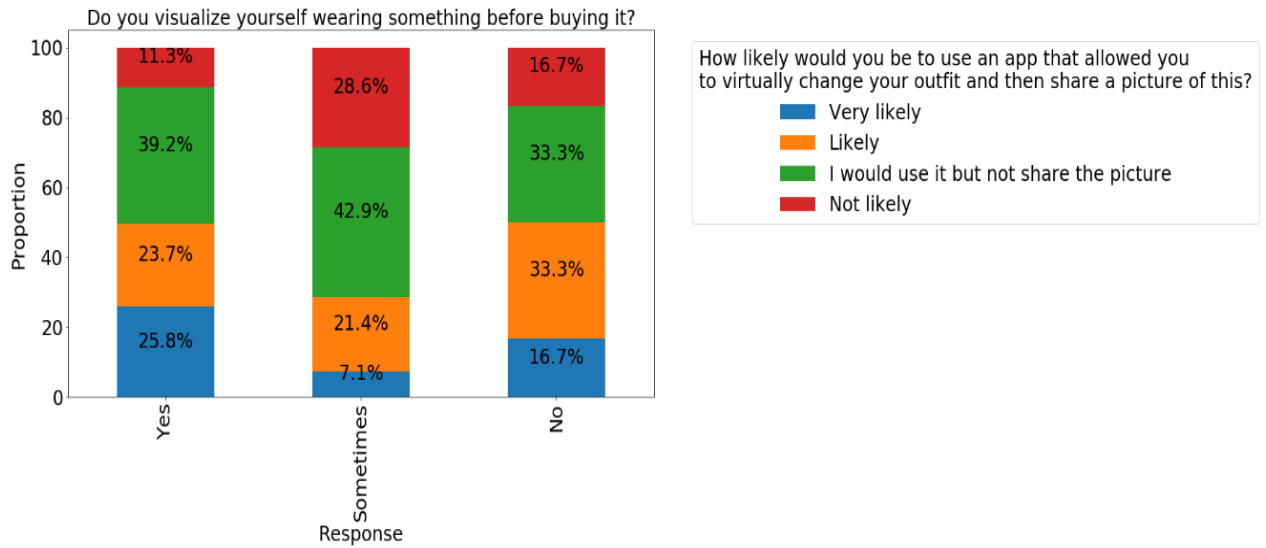
62. Table of Q4: How likely would you be to use an app that allowed you to virtually change your outfit and then share a picture of this? Vs Q9: Do you visualize yourself wearing something before buying it?

How likely would you be to use an app that allowed...? Do you visualize yourself wearing something before buying it?	Very likely	Likely	I would use it but not share the picture	Not likely	Total
Yes	25	23	38	11	97
Sometimes	2	6	12	8	28
No	3	6	6	3	18
Total	30	35	56	22	143

Despite the fact that there are some interesting observations in the plots above, the Fisher test did not show any relation between the two questions. Specifically, the p-value of the test was 0.17, which means that we cannot reject the null hypothesis that the two questions are not related. Therefore, the most probable scenario is that the comments we mentioned earlier are due to the low sample size.

In summary, for people who try their outfit before buying it, seems to be more likely to use such an app without any statistical proof though.

It is now time to focus on questions regarding the important features of the application. We start with question 10, "If you could see yourself wearing a new product in an app what would be the most important things for you when doing this?" for which the participants had the chance to choose more than one answer.

In order to compare the features with other questions we are doing the following assumption (this may not be correct from statistical perspective, but it can help us have a better picture of the important features):

Each participant can choose several answers. In that case, we assume that all different answers are coming from different participants. For example, assuming that a female within the age group 25-34, answered "Be able to rotate yourself to see how it looks at different angles, Provide you with size recommendations". In this (and only in this part of the analysis), we assume that we have two different participants both female and age 25-34 with two different answers. One, who chose "Be able to rotate yourself to see how it looks at different angels" and one, who voted "Provide you with size recommendations".

It should be stated though, that for all the different pair of questions below, a Chi-square test (or Fisher exact test when the observations in some cells were less than 5) was conducted, which showed that there is not any association between the tested pair. In most cases the p-value was even higher than 0.5. **Therefore, all the following analysis can be just used as an indicator, but without any statistical significance**.

63. Q10: If you could see yourself wearing a new product in an app what would be the most important things for you when doing this? Vs Q1: What is your gender?

64. Table of Q10: If you could see yourself wearing a new product in an app what would be the most important things for you when doing this? Vs Q1: What is your gender?
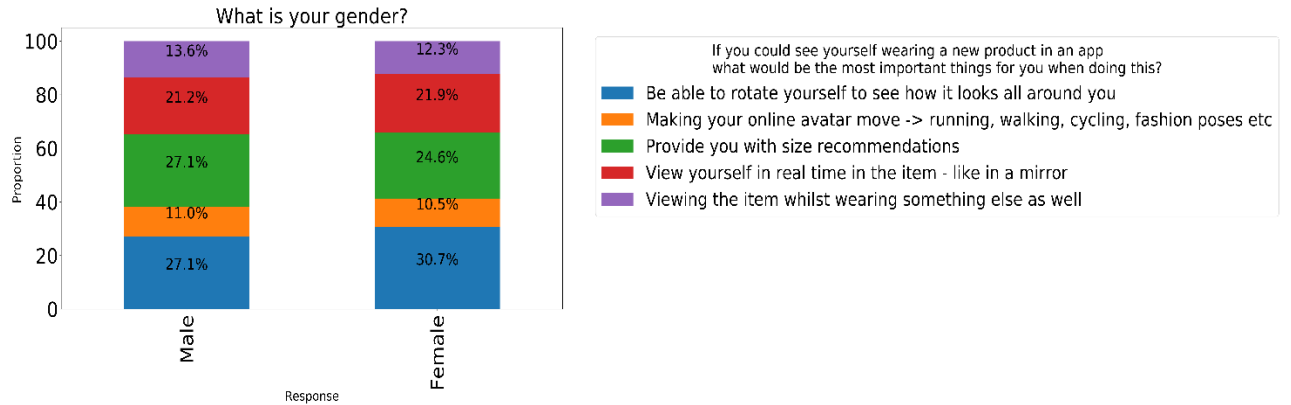
If you could see yourself wearing a new product in an app what would be the most important things for you when doing this? What is your gender?	Be able to rotate yourself to see how it looks all around you	Making your online avatar move -> running, walking, cycling, fashion poses etc	Provide you with size recommendations	View yourself in real time in the item - like in a mirror	Viewing the item whilst wearing something else as well	Total
Male	32	13	32	25	16	118
Female	70	24	56	50	28	228
Total	102	37	88	75	44	346

From the above plot, we can see how the 5 different answers are distributed both for male and female participants. It can be seen that the percentages are very similar across gender. As discussed in the univariate analysis, the most frequent feature was "Be able to rotate yourself to see how it looks around you", followed by "Provide you with size recommendations". From the above plot, we can comment that the gender of the participants does not play a great role in the features of the application (as also proved with a chi-square test with a very high p-value-0.94).

65. Q10: If you could see yourself wearing a new product in an app what would be the most important things for you when doing this? Vs Q2: How old are you?

66. Table of Q10: If you could see yourself wearing a new product in an app what would be the most important things for you when doing this? Vs Q2: How old are you?

If you could see yourself wearing a new product in an app what would be the most important things for you when doing this?	Be able to rotate yourself to see how it looks all around you	Making your online avatar move -> running, walking, cycling, fashion poses etc	Provide you with size recommendations	View yourself in real time in the item - like in a mirror	Viewing the item whilst wearing something else as well	Total
How old are you?						
Under 16	0	0	2	2	2	6
16-24	29	11	21	19	12	92
25-34	45	18	42	30	19	154
35-44	16	6	13	14	10	59
45-54	6	1	5	7	1	20
55+	6	1	5	3	0	15
Total	102	37	88	75	44	346

It is also important to see, the relationship between age and specific features. The above could give us an idea of which, participants of different ages believe, are the most important features. We can comment that the distribution of the features among different ages is very similar (excluding "Under 16" for which we had very low number of observations). For the rest of the age scales, the preferences are quite similar with once again the choice "Making your online avatar move -> running, walking, cycling, fashion poses etc" to be the less frequent.

67. Q10: If you could see yourself wearing a new product in an app what would be the most important things for you when doing this? Vs Q4: How likely would you be to use an app that allowed you to virtually change your outfit and then share a picture of this?

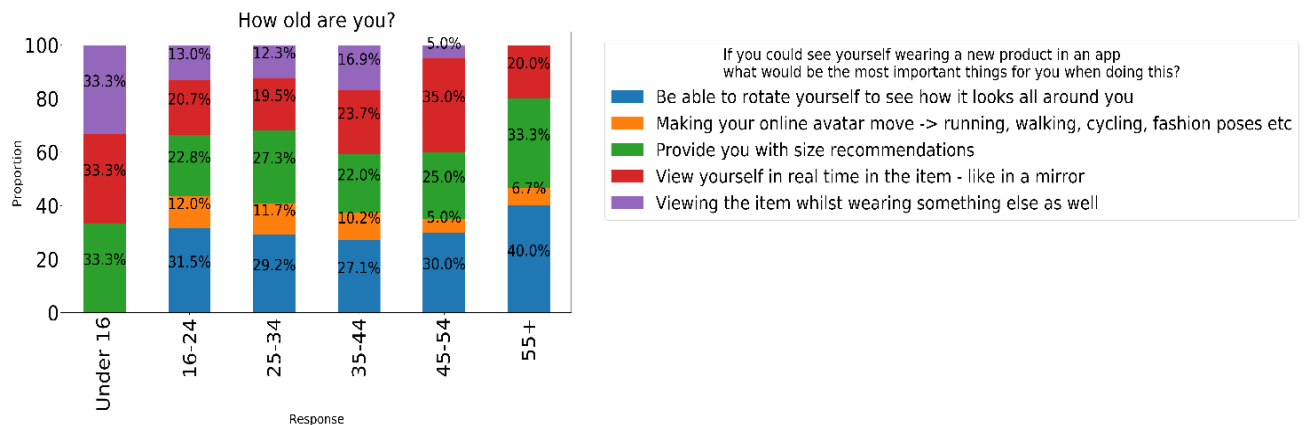### 68. Table of Q10: If you could see yourself wearing a new product in an app what would be the most important things for you when doing this? Vs Q4: How likely

would you be to use an app that allowed you to virtually change your outfit and then share a picture of this?

If you could see yourself wearing a new product in an app what would be the most important things for you when doing this? How likely would you be to use an app that allowed you to virtually change your outfit and then share a picture of this?	Be able to rotate yourself to see how it looks all around you	Making your online avatar move -> running, walking, cycling, fashion poses etc	Provide you with size recommendations	View yourself in real time in the item - like in a mirror	Viewing the item whilst wearing something else as well	Total
Very likely	22	8	15	14	7	66
Likely	26	14	25	19	9	93
I would use it but not share the picture	39	8	32	30	23	132
Not likely	15	7	16	12	5	55
Total	102	37	88	75	44	346

It is also interesting to see if people, who are less likely to use the app, have different preferences regarding the features of the app (or to check if they skewed the distribution of the features). From the plot above though, we cannot really conclude something for that. It can be seen that their preferences are similar to the other participants (the ones that are willing to try the app). Moreover, the Chi-square here showed that there is not any relation between the two questions (fail to reject the null hypothesis with p-value approximately 0.6)

69. Q10: If you could see yourself wearing a new product in an app what would be the most important things for you when doing this? Vs Q6: Knowing your own body measurements can be extremely helpful in finding the right size for yourself. Have you ever scanned yourself with an app to determine your body measurements (finding the right size, perfect fit, fit finder etc)?

Knowing your own body measurements can be extremely helpful in finding the right size for yourself.
Have you ever scanned yourself with an app to determine your body measurements (finding the right size, perfect fit, fit finder etc) ?
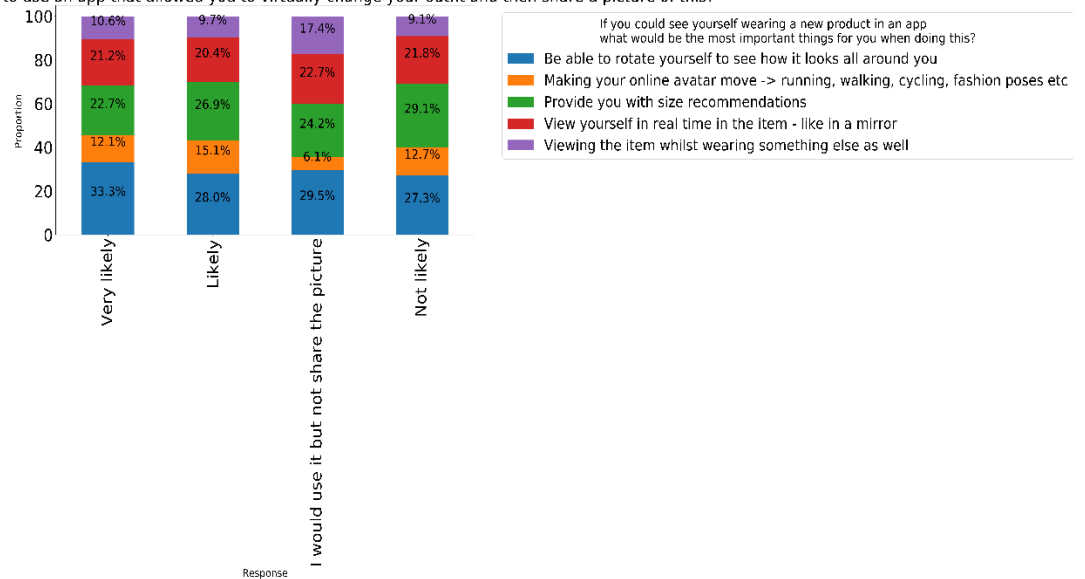
70. Table of Q10: If you could see yourself wearing a new product in an app what would be the most important things for you when doing this? Vs Q6: Knowing your own body measurements can be extremely helpful in finding the right size for

yourself. Have you ever scanned yourself with an app to determine your body measurements (finding the right size, perfect fit, fit finder etc)?

If you could see yourself wearing a new product in an app what would be the most important things for you when doing this?	Be able to rotate yourself to see how it looks all around you	Making your online avatar move -> running, walking, cycling, fashion poses etc	Provide you with size recommendations	View yourself in real time in the item - like in a mirror	Viewing the item whilst wearing something else as well	Total
Knowing your own body measurements can be extremely helpful in finding the right size for yourself. Have you ever scanned yourself with an app to determine your body measurements (finding the right size, perfect fit, fit finder etc) ?						
Yes	13	11	13	11	8	56
No and I would like to try	77	25	61	57	33	253
No and I wouldn't	12	1	14	7	3	37
Total	102	37	88	75	44	346

From the plot on the page before, we can observe that there are only slight differences between the people who have already tried or are willing to try an app to determine body measurements and the features that they prefer. However, for those who are not willing to try such an app, almost 40% would like the feature "Provide you with size recommendations" in comparison to approximately 24% for each one of the other 2 answers, but the number of answers in this category is very low to test for statistical difference.

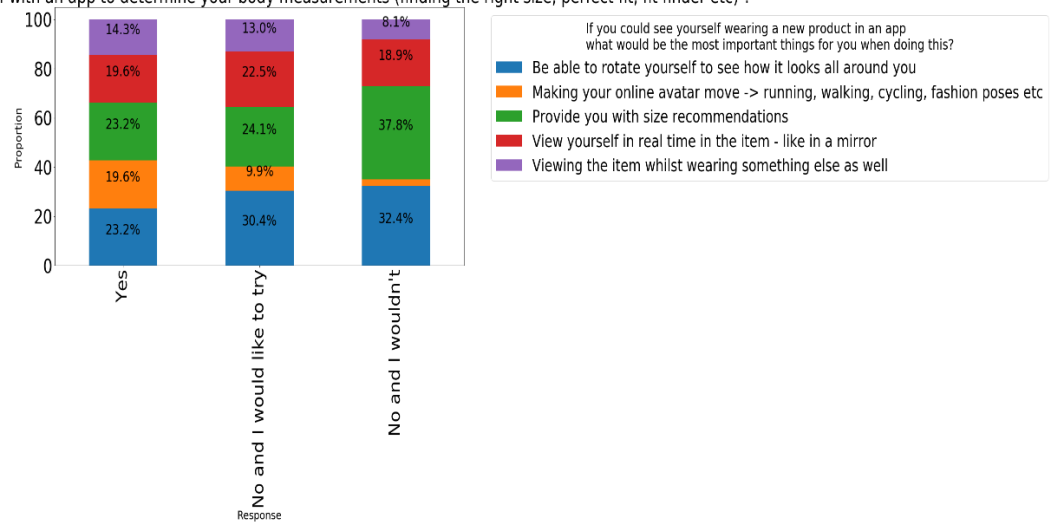**71. Q10: If you could see yourself wearing a new product in an app what would be the most important things for you when doing this? Vs Q9: Do you visualize yourself wearing something before buying it?**
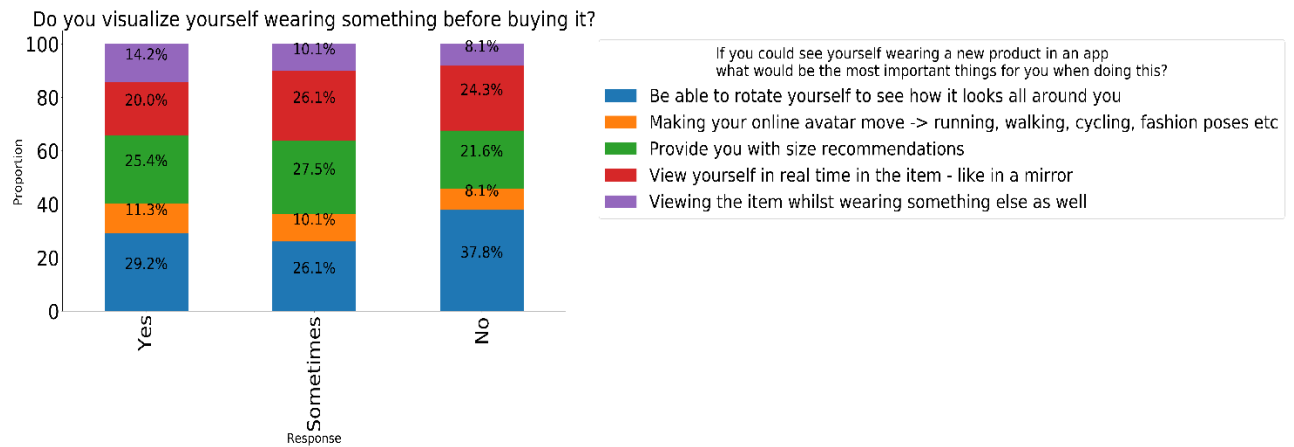
72. Table of Q10: If you could see yourself wearing a new product in an app what would be the most important things for you when doing this? Vs Q9: Do you visualize yourself wearing something before buying it?

If you could see yourself wearing a new product in an app what would be the most important things for you when doing this?	Be able to rotate yourself to see how it looks all around you	Making your online avatar move -> running, walking, cycling, fashion poses etc	Provide you with size recommendations	View yourself in real time in the item - like in a mirror	Viewing the item whilst wearing something else as well	Total
Do you visualize yourself wearing something before buying it?						
Yes	70	27	61	48	34	240
Sometimes	18	7	19	18	7	69
No	14	3	8	9	3	37
Total	102	37	88	75	44	346

From the plot on the page before seems, that the preference of the features does not really depend on if the participants visualize themselves wearing something before buying it. The frequencies are similar among categories (as also proved from a Fisher exact test for which we cannot reject the null hypothesis that there is not any relation between the two answers).

In the next section, we compare question 5 with a set of questions. As discussed before, given the fact that we have different number of answers in each one of the questionnaires, we will do the analysis separately for each one. First will be the ODLO questionnaire results and then we will follow up with the Mallzee one.

Given that in this questionnaire, the participants could choose more than one answer for question 5, we were using the same assumption as in question 10. Therefore, we assume that each answer is coming from different participants (even if this is not true).

Once again here, we use statistical tests to check if there is any association between the pair of questions, but in all cases we cannot reject the null hypothesis (which is that there is not any association between them). **Therefore, similar to question 10, the following analysis is just an indicator without statistical significance.**

73. Q5: What do you think would be the most important feature of this app? Vs Q1: What is your gender? (ODLO questionnaire)

74. Table of Q5: What do you think would be the most important feature of this app? Vs Q1: What is your gender? (ODLO questionnaire)

What do you think would be the most important feature of this app? What is your gender?	Being able to change image in an existing photo	How quickly it created a picture	How the clothes fit you	How the clothes looked on you	The design of the clothes you could try out	Total
Male	6	12	22	23	18	81
Female	6	8	35	37	17	103
Total	12	20	57	60	35	184

We start by plotting the possible answers for the most important feature regarding the gender. As we also saw in question 10, there are not many differences between the two genders. A small difference is that males seem to care more about speed and the design of the clothes they can try, compared to females. On the other hand, female participants prefer mostly features regarding how the clothes fit and look on them. The Chi-square though showed that there is not any association between gender and the features (p-value equal to 0.343).

75. Q5: What do you think would be the most important feature of this app? Vs Q2: How old are you? (ODLO questionnaire)

76. Table of Q5: What do you think would be the most important feature of this app? Vs Q2: How old are you? (ODLO questionnaire)

What do you think would be the most important feature of this app? How old are you?	Being able to change image in an existing photo	How quickly it created a picture	How the clothes fit you	How the clothes looked on you	The design of the clothes you could try out	Total
16-24	2	2	8	7	5	24
25-34	6	8	31	33	21	99
35-44	1	5	11	11	5	33
45-54	1	5	4	5	2	17
55+	2	0	3	4	2	11
Total	12	20	57	60	35	184

In this specific questionary, we did not have any participant under 16 years old. The counts for the rest of the preferences are quite similar, with the answers "How the clothes looked on you" and "How the clothes fit you" being the most frequent.

77. Q5: What do you think would be the most important feature of this app? Vs Q4: How likely would you be to use an app that allowed you to change your outfit in a picture and then share this picture of this? (ODLO questionnaire)

78. Table of Q5: What do you think would be the most important feature of this app? Vs Q4: How likely would you be to use an app that allowed you to change your outfit in a picture and then share this picture of this? (ODLO questionnaire)

What do you think would be the most important feature of this app? How likely would you be to use an app that allowed you to virtually change your outfit and then share a picture of this?	Being able to change image in an existing photo	How quickly it created a picture	How the clothes fit you	How the clothes looked on you	The design of the clothes you could try out	Total
Very likely	1	2	9	6	3	21
Likely	5	8	16	21	14	64
I would use it but not share the picture	5	6	25	26	10	72
Not likely	1	4	7	7	8	27
Total	12	20	57	60	35	184

An interesting observation here can be done for participants who answered "Not likely" for using such an app. It seems that they care more about "The design of the clothes they can try on" and the upload speed compared to the other categories. Another comment that can be done is that while the probability of using such an app is increasing, the percentage of the answers "How the clothes fit you" and "How the clothes looked on you" is also increasing. The statistical test though, showed that there is not any relationship between the two questions. Therefore, the above observations are probably due to the small sample size.

In summary, even if it seems that the participants which are more likely to use the app, care more about how the clothes fit and looked on them, it is not statistical proven.

79. Q5: What do you think would be the most important feature of this app? Vs Q6: Knowing your own body measurements can be extremely helpful in finding the right size for yourself. Have you ever scanned yourself with an app to determine your body measurements (finding the right size, perfect fit, fit finder etc)? (ODLO questionnaire)

Knowing your own body measurements can be extremely helpful in finding the right size for yourself.
Have you ever scanned yourself with an app to determine your body measurements (finding the right size, perfect fit, fit finder etc) ?

80. Table of Q5: What do you think would be the most important feature of this app? Vs Q6: Knowing your own body measurements can be extremely helpful in finding the right size for yourself. Have you ever scanned yourself with an app to determine your body measurements (finding the right size, perfect fit, fit finder etc)? (ODLO questionnaire)
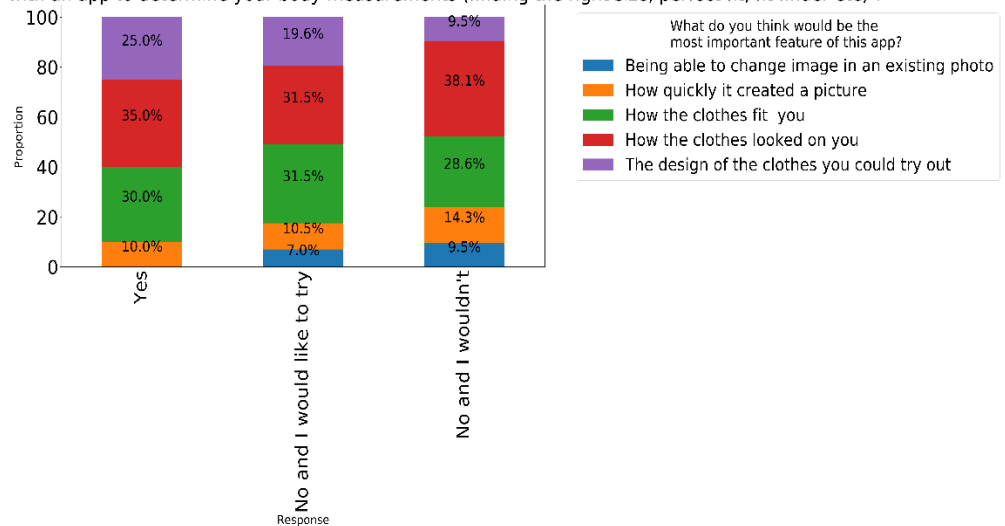
What do you think would be the most important feature of this app?	Being able to change image in an existing photo	How quickly it created a picture	How the clothes fit you	How the clothes looked on you	The design of the clothes you could try out	Total
Knowing your own body measurements can be extremely helpful in finding the right size for yourself. Have you ever scanned yourself with an app to determine your body measurements (finding the right size, perfect fit, fit finder etc) ?						
Yes	0	2	6	7	5	20
No and I would like to try	10	15	45	45	28	143
No and I wouldn't	2	3	6	8	2	21
Total	12	20	57	60	35	184

It seems that all features are balanced the same way either if you have already used an app to scan yourself or if you haven`t (No and I wouldn`t and No and I would like to try). Moreover, we cannot reject the null hypothesis that there is no association between the two questions (p-value for Fisher exact test equal to 0.89)

81. Q5: What do you think would be the most important feature of this app? Vs Q9: Do you visualize yourself wearing something before buying it? (ODLO questionnaire)

82. Table of Q5: What do you think would be the most important feature of this app? Vs Q9: Do you visualize yourself wearing something before buying it? (ODLO questionnaire)

What do you think would be the most important feature of this app? Do you visualize yourself wearing something before buying it?	Being able to change image in an existing photo	How quickly it created a picture	How the clothes fit you	How the clothes looked on you	The design of the clothes you could try out	Total
Yes	8	11	33	38	25	115
Sometimes	3	5	15	12	6	41
No	1	4	9	10	4	28
Total	12	20	57	60	35	184

From the above plot and the contingency table, we cannot comment on the preferences of the participants regarding the important features and their habit to try or not a cloth before buying it. In all three categories the percentages are similar and they align with the analysis which has been done until now. Moreover, the statistical test showed that there is not any association between the two questions (p value 0.939 for Fisher exact test).

83. Q5: What do you think would be the most important feature of this app? Vs Q7: How interested are you in seeing new products before they are released for sale and trying them on digitally? (ODLO questionnaire)

84. Table of Q5: What do you think would be the most important feature of this app? Vs Q7: How interested are you in seeing new products before they are released for sale and trying them on digitally? (ODLO questionnaire)

What do you think would be the most important feature of this app? How interested are you in seeing new products before they are released for sale and trying them on digitally?	Being able to change image in an existing photo	How quickly it created a picture	How the clothes fit you	How the clothes looked on you	The design of the clothes you could try out	Total
Very interested	2	6	20	22	11	61
Interested	7	9	26	27	17	86
Not interested	3	5	11	11	7	37
Total	12	20	57	60	35	184

Once again the distributions of each answer seem very similar in all cases, with the majority of the answers to be centred between "How the clothes looked on you" and "How the clothes fit you", followed by "The design of the clothes you could try out". We also cannot reject the null hypothesis here with a very high p-value (0.96) for Fisher exact test.

85. Q5: What do you think would be the most important feature of this app? Vs Q1: What is your gender? (MLZ questionnaire)
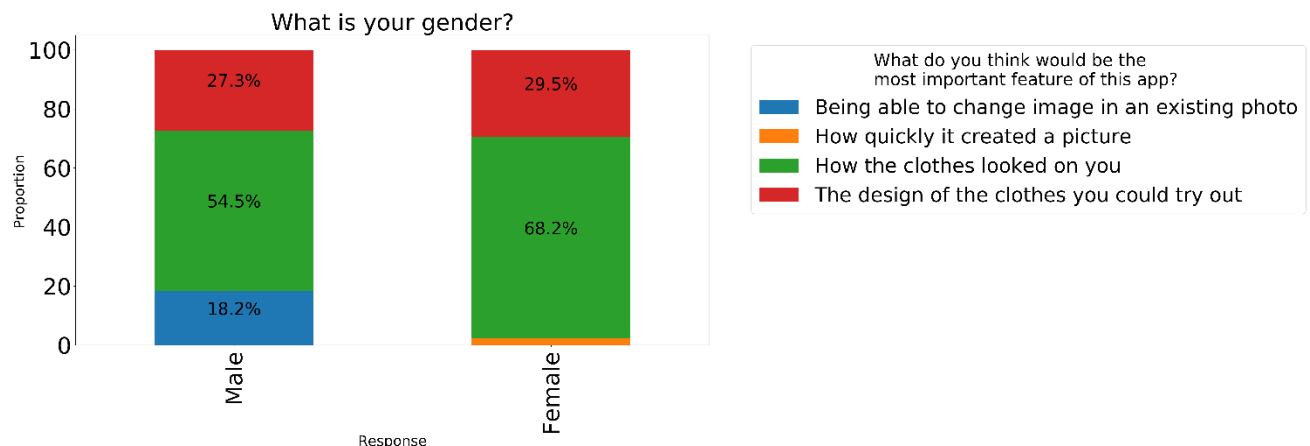
86. Table of Q5: What do you think would be the most important feature of this app? Vs Q1: What is your gender? (MLZ questionnaire)

What do you think would be the most important feature of this app?	Being able to change image in an existing photo	How quickly it created a picture	How the clothes looked on you	The design of the clothes you could try out	Total
What is your gender?					
Male	2	0	6	3	11
Female	0	1	30	13	44
Total	2	1	36	16	55

For this questionnaire the participants could only choose one answer. From the stacked bar plot on the page before we can see the preferences of different genders. In both cases the most frequent answer is "How the clothes looked on you", followed by "The design of the clothes you could try out".

There are some small differences between the genders, but given the very small sample for the Males, any statistical test will probably not be valid.

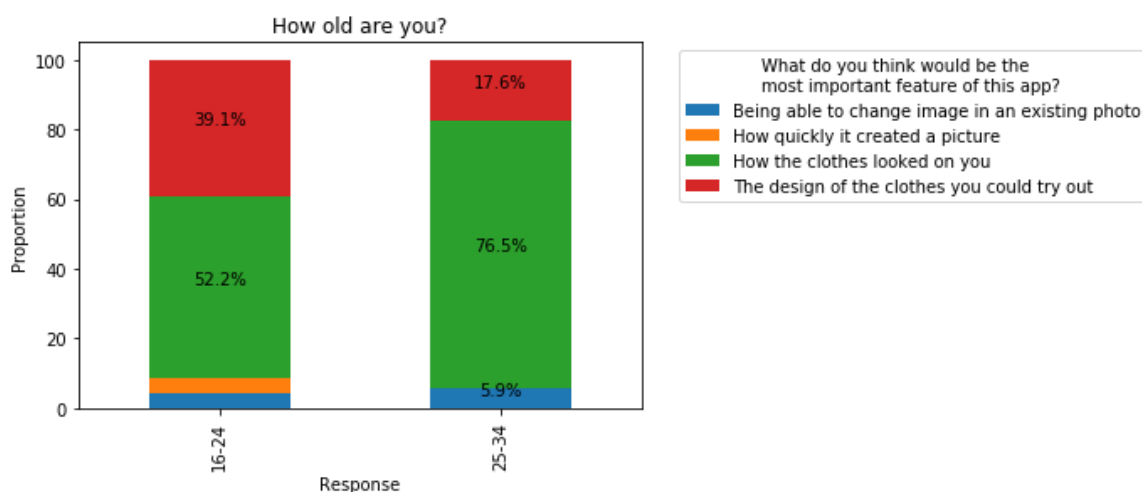## 87. Q5: What do you think would be the most important feature of this app? Vs Q2: How old are you? (MLZ questionnaire)

88. Table of Q5: What do you think would be the most important feature of this app? Vs Q2: How old are you? (MLZ questionnaire)

What do you think would be the most important feature of this app?	Being able to change image in an existing photo	How quickly it created a picture	How the clothes looked on you	The design of the clothes you could try out	Total
How old are you?					
Under 16	0	0	0	2	2
16-24	1	1	12	9	23
25-34	1	0	13	3	17
35-44	0	0	4	2	6
45-54	0	0	2	0	2
55+	0	0	5	0	5
Total	2	1	36	16	55

In this case, we have plotted only the age categories "16-24" and "25-34", because the rest of the categories have very few observations (as can be seen in the contingency table) and the results may lead to wrong conclusions. In these two categories the answer "How the clothes looked on you" is the most frequent.

89. Q5: What do you think would be the most important feature of this app? Vs Q4: How likely would you be to use an app that allowed you to change your outfit in a picture and then share this picture of this? (MLZ questionnaire)

90. Table of Q5: What do you think would be the most important feature of this app? Vs Q4: How likely would you be to use an app that allowed you to change your outfit in a picture and then share this picture of this? (MLZ questionnaire)

What do you think would be the most important feature of this app? How likely would you be to use an app that allowed you to change your outfit in a picture and then share a picture of this?	Being able to change image in an existing photo	How quickly it created a picture	How the clothes looked on you	The design of the clothes you could try out	Total
Very likely	0	1	15	4	20
Likely	0	0	3	2	5
I would use it but not share the picture	2	0	14	7	23
Not likely	0	0	4	3	7
Total	2	1	36	16	55

We also present the above plot, in order to see if we can focus on specific features, especially for the people that are willing to use the app. It seems though that people who are likely to use the app have the same preferences as the rest of the participants who are not likely to use the app. Given the small sample size and many cells with very low observations though, not a statistical valid conclusion can be done (especially for "Likely and "Not likely" we only have 5 and 7 responses respectively).

91. Q5: What do you think would be the most important feature of this app? Vs Q6: Knowing your own body measurements can be extremely helpful in finding the right size for yourself. Have you ever scanned yourself with an app to determine your body measurements (finding the right size, perfect fit, fit finder etc)? (MLZ questionnaire)

Knowing your own body measurements can be extremely helpful in finding the right size for yourself.
Have you ever scanned yourself with an app to determine your body measurements (finding the right size, perfect fit, fit finder etc) ?
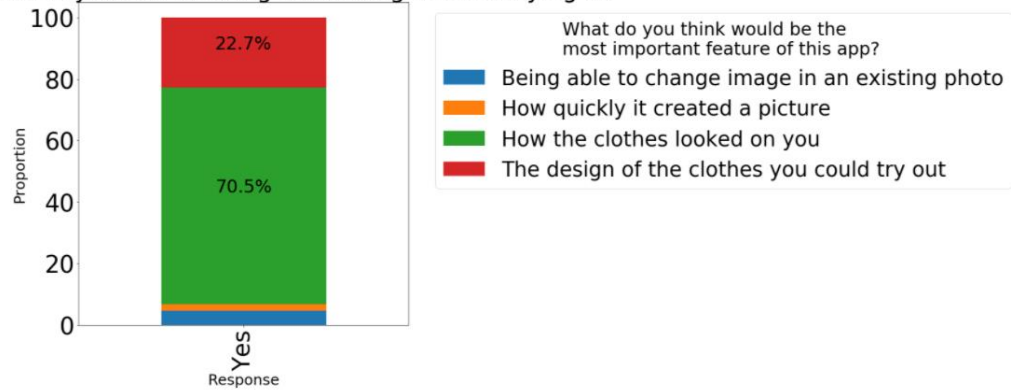
92. Table of Q5: What do you think would be the most important feature of this app? Vs Q6: Knowing your own body measurements can be extremely helpful in finding the right size for yourself. Have you ever scanned yourself with an app to determine your body measurements (finding the right size, perfect fit, fit finder etc)? (MLZ questionnaire)

What do you think would be the most important feature of this app?	Being able to change image in an existing photo	How quickly it created a picture	How the clothes looked on you	The design of the clothes you could try out	Total
Knowing your own body measurements can be extremely helpful in finding the right size for yourself. Have you ever scanned yourself with an app to determine your body measurements (finding the right size, perfect fit, fit finder etc) ?					
Yes	0	1	7	3	11
No and I would like to try	2	0	23	9	34
No and I wouldn't	0	0	6	4	10
Total	2	1	36	16	55

We tried the same thing, but in this case, we normalized the answers of the scanning app for finding your right size. The target was to see if the participants who answered "No and I wouldn`t", have different preferences from the rest of the people. Given the small sample, we cannot really conclude that though, even if the most frequent answers for all different categories are the same.

93. Q5: What do you think would be the most important feature of this app? Vs Q9: Do you visualize yourself wearing something before buying it? (MLZ questionnaire)

Do you visualise yourself wearing something before buying it?

94. Table of Q5: What do you think would be the most important feature of this app? Vs Q9: Do you visualize yourself wearing something before buying it? (MLZ questionnaire)

What do you think would be the most important feature of this app? / Do you visualise yourself wearing something before buying it?	Being able to change image in an existing photo	How quickly it created a picture	How the clothes looked on you	The design of the clothes you could try out	Total
Yes	2	1	31	10	44
Sometimes	0	0	4	3	7
No	0	0	1	3	4
Total	2	1	36	16	55

For this pair of questions, we plot only the "Yes" answer. As can be seen from the contingency table, the other two categories have very few observations and a plot with them could lead to wrong conclusions. Regarding the participants who voted "Yes", they think that the most important feature is 'How the clothes looked on you", which aligns with the analysis so far.

95. Q5: What do you think would be the most important feature of this app? Vs Q7: How interested are you in seeing new products before they are released for sale and trying them on digitally? (MLZ questionnaire)

96. Table of Q5: What do you think would be the most important feature of this app? Vs Q7: How interested are you in seeing new products before they are released for sale and trying them on digitally? (MLZ questionnaire)

What do you think would be the most important feature of this app? How interested are you in seeing new products before they are released for sale and trying them on digitally?	Being able to change image in an existing photo	How quickly it created a picture	How the clothes looked on you	The design of the clothes you could try out	Total
Very interested	2	1	14	11	28
Interested	0	0	20	4	24
Not interested	0	0	2	1	3
Total	2	1	36	16	55

For this pair of questions, we did not plot the answer "Not interested" given that it only got 3 answers. For the other two categories ("Very interested" and "Interested"), the plots shows that the features "How the clothes looked on you" and "The design of the clothes you could try out" are the most frequent in all cases. Regardless, given the low number of observations, we cannot make a statistically significant conclusion here.

4.5   Brief Summary of the findings

In summary, the results in most cases were consistent and aligned with what we were expecting. First of all, it is promising that approximately 85% of the participants are willing to use such an application (in different scales and with or without sharing the picture). Moreover, the participants prefer features related to the fit and looks of the clothes rather than the speed and freedom of changing images in an existing photo. Regarding wearing a new product, the majority of the participants prefer to be able to rotate themselves and to be provided with size recommendations (in this question though most of the answers had similar number of votes).

In order to decide the specific features of the application, it might make more sense to focus on specific answers and target groups (for example we should not focus on the answers of participants who are not willing to use such an app).

5.   User Requirements

5.1   User Requirements of the questionnaire of the Designer App

Even though analysing an open questionnaire is very difficult and does not give so many different analysis tools and insights, we can still say that we also got clear directions from the designer questionnaire.

The realistic look and true to life visual appearance seems very important to designers. More than any other category. Of course, it can be that very good visuals lead to also better outcomes in other categories such as better sales, less costs and better marketing content or fewer prototypes which are in the end more sustainable. In the beginning of all that stays the accurate, realistic and true to life virtual garment in a high quality.

What is preventing designers of getting to this realistic, true to life 3D visuals are the not perfectly useful software functionalities in their design software and computer power of their devices which seems to be overwhelmed with the software needs.

Animation is also a very important topic to designers, but they are also afraid of not being able to properly use animation features due to lack of their machine power.

If our application can help them in achieving realistic-looking, high-quality visuals, which can even include animation and also not overwhelm their devices, we have a very good chance to get an application, which is useful for the designers. Finally, it seemed that if with our app we could replace the designers' need for using multiple software suites for reaching realistic visualizations, it could really help them and address a variety of their needs.

5.2   User Requirements of the questionnaire of the DressMeUp App and the Magic Mirror App

We can say that 84.6% of all participants are willing to try the application we want to develop. While we have to see, that half of participants, who would try the app, would use it, but not share the picture (39.2%) this has to be kept in mind when it comes to developing the DressMeUp app which has the idea of the functionality of sharing quickly and easy images on social media. The most suitable outcome here is to give the choice of sharing the picture to the user as a feature.

We can also say that the applications are targeting a little bit more females than males but, despite that, we have a wide age range between 16 and 54 years old in both genders. The target persona uses also daily social media.

For the functionality of the apps, we can say that the most important feature is "How the clothes looked on you", which is also close to the feature "How the clothes fit you" (there is not any statistically significant difference between them). Therefore, we can conclude that for the participants of the app it is important to see how the clothes they try on virtually look on them in terms of fit, size, colour, style, print, material type, etc. It is all about directly seeing their visual appearance. Moreover, as mentioned above, the features "Being able to change image in an existing photo" and "How quickly it created a picture" were the less chosen features (with also significant difference with the rest of the features).

Regarding the features for the situation, where they could see themselves wearing a new product in an app, the answers "Be able to rotate yourself to see how it looks all around you" and "Provide you with size recommendations" were the most frequent (there was not any statistically significant difference between them). This can be connected with the answer "How the clothes looked on you", which they can better experience if they are

"able to rotate yourself to see how it looks all around you". As discussed, providing size recommendations should be also considered as a feature for the application.

Regarding the bivariate analysis, we had some interesting observations that could be used as insights for creating a questionnaire with a wider audience at a second phase, but at this phase, none of the pairs of questions tested appeared to be statistically correlated to each other to draw safe conclusions.