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EasyTV: Easing the access of Europeans with disabilities to converging media and content

Report on final tests: Type of tests, results and final feedback

EasyTV Project

H2020. ICT-19-2017 Media and content convergence. – IA Innovation action.

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Definitions, Acronyms and Abbreviations

ACRONYMS / ABBREVIATIONS	DESCRIPTION
NPS	Net Promoter Score
SUS	System Usability Scale
UI	User Interface
SL	Sign Language
ONCE	Organización Nacional de Ciegos Españoles
GDPR	General Data Protection Regulation
HbbTV	Hybrid Broadcast Broadband TV

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Executive Summary

This deliverable presents the results and feedbacks gathered from the final tests of the EasyTV project.

The document follows almost the same structure of the D6.2 with minor changes according to the services that have been tested. We also report here again the information related to the methodology and procedures used to carry out the tests (chapter 2) and ethical issues (chapter 3).

In the chapter 4 we present the results of each service as defined in the "Template for tests report" including a test conclusion paragraph for each service. In chapter 5 we report the overall conclusions with a summary table of the test results of each service and finally, in chapters 6 and 7 also references and annexes are reported for completeness.

One important issue raised during the final test have been the COVID-19 outbreak, so we had to change the execution of tests and rely only to the online/survey testing using the web site platform. However, we had the possibility to execute some live tests and face to face interview with some blind and visual impaired end user testers. These tests have been executed in Italy at UICI premise for the Speech Platform service through the Companion Screen Application.

1. INTRODUCTION

This deliverable aims at presenting all the information regarding the methodology and results of the final tests, including services tested, questionnaires delivered, and any new ethical consideration not covered by previous deliverables. The results obtained for each test carried out and the final conclusions drawn are also offered.

To execute the tests, we have prepared a demo for each service and created all videos in different languages for each of the services that had to be tested. End users were able to evaluate all the service usability and gave their opinion on the maturity of the proposed development.

Moreover, services were tested in different languages both to reflect the multilingualism that characterises the project and to assess the pertinence of the services developed regardless the geographical and cultural background of end users.

Unfortunately, due to the COVID-19 outbreak, we were only able to perform online tests after the restrictions put in place by the governments of the various states of the European community and in particular by the Italian, Spanish and Greek governments. However, before the restrictions we were able to execute some live tests and face to face interview with blind and visual impaired people at UICI premise. These live tests have been executed using the Companion Screen Application for the Speech Platform service.

2. INFORMATION FOR THE FINAL TESTING PHASE

This section offers the information regarding the final tests carried out during March-May 2020. As for the intermediate tests we used a common questionnaire for most of the services already approved by all partners and translated into English (see [annex 7.1](#) and [7.9](#)) Spanish ([7.2](#) and [7.10](#)), Catalan ([7.3](#) and [7.11](#)), Greek ([7.4](#) and [7.12](#)), Italian ([7.5](#) and [7.13](#)), Greek Sign Language ([7.7](#) and [7.15](#)), Spanish Sign Language ([7.8](#) and [7.16](#)) and Arabic ([7.6](#) and [7.14](#)).

Regarding the multilingual subtitles service carried out by CCMA we have included one more questions since the services has been tested in three languages (English, Spanish and Arabic) and three modalities (Multilingual subtitles on the website, Multilingual subtitles on HbbTV/live and Multilingual subtitles on HbbTV/on demand).

For the Avatar service instead, carried out by CERTH, we also used a different questionnaire to evaluate different features related to the quality of the Avatar itself. The questionnaire is reported in Spanish and Greek languages in annexes [7.17](#) and [7.18](#).

All the questionnaires were introduced in the testing platform created by CERTH (<https://easytvproject.eu/questionnaire#/form/services> and <https://easytvproject.eu/questionnaires/services.html>). See Figure 1: First Screens of the EasyTV final tests' platform - accessible page in the left

This platform allowed informants to take part in the test regardless both online and live face to face. The platform first presented a list of all the services available for testing. Users had to choose the one they were testing and then select their language. After making these two choices, users were informed about the test and asked for their consent and watch a demonstration video of the service. Finally, users finished by answering a questionnaire that was common to all services tested.

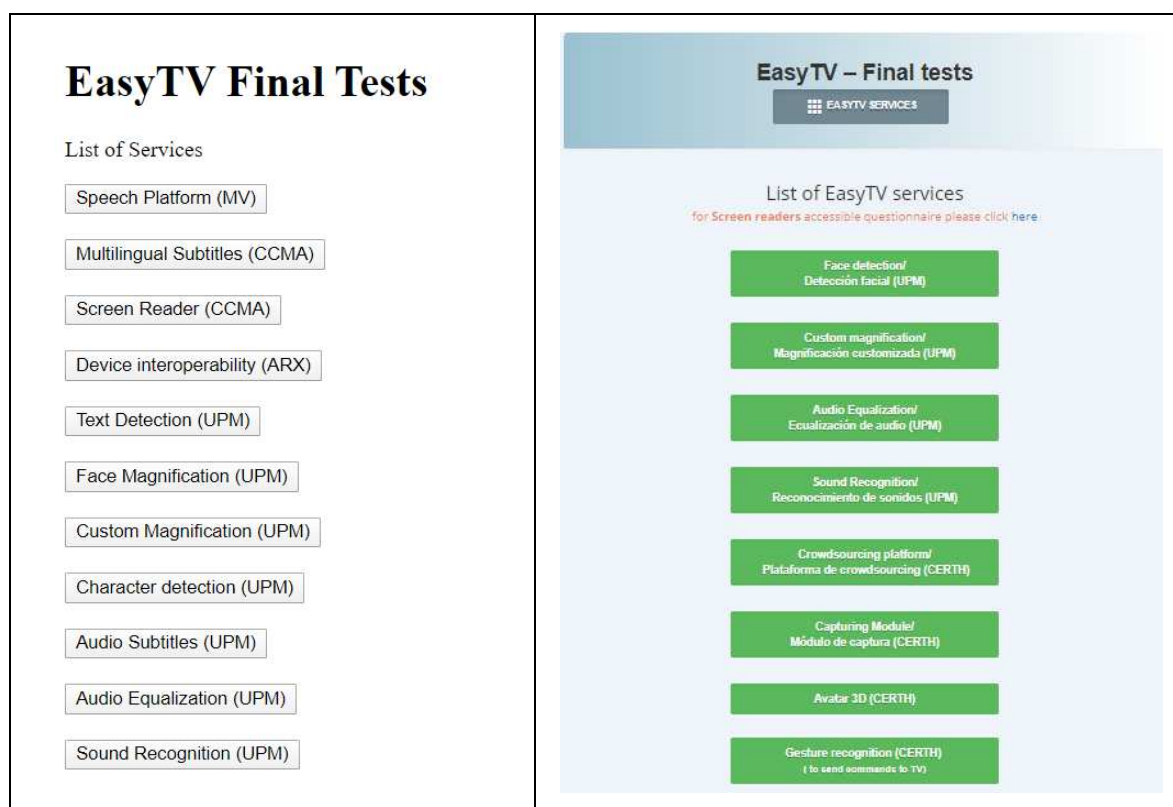


Figure 1: First Screens of the EasyTV final tests' platform - accessible page in the left

The following subsections specify which services were chosen to be tested, how they were tested (test modality and language), what kind of questions were included in the final test questionnaire and the workflow that all partners followed for the testing sessions.

2.1. Services to be tested

A total of 12 services were tested in this phase, which were the following:

1. **Crowdsourcing platform (CERTH):** this service is an online collaborative working platform in which several users interact to produce sign language interpreting.
2. **Capturing module (CERTH):** this service consists in a technology that captures the user's body movement, face expression and handshapes and translates them into data that can be used to animate a 3D skeleton.
3. **Gesture/gaze remote controller (CERTH):** this service uses the same motion capture technology of the capturing module to remotely control the TV using different predefined hand movements.
4. **Avatar (CERTH):** using the data produced with the capturing module, this service creates a 3D avatar animation that can perform sign language interpreting.
5. **Text detection (UPM):** this service detects any text on screen and converts it into a subtitle which can, if needed, be read as an audio subtitle.
6. **Face detection/magnification (UPM):** This service allows the user to magnify automatically faces detected in a previous step. The user can interpret better the movements of the lips.
7. **Custom magnification (UPM):** by using this service, the user can magnify the area of the screen they wish, which allows people with sight loss to see it better.
8. **Character detection and recognition (UPM):** This service automatically detects the characters that appear in the scene. The service provides information such as the name, the age, and the gender. The application can read aloud this information.

9. **Audio subtitles (UPM):** This service reads aloud the subtitles of a media content when they are enabled and showed on the screen. The user can customize the font size, the font color, and the background color.
10. **Audio Equalization (UPM):** This service allows a personal equalization of the multimedia content based on the user profile.
11. **Sound Recognition (UPM):** This service is in charge of detecting different sounds (previously defined from a common sound database) within the multimedia content and provide a textual label to be included in the playback of the content.
12. **Screen reader (CCMA):** this service detects text in the user interface and converts it into audio, so people with sight loss can listen to it, instead of reading it.
13. **Multilingual subtitles (CCMA):** this service provides multi-lingual subtitles to break language barriers.
14. **Device Interoperability (ARX):** this service provides the possibility to interact with home smart devices through the companion application of the EasyTV platform.
15. **Speech platform (MV):** this service is a speech platform system that lets users completely control the tv and applications using simple voice commands.

The services, the partners in charge of developing them, the test modality and the language in which the test was performed are summarized in Table 1.

Partner	Service and test modality	Language involved
CERTH	Crowdsourcing platform (online)	Greek Sign Language, Spanish Sign Language
	Capturing module (online)	Greek Sign Language, Spanish Sign Language
	Gesture/gaze remote controller (online)	Greek
	Avatar (online)	Greek Sign Language, Spanish Sign Language
UPM	Text detection (online)	Italian, Spanish
	Face detection/magnification (online)	Italian, Spanish
	Custom magnification (online)	Italian, Spanish
	Character detection and recognition (online)	Italian, Spanish
	Audio subtitles (online)	Italian, Spanish
	Audio Equalization (online)	Italian, Spanish
	Sound Recognition (online)	Italian, Spanish
CCMA	Multilingual subtitles (online)	Spanish, English, Arabic
	HbbTV Screen reader (online)	Catalan

MV	Speech platform (online + face to face)	Italian, Spanish
ARX	Device Interoperability (online)	Italian, Spanish

Table 1 Final tests details

2.2. Questionnaires

It was decided by all partners that all the users participating in the final tests would share the same questionnaire, so it would be easier to compare results. This decision was taken after the first project review, in which reviewers suggested not to separate users by disabilities, since one technology could be useful for more than a group. For example, audio subtitles, although initially thought as a service for people with sight loss, could be interesting for deaf people as well, since they can act as clean audio. The sections contained in the questionnaire informants were presented with were as follows.

2.2.1. Demographics

Only two questions integrated the demographics section of the questionnaire so that it would fit all the tests:

1. Highest level of studies reached:

- ☐ Lower than primary education
- ☐ Primary education
- ☐ Secondary education
- ☐ Advanced vocational education
- ☐ First cycle university education (diploma, degree or graduate studies)
- ☐ Second cycle university education (master, postgraduate or doctoral studies)
- ☐ Prefer not to tell

2. How would you define yourself? (more than one could be selected)

- ☐ Sight loss
- ☐ Blind
- ☐ 65+
- ☐ Hearing loss
- ☐ I'm deaf or hard of hearing, and I prefer to use sign language on my everyday life
- ☐ I'm deaf or hard of hearing, and I prefer to use oral language on my everyday life
- ☐ Prefer not to tell
- ☐ Other (please, indicate):

In both questions, users were given the choice of not answering in case they did not feel comfortable with giving personal information. Also, the second question aimed at avoiding the usual approach of focusing only on blind or deaf users by giving more options and even by offering users the opportunity to define themselves the way they thought to be most appropriate.

2.2.2. System Usability Scale (SUS)

The SUS is amongst the most popular usability testing tools due to its many advantages, such as its brevity and robustness, as well as it being free of charge (Katsanos *et al.*, 2012: 302; Bangor *et al.*, 2008). Despite its simplicity, Tullis and Stetson (2004) noted that the SUS yielded very reliable results across sample sizes. It has also been successfully applied to a wide range of devices and systems (learning management systems, landline telephones, non-web graphical user interfaces, automated telephone interfaces, web-based interfaces, to name a few), which proves its flexibility and lack of dependence towards the system under study. It was designed by John Brooke and it consists of just

ten questions, half of which are positive statements, while the rest are negative. These questions are alternated and presented in a fixed standardised order. Informants need to express how much they agree with the proposed statements selecting one of the five options available, ranging from “strongly disagree” to “strongly agree”. Final scores for the SUS can range from 0 to 100, where higher scores indicate better usability. Based on research, a SUS score above a 68 would be considered above average and anything below 68 is considered below average.

The SUS consists of 10 questions with 5 options to choose from. Here below we report the 10 questions used to test the EasyTV ecosystem.

1. I think that I would like to use this service frequently
2. I found the service unnecessarily complex
3. I thought the service was easy to use
4. I think that I would need the support of a technical person to be able to use this service
5. I found the various functions in this service were well integrated
6. I thought there was too much inconsistency in this service
7. I would imagine that most people would learn to use this service very quickly
8. I found the service very cumbersome to use
9. I felt very confident using the service
10. I needed to learn a lot of things before I could get going with this service

For the calculation of the SUS score for each of the respondents we have to follow few simple steps:

Step 1: Convert the scale into number for each of the 10 questions

- Strongly Disagree: 1
- Disagree: 2
- Neutral: 3
- Agree: 4
- Strongly Agree: 5

Step 2: Calculate

- $X = \text{Sum of the points for all odd-numbered questions} - 5$
- $Y = 25 - \text{Sum of the points for all even-numbered questions}$
- $\text{SUS Score} = (X + Y) \times 2.5$

The rationale behind the calculation is very intuitive. The **total score is 100** and each of the questions has a weight of 10 points.

As odd-numbered questions are all in a positive tone, if the response is “**strongly agree**”, you will want to give them the **maximum point** which is 10 for each question. If the response is “**strongly disagree**”, you will want to give them the minimum point which is 0. By subtracting 1 from each of the odd-numbered questions, you ensure that minimum is 0. After which, by multiplying by 2.5, you ensure that the maximum is 10 for each of the questions.

Vice versa, for the even-numbered questions in a negative tone, if the response is “**strongly agree**”, you will want to give them the **minimum point** which is 0 for each question. If the response is “**strongly disagree**”, you will want to give them the minimum point which is 0. As such, by subtracting the points of each question from 5, you ensure that minimum is 0. After which, by multiplying by 2.5, you ensure that the maximum is 10 for each of the questions.

Finally, SUS score will be able to tell us the usability performance in the aspects of effectiveness, efficiency, and overall ease of use. The average SUS score is 68. This simply means that a score of 68 will just put you at 50th percentile. Below is the general guideline on the interpretation of SUS score.

SCORE	GRADE	ADJECTIVE
> 80.3	A	Excellent
68 – 80.3	B	Good
68	C	Okay
51 - 68	D	Poor
< 51	F	Awful

Table 2: Interpretation of SUS score

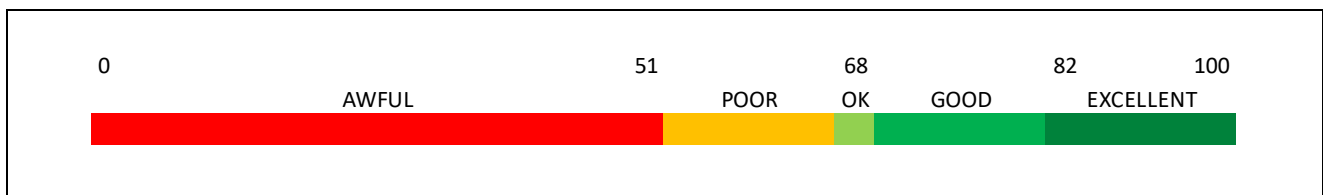


Figure 2: SUS grade scale

2.2.3. Net Promoter Score (NPS)

Net Promoter Score was also included in the questionnaire. This score is calculated based on responses to a single question: “How likely would you recommend our company/ product/ service to a friend or colleague?”. Respondents are asked to rate their response in a 0 to 10 scale, in which 0 means “definitely not” and 10 means “I would recommend it for sure”. Those who respond with a score of 9 to 10 are called “promoters”; those who respond with a score of 0 to 6 are labelled as “detractors”; and those responding from 7 to 8 are considered “passives”.

NPS calculation is done using the NPS formula that calculates the overall score by subtracting the percentage of detractors from the percentage of promoters. Passives can be ignored in the calculation. Once the score is calculated, the NPS grade scale (Figure 3: NPS grade scale) can be consulted to see how each service can be classified.

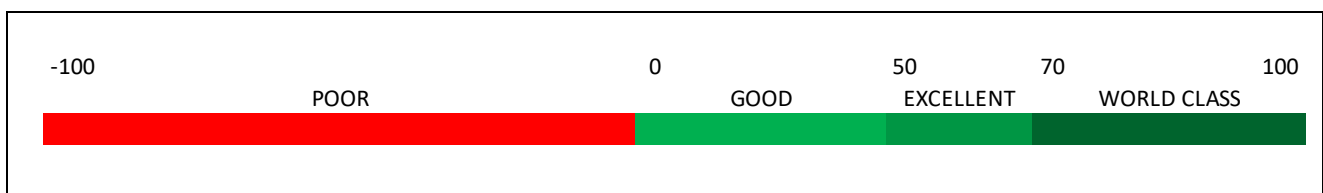


Figure 3: NPS grade scale

In the EasyTV tests, this question was followed by an open-ended question in which informants were asked to justify their score.

2.2.4. Others

Apart from the demographic questions, the questions based on the SUS questionnaire and the NPS, the following four more questions were added:

1. Did you know about or have you ever used this kind of service before? If so, which one?
2. Do you think we should continue researching and developing on this area of TV service?
 - ☐ Yes
 - ☐ No
 - ☐ Prefer not to tell
3. If you would like to suggest any new functionality or improvement, you can do it now.
4. Is there anything you would like to add?

The first question was considered to be important because previous experience with similar technology could have an impact on the results. Informants were given some space to write in case they wanted to share the type of technology they had experience with.

The second question asked informants if they thought that researching that service was worth it. The addition of this question was required by the reviewing committee in the first annual review. Its main goal was to know if the services being developed in the project were relevant enough to keep working on them. The question was compulsory but allowed the informants to choose a “prefer not to tell” option besides the usual “yes” or “no”.

The third of these additional questions allowed informants to suggest new functionalities or modifications that they considered could be added to the service to improve it. It was a non-compulsory open-ended question.

Also, at the end of the questionnaire, another open-ended question was added. This one let informants make any other comments that they considered to be valuable to our project. That space could also be used to add information about the informant's demographic profile that was not reflected in the first two questions or inform the developers about issues that were not necessarily usability related.

Finally, regarding the evaluation of the Avatar service, we formulated a different questionnaire from the one used for the other EasyTV services and the one used for the Avatar service intermediate testing. This is because during the intermediate testing, we identified the need for a more suitable questionnaire for the Avatar service with questions focusing on specific areas that CERTH can improve using the user feedback. As a result, the new questions inquired users on content understanding, realism of hand gestures and facial expressions, speed of signing, avatar appearance and contrast to background, etc. Such questions helped CERTH identify which areas of the avatar, according to user responses, require more attention to improve them.

2.3. Workflow

Partners were asked to follow two types of workflows to make sure that everybody carried out the tests in the same way. There were two possible test modalities: live face to face and online. The next subsections reproduce the steps that were recommended for each one.

2.3.1. Workflow for live tests

The workflow for live face to face tests was as follows:

- Stage 1: Welcome users + Introduction

In case of face to face testing, partners had to make sure the atmosphere was comfortable for the participants, with an adequate room arrangement and a proper internet connection. During the introduction, partners were asked to welcome informants and inform them about the test (for example, what exactly they would be testing) and the protocol.

- Stage 2: Users were paired with a computer/tablet

Partners needed to provide a computer/tablet already connected to the EasyTV testing platform. Users selected the service they would be testing and their preferred language. Partners assisted

them at this point.

- Stage 3: Users read online information sheet + consent form

Partners offered informants with sight loss either to use a screen reader or read the consent form and information sheet aloud to them. Partners made sure informants consented taking part in the test by selecting 'yes' on the consent form before proceeding.

- Stage 4. Users interacted with the service

Each partner had to write down the tasks users were asked to perform during the live face to face test. These instructions are included in the report each partner sent to WP6 leader (UAB) by the end of the testing phase.

- Stage 5. Users answered the questionnaire for each service tested

After interacting with the service, users went back to their computer/tablet and answered the questionnaire online in their own language.

- Stage 6. Farewell and thanks
- Stage 7: Each partner analysed the results of its own questionnaires
- Stage 8: Partners filled in the tests template for each service as a summary of the results together with future lines of action and sent it back to MV by June 10th, 2020.

2.3.2. Workflow for online tests

The workflow for online tests was as follows.

- Stage 1: Users were contacted and briefed

Users were contacted via email by user associations and briefly informed about the aim of the project and the service they would be testing. The email also provided the link of the EasyTV testing platform. Users were told to just follow the steps indicated in the platform and they were also informed about the deadline to complete the test.

- Stage 2: Users entered the EasyTV testing platform, read the information and consent form and, if willing to take part in the test, proceeded watching the video and answered the questions.
- Stage 3: Each partner analysed its own questionnaires after the deadline proposed to users.
- Stage 4: Partners filled in the tests template for each service as a summary of the results together with future lines of action and sent it back to MV by June 10th, 2020.

3. ETHICAL ISSUES

Deliverable 9 (D.9, M6) included all the ethical issues that the EasyTV project had taken into consideration so far. Since almost all the information included in that deliverable still applies, and for the sake of brevity, following only the latest changes regarding data protection regulations are presented.

3.1. Payment

No payments have been provided in this final test phase since it has been established that participation in the test should only take place on a voluntary basis.

3.2. Data protection

In May 2018 the “Regulation 2016/679 — protection of natural persons with regard to the processing of personal data and the free movement of such data” (GDPR) came into effect. This regulation substitutes the previous one from 1995, hence the EasyTV project having to take into consideration the new rights provided for European citizens. This new regulation aims at EU citizens better

controlling their personal data. Some of the key points raised by the GDPR are the following:

- easier access to their data: including providing more information on how that data is processed and ensuring that that information is available in a clear and understandable way.
- clearer data process.
- a clearer right to erasure: when an individual no longer wants their data to be processed and there is no legitimate reason to keep it, the data will be deleted.
- right to know when their personal data has been hacked: companies and organisations will have to inform individuals promptly of serious data breaches.

This new data management regulation was complied with by:

- Selecting a data protection officer. In this case it was Dr Pilar Orero from UAB.
- Making sure users gave their informed consent so that their data was processed for a specific purpose. Both the information and the consent were delivered in accessible ways whenever the informants required so.
- Making sure users could stop the test and withdraw their consent at any time without being subject to negative consequences.
- Making sure the only personal data asked for was that indispensable for more accurate analysis of the results i.e., their educational level and the impairment they suffer from (data minimisation and anonymity).
- Making sure the information that users were presented with was understandable and clear enough.
- Granting informants, the new rights recognized in this new directive, i.e., right to transparency of information, right of erasure, right of limitation and right to portability.
- By specifying how long their data would be stored for.

Also, in this final test phase no photos or videos of the tests have been taken, so we didn't draft any "image and video recording consent form".

4. RESULTS OF THE TESTS

As already said in "Chapter 1 INTRODUCTION", we were only able to perform online tests after the restrictions put in place by the governments of the various states of the European community and in particular by the Italian, Spanish and Greek governments. However, before the restrictions we were able to execute some live tests and face to face interview with blind and visual impaired people at UICI. These live tests have been executed using the Companion Screen Application with all the functionalities that can be accessed by voice interaction and touch including: speech platform, text detection, face magnification, character detection, custom magnification, audio subtitles, audio equalization, sound recognition and device interoperability.

The results are presented in this section. All the results include the data gathered for online tests except the speech platform which includes both modalities: online and live. When substantial differences were found among online data, the results obtained in the tests are presented separately.

4.1. Crowdsourcing Platform Online

General information about the test

- Testing partner: CERTH, FCNSE
- Service tested: Crowdsourcing Platform (CERTH)
- Testing date: (May - 2020)
- Venue: (Online) Greek users from Thessaloniki-KENΓ), Spanish users from FCNSE Madrid
- Number of participants: 15
- Language(s) involved: 2 – Spanish SL, Greek SL
- Tasks performed by users to carry out the test: Participants were asked to watch a demonstration video with the main actions:
 - Register a new member and login to the platform
 - Check the pending crowdsourcing tasks
 - Fulfil a task by using the appropriate files
- Approximate test duration: 10-15 minutes

4.1.1 Description of the informants' demographic profile:

In this section, the demographic data collected during the final tests is reported for the 15 participants (11 Spanish SL and 4 Greek SL).

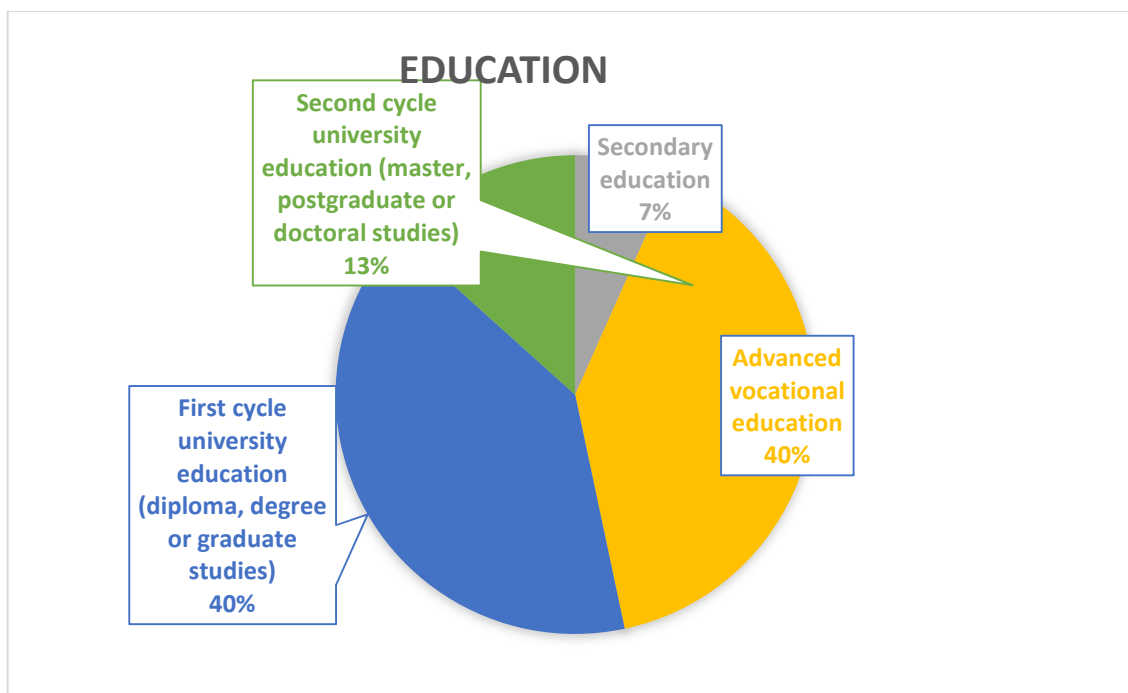


Figure 4: Crowdsourcing Platform Education Profiles

Regarding to the demographic profile of the participants, Figure 4 shows the percentages of the participants' educational level. We can see that about 60% have a higher than "Advanced vocational education level".

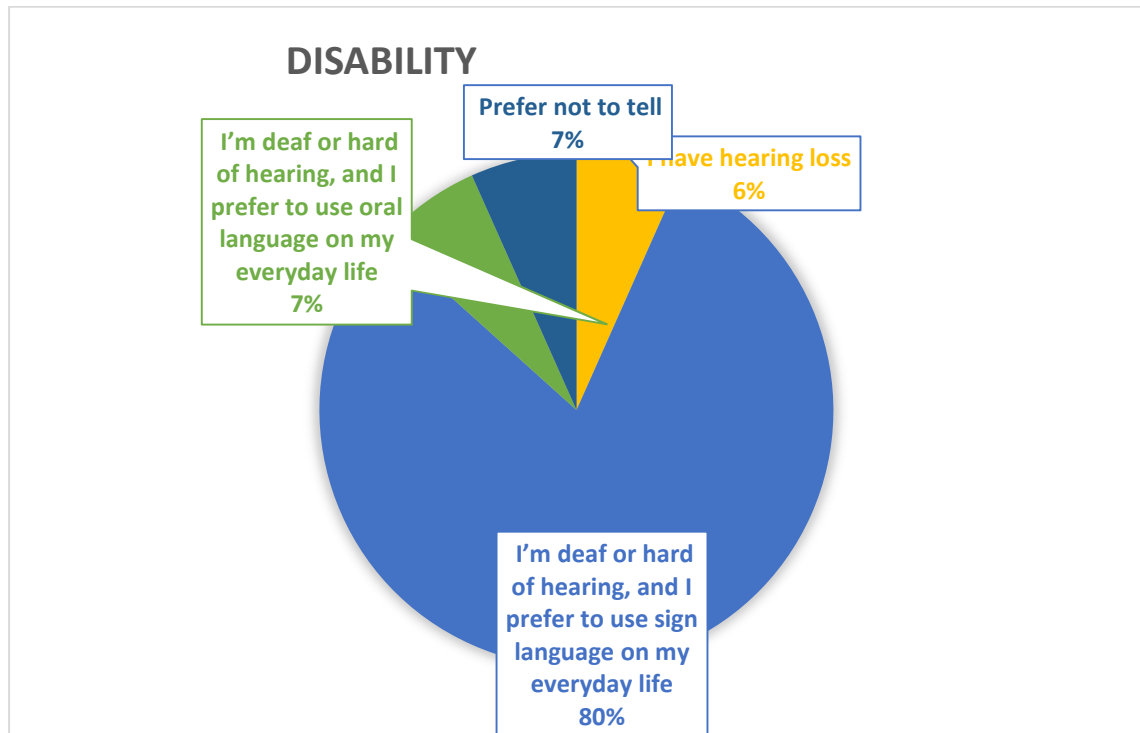


Figure 5: Crowdsourcing Platform Disability Profiles

Regarding the disability demographics of our participants, it should be remarked that our purpose was to include users of with good command of a Sign Language.

4.1.2 SUS results:

In this section, the SUS results of live tests with end users regarding their interaction with the Crowdsourcing platform service of EasyTV are summarized. **Due to Covid-19, an online demonstration of the platform's workflows was carried out instead of real tests with users.** However, this validation process is completely impersonal and reduces significantly the engagement of the users, since they don't participant in the execution of specific tasks using the proposed technology, (i.e., in a real application scenario the user has to complete first a session with the capturing module using the depth sensor in order to produce the required files and then upload these files using the Crowdsourcing platform), but instead they just watch an online demonstration before they fill in SUS and NPS questionnaires.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scales			
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.				
N.											Odd items	Even items	SUS score	Grade s
user 1	5	3	4	4	4	1	4	1	4	4	16	12	70	B
user 2	4	4	4	5	5	3	5	4	5	5	18	4	55	D
user 3	1	5	1	4	2	4	1	3	2	2	2	7	22,5	F
user 4	3	3	3	3	3	3	1	3	3	3	8	10	45	F
user 5	1	5	4	4	3	2	2	4	3	3	8	7	37,5	F
user 6	3	2	4	2	3	1	3	2	3	2	11	16	67,5	D
user 7	5	5	3	5	5	5	3	5	1	5	12	0	30	F
user 8	3	4	2	2	3	3	3	4	1	1	7	11	45	F
user 9	3	5	2	5	3	4	1	4	2	5	6	2	20	F
user 10	5	4	4	4	4	3	3	3	4	5	15	6	52,5	D
user 11	2	2	2	2	2	2	2	3	3	2	6	14	50	F
user 12	4	4	3	3	4	2	4	2	3	3	13	11	60	D
user 13	5	2	4	3	4	2	2	3	3	3	13	12	62,5	D
user 14	5	2	4	1	5	1	5	1	5	2	19	18	92,5	A
user 15	3	2	2	5	3	2	3	3	4	3	10	10	50	F
													50.67	

Table 3: Crowdsourcing Platform SUS Results

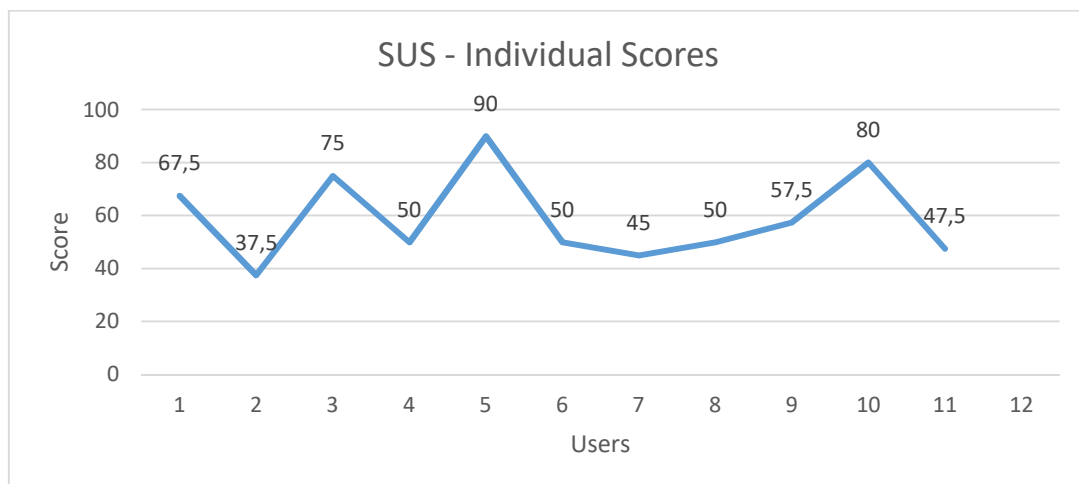


Figure 6: Crowdsourcing Platform - Chart graph of SUS scores

The Overall SUS score is almost 50,5, while the corresponding grade scale of SUS is D.

4.1.3 NPS results:

The table below reports the individual scores for each participant along their justification comments (wherever user provided one)

Individual Scores			
Response	Scores	Percentage	Comment of the choice (translated from Spanish and Greek)
1	8	9.09%	My parents are deaf and it seems incredible to me that there start to be platforms of this time, helping and adapting the information, etc.
2	10	11.36%	
3	2	2.27%	
4	5	5.68%	
5	2	2.27%	
6	7	7.95%	It is an accessible and easy to use service that I recommend I think it is easier to use or manage each section with a square of the areas of vocabularies with Spanish sign language. For personal
7	4	4.55%	
8	3	3.41%	
9	4	4.55%	
10	9	10.23%	
11	3	3.41%	It is an interesting service
12	8	9.09%	
13	9	10.23%	
14	8	9.09%	I was satisfied
15	6	6.82%	
Total	88	100%	

Table 4: Crowdsourcing Platform - NPS individual scores

In this NPS survey we have the following result based on the above formula

NPC CALCULATION	Number	%
Promoters	3	20%
Neutrals	4	27%
Detractors	8	53%
Total	15	100%
	NPS SCORE	-33.3

Table 5: Crowdsourcing Platform - NPS score calculation

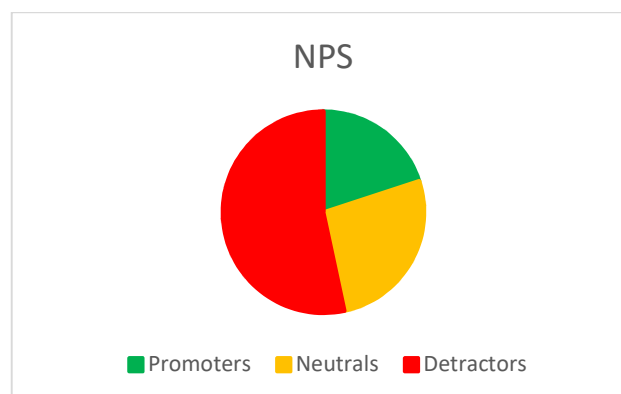


Figure 7: Crowdsourcing Platform - Chart of NPS data

4.1.4 Qualitative comments made

According the related question, about **80% of the participants** believe that research and development should be carried on this service.

CONTINUE RESEARCH	Response	%
YES	12	80%
NO	1	7%
NO RESPONSE	2	13%
Total	15	100%

Table 6: Crowdsourcing Platform - Continue with research response

Also, some of the users submitted the following qualitative comments:

N	COMMENT
1	As I work with people with intellectual disabilities, I think sign language is a fundamental tool also in the life of these people, if there was also an option with pictograms associated with signs it would be very complete and a unique communication tool
2	No one at the moment

Table 7: Crowdsourcing Platform - User Comments

4.1.5 Test conclusions

The Crowdsourcing platform's final version was enriched as its integration was implemented with backend services like the Ontology Web Service and the playback demo-preview of the MoCAP data. Despite the fact that we were expecting more favourable results considering the platform's upgraded features, the participants testing method was substantially different from the intermediate tests as **we were unable to perform live test sessions with users due to Covid-19** emergency measures. This situation reduced the participation in the tests to an online demonstration of the platform's workflows. In comparison, during the intermediate tests sessions we had the ability to present users with the whole workflow in-person, beginning from the Capturing Module tool till the automated production of the 3D signing avatar.

Finally, we should note that from the total 15 participants only 5 of them submitted qualitative comments related to their selected score and only 2 of them submitted comments related to suggested improvements or other advices. This fact may be interpreted as a strong indication that their interaction with the system during the online tests was not enough to give them a clear view and understanding of the platform's upgraded features. However, **the overwhelming majority of the participants 80% firmly believe that research and development should be carried on this service**, which is considered as a very positive feedback from the users.

Finally, it should be noted that **the same web platform has been used as the crowdsourcing infrastructure for the production of Multilingual Subtitles Online** whose pilots were orchestrated and conducted by CCMA since middle of January. The usability and **NPS results in this case (77,7% and 22)**, in a sharp contrast with the platform's Sign Language Production part, have been clearly favourable. These results came despite the fact that crowd volunteers were also prompted to

participate in a complex workflow of online crowdsourced production that involved frequent interaction and email communication with the platform, thus proving the platform's technical efficiency. **This leads us to the conclusion that substantial difference in the testing method (real frequent user sessions on one hand versus answering to questionnaires after watching a short demo clip) highly affected the user understanding of the platform's scope and upgraded features.**

4.2. Sign Language Capturing Module Online

General information about the test

- Testing partner: CERTH, FCNSE
- Service tested: Sign Language Capturing Module (CERTH)
- Testing date: (May - 2020)
- Venue: (Online) Greek users from Thessaloniki-KENΓ), Spanish users from FCNSE Madrid
- Number of participants: 15
- Language(s) involved: 2 – Spanish SL, Greek SL
- Tasks performed by users to carry out the test: Participants were asked to watch a demonstration video from the capturing of a signer.
- Approximate test duration: 10-15 minutes

4.2.1 Description of the informants' demographic profile:

In this section, the demographic data collected during final tests is reported for the 15 participants (11 Spanish SL and 4 Greek SL).

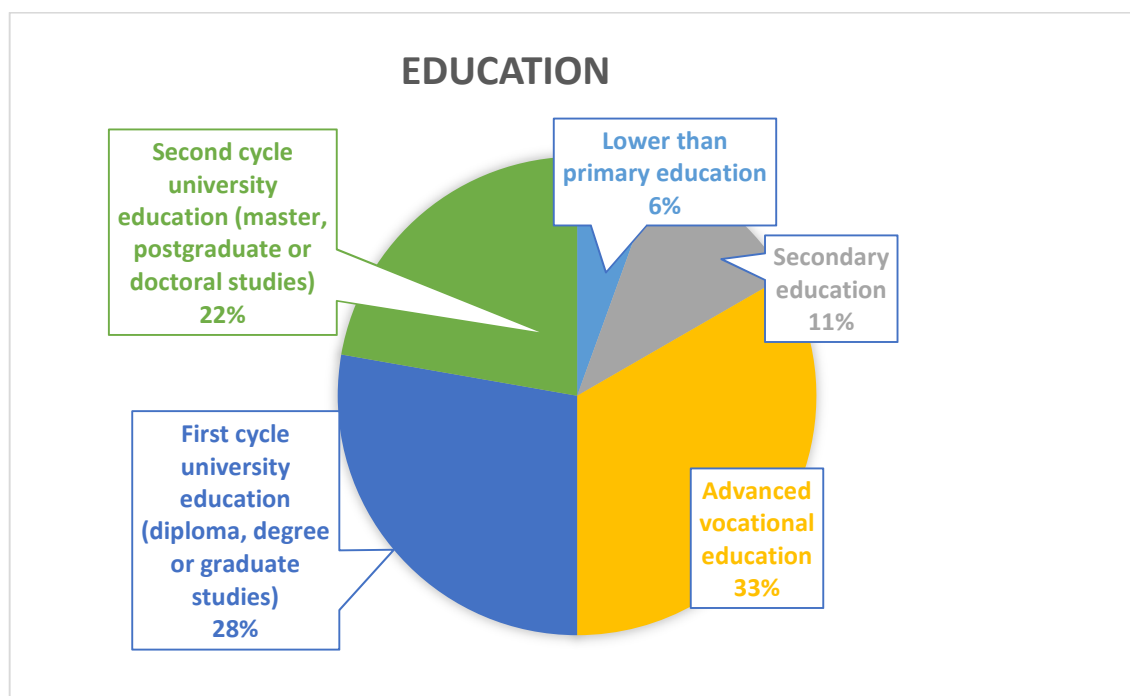


Figure 8: Capturing Module - Education Profile

Regarding to the demographic profile of the participants, we can see that the percentages of the participants' educational level. We can see that about 60% have a higher than "Advanced vocational education level".

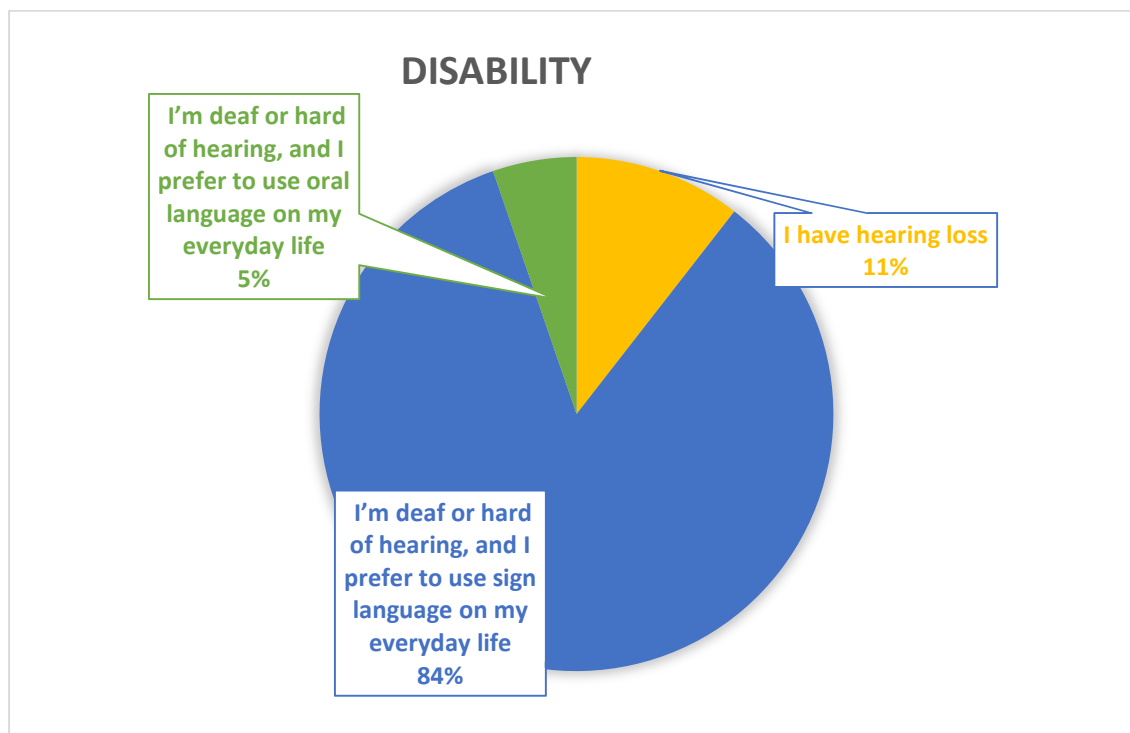


Figure 9: Capturing Module - Disability Profile

Regarding the disability demographics of our participants, it should be remarked that our purpose was to include users with good command of a Sign Language.

4.2.2 SUS results:

In this section, the SUS results of live tests with end users regarding their interaction with the Sign Language Capturing Module service of EasyTV are summarized. Similarly, with the previous case, **due to Covid-19, an online demonstration of the platform's workflows was carried out instead of real tests with users. This means that the users didn't have the opportunity to use the proposed technology for capturing signs, i.e., the users didn't use the depth sensor to capture signs, which usually increases the engagement of the users, but instead they watched a simple demo video.** At the end, SUS and NPS questionnaire is answered and comments are gathered from participants.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scales			
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.	Odd items	Even items	SUS score	Grades
N.														
user 1	5	5	3	5	1	5	5	5	3	5	12	0	30	F
user 2	5	4	4	5	5	3	3	4	4	2	16	7	57.5	D
user 3	1	4	2	2	2	4	3	3	4	2	7	10	42.5	F
user 4	1	5	1	5	5	5	1	5	1	5	4	0	10	F
user 5	3	3	3	3	3	3	1	3	3	3	8	10	45	F
user 6	3	3	3	5	2	3	2	4	1	3	6	7	32.5	F
user 7	2	3	2	4	3	4	2	4	2	4	6	6	30	F
user 8	1	1	5	1	5	1	5	1	5	1	16	20	90	A
user 9	2	2	3	2	3	2	3	2	3	2	9	15	60	D
user 10	5	5	3	5	5	5	3	5	1	5	12	0	30	F
user 11	1	5	1	5	1	5	3	5	1	3	2	2	10	F
user 12	5	4	4	4	4	4	4	4	4	4	16	5	52.5	D
user 13	2	2	2	2	2	3	3	3	3	1	7	14	52.5	D
user 14	2	4	1	4	1	4	2	4	2	3	3	6	22.5	F
user 15	3	3	4	4	4	2	4	2	4	4	14	10	60	D
user 16	5	2	4	1	5	2	4	1	4	1	17	18	87.5	A
user 17	3	3	2	5	3	3	2	3	2	4	7	7	35	F
user 18	3	3	2	5	3	3	2	3	3	5	8	6	35	F
													43.47	

Table 8: Capturing Module - SUS Results

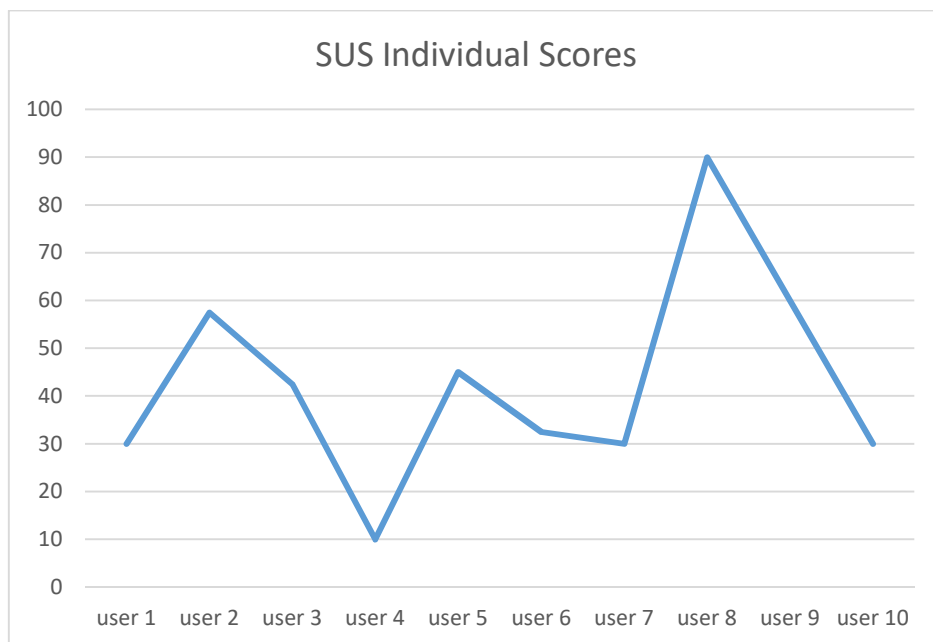


Figure 10: Capturing Module - Chart graph of SUS scores

The Overall SUS score is almost **43,5**, while the corresponding grade scale of SUS is **F**.

4.2.3 NPS results:

The table below reports the individual scores for each participant along their justification comments (wherever user provided one)

Individual Scores -			
Response	Number	Percentage	Comments (translated from Spanish & Greek)
1	5	6.25%	
2	10	12.50%	
3	1	1.25%	
4	0	0.00%	
5	5	6.25%	
6	2	2.50%	
7	2	2.50%	
8	8	10.00%	
9	3	3.75%	Es poco natural
10	3	3.75%	
11	0	0.00%	
12	6	7.50%	
13	2	2.50%	
14	4	5.00%	Por lo que no entiendo cuál es la intención de este sistema, si es para la vida cotidiana creo que es innecesariamente. Si en el ámbito de profesional relacionado LS o grabación podría ser útil.
15	9	11.25%	It's interesting and it's original
16	9	11.25%	is important for sign language
17	6	7.50%	
18	5	6.25%	
Total	80	100%	

Table 9: Capturing Module - NPS individual scores

Net Promoter Score Calculation

	Number	Percentage
Promoters	3	17%
Neutrals	1	6%
Detractors	14	78%
Total	18	100%
Net Promoter Score		-61.1

Table 10: Capturing Module - NPS score Calculation

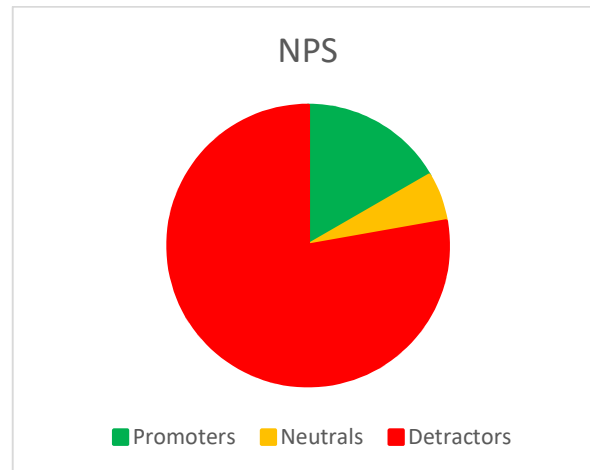


Figure 11: Capturing Module - Chart of NPS data

Figure 11 presents the classification of the testing participants according to the three types defined in NPS: promoters, neutrals and detractor. Although after the release of the final version we were expecting an increase in the NPS score of the final tests as the system was released integrated with most of its features.

4.2.4 Qualitative comments made

According the related question, about **72% of the participants believe** that research and development should be carried on this service.

CONTINUE RESEARCH	Response	%
YES	13	72%
NO	1	6%
NO RESPONSE	4	22%
Total	18	100%

Table 11: Capturing Module - Continue with research response

Also, some of the users submitted the following qualitative comments:

N	COMMENT
1	I think better to use easier and visual to press record / save / end
2	I would like to clarify first what is the intention and in what this type is applied, and what is it for. In order to give an exact answer

Table 12: Capturing Module - Comments

4.2.5 Test conclusions

While a number of targeted refinements and optimizations were made to this service according to expert signer instructions, we observe that results for both SUS and NPS declined from the intermediate tests. More specifically, the SUS overall score dropped by 14.5% from last time, with F being given by the majority of the participants now. NPS has also decreased since we now have a higher number of detractors (78%). There is a slight difference on the demographic profiles of participants to the ones of the previous tests, with 22% holding a post-graduate degree this time. No

safe conclusions can be made though, relating demographic characteristics to results. A more possible cause could be the **non-interactive way of testing due to the COVID-19 situation**. Testing with videos instead of live demos might indeed have had a negative impact to the participants in these tests. **Despite negative results, the majority of participants (72%) stated that research should be continued on this service.**

In order to have an **objective evaluation** of the motion data produced by the capturing module and specifically by the novel hand detection algorithm developed by CERTH [1], we carried out experimental results on the two most widely used dataset for 3D hand pose estimation, namely Rendered Handpose Dataset (RHD) [5] and Stereo Hand Pose Tracking Benchmark (STB) [4]. As can be seen by the experimental results below, **our video-based algorithm outperforms all state-of-the-art algorithms in both datasets**. This work was presented in the most prestigious conference on pattern recognition, namely IEEE Conference on Computer Vision and Pattern Recognition (CVPR, 2020).

Table 13: Capturing Module - Experimental results (average distance between predictions and ground truth) of the proposed hand detection algorithm in RHD and STB datasets and comparison with other state-of-the-art methods.

Method	RHD	STB
Zimmerman [5]	30.42	8.68
Yang/Yao [3]	19.95	8.66
Spurr [2]	19.73	8.56
Proposed [1]	15.61	6.93

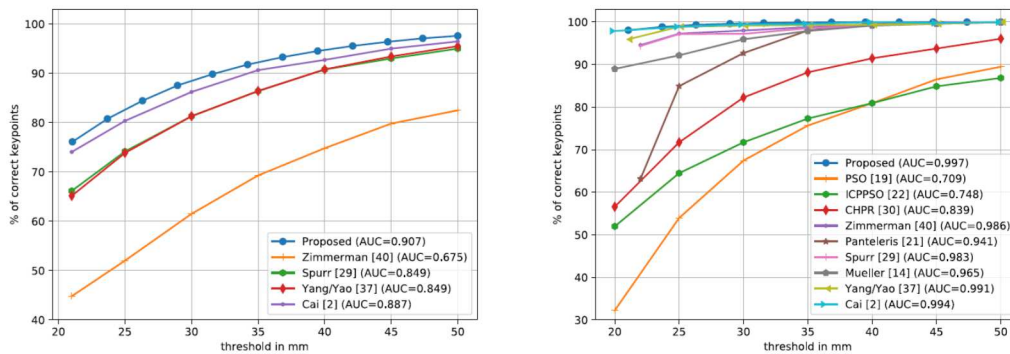


Figure 12: Capturing Module - AUC on PCK curve: Comparison to state-of-the-art methods on RHD (left) and STB (right) datasets

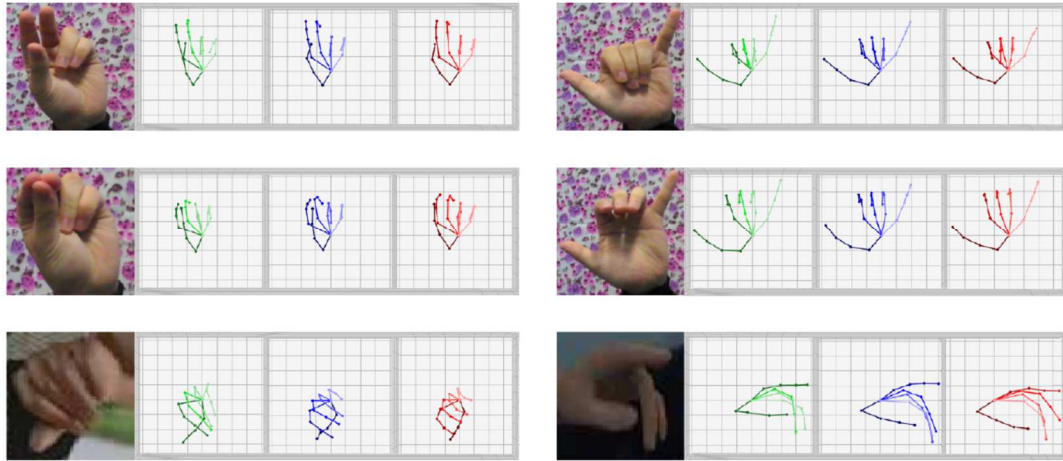


Figure 13: Capturing Module - Experimental results with CETH's algorithm. The red color indicates the final 3D hand pose estimation, while green and blue colors are used for intermediate results.

4.3. Gesture/gaze remote controller Online

General information about the test

- Testing partner: CERTH
- Service tested: Gesture/gaze remote controller
- Testing date: from June 1st to June 2nd
- Venue: Online
- Number of participants: 6
- Language(s) involved: Greek
- Tasks performed by users to carry out the test: The functionality of the Gesture/Gaze Remote controller was demonstrated online using a demo video.
- Approximate test duration: 15 minutes

4.3.1 Description of the informants' demographic profile:

As far as the demographic profile of the participants is concerned, Figure 14 shows the percentages based on users' educational level. As it can be seen, all participants have completed at least a bachelor degree in a university, while 67% of them have additional master or doctoral degrees.

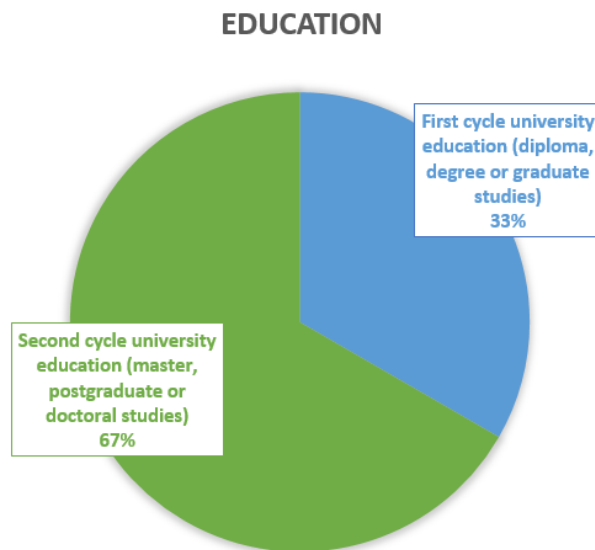


Figure 14: Gesture/gaze - Education Profiles

Regarding users' profile, no user belonged to any disability group since the gesture/gaze remote controller does not require specific user profiles for testing. As a result, all users were selected from the IT area due to their expertise with software development that we believe is crucial in order to obtain valuable feedback for the gesture/gaze remote controller.

4.3.2 SUS results:

Table 14 shows the results for the SUS questionnaire, while Figure 15 presents a graph with the individual scores. As it can be seen, the overall score is 87.92, which can be considered as a really good result (higher than the average score of 68). Furthermore, there is only one user that graded the service with B (SUS score of 80), while all other users graded the service with A (best SUS score

of 95). These results show that there is a very positive feedback from the users towards the gesture/gaze remote controller.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scales			
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.				
											Odd items	Even items	SUS score	Grades
N.														
user 1	5	2	5	2	5	1	5	1	5	1	20	18	95	A
user 2	4	2	4	2	5	2	5	1	4	1	17	17	85	A
user 3	4	1	1	1	5	1	4	1	4	2	13	19	80	B
user 4	4	2	5	1	5	1	5	1	5	2	19	18	92,5	A
user 5	4	1	5	1	5	1	4	1	5	2	18	19	92,5	A
user 6	3	1	4	2	5	1	4	2	5	2	16	17	82,5	A
													87,92	A

Table 14: SUS responses and scores for the gesture/gaze remote controller online tests.

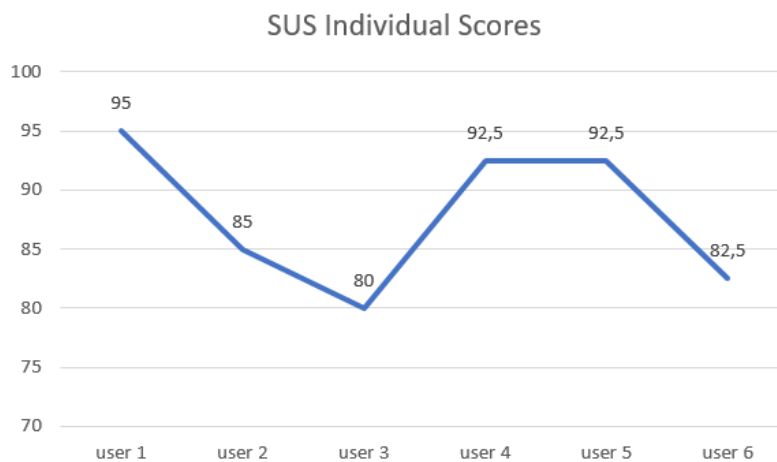


Figure 15: Gesture/gaze - Chart graph of SUS scores

4.3.3 NPS results:

The scores obtained for the NPS scale are presented in Table 15. One can observe that four users give a very high punctuation, thus becoming promoter users, while the rest users (two in number) are classified as neutral user.

Response	Scores	Percentage
1	10	18,87%
2	9	16,98%
3	9	16,98%
4	8	15,09%
5	9	16,98%
6	8	15,09%

Table 15: Gesture/Gaze - NPS individual scores

Table 16 shows the percentages of the promoters, neutrals and detractors users, along with the calculation of the Net Promoter Score. From Table 16, we can observe that the gesture/gaze remote controller achieves a NPS score of 66.7, which can be considered a very good result.

NPC CALCULATION	Number	%
Promoters	4	67%
Neutrals	2	33%
Detractors	0	0%
Total	6	100%
	NPS SCORE	66,7

Table 16: Gesture/gaze - NPS score calculation

Finally, Figure 16 presents the classification of the users according to the three types defined in NPS: promoters, neutrals and detractors. One can observe that the majority of users belong to promoters, while no detractor users exist.

NPS User Classification

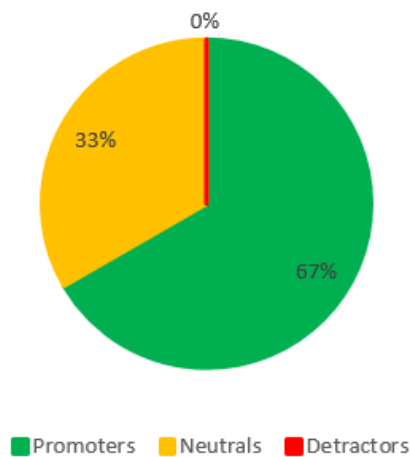


Figure 16: Gesture/gaze – Chart of NPS data

4.3.4 Qualitative comments made:

The main qualitative comments provided by the users during the test are included in Table 17. Only one user commented on the service, asking for a faster response (speed) of the service.

N	COMMENT
1	The service's response may be faster

Table 17: Main qualitative comments for the gesture/gaze remote controller online tests.

Finally, Table 18 presents the user responses on the question of whether the research on this particular service should continue. From the responses, we observe that all users want the service to keep being researched and improved.

CONTINUE RESEARCH	Response	%
YES	6	100%
NO	0	0%
NO RESPONSE	0	0%
Total	6	100%

Table 18: Gesture Gaze - Continue with research response.

4.3.5 Test conclusions

Based on the obtained results, we can conclude that all users were positively inclined towards the gesture/gaze remote controller (SUS score of 87.92 is higher than the average of 68). The users only commented on the speed of the service, considering there is room for improvement in this direction. Moreover, all users think the research on the service should continue, believing on its importance and value for the community. Regarding the NPS score, most users were promoters of the service, while none of the users are detractors. **Comparing the final with the intermediate testing of the service, it can be observed that the SUS score has been significantly improved (87.92 instead of 77.5),** while a single detractor that was present in the intermediate testing does not exist anymore. The improvement in the evaluation of the service can be attributed to the implementation of additional functionalities and the refinement of the existing ones, according to the comments of the users during the intermediate testing.

4.4. Avatar Online (Greek)

General information about the test

- Testing partner: CERTH
- Service tested: Avatar
- Testing date: June 1st
- Venue: Online
- Number of participants: 4
- Language(s) involved: Greek
- Tasks performed by users to carry out the test: The functionality of the Avatar service was demonstrated online using a demo video presenting a Greek signer.
- Approximate test duration: 15 minutes

4.4.1 Description of the informants' demographic profile:

As far as the demographic profile of the participants is concerned, Figure 17 shows the percentages based on Greek users' educational level. As it can be seen, all participants have completed at least a master degree in a university.

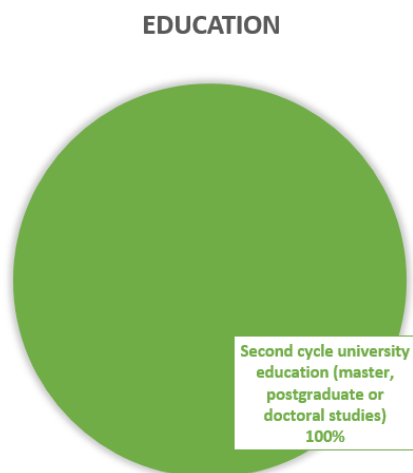


Figure 17: Avatar Greek - Education Profiles

Regarding Greek users' profile, all users are identified as having hearing loss, as shown in the figure below.

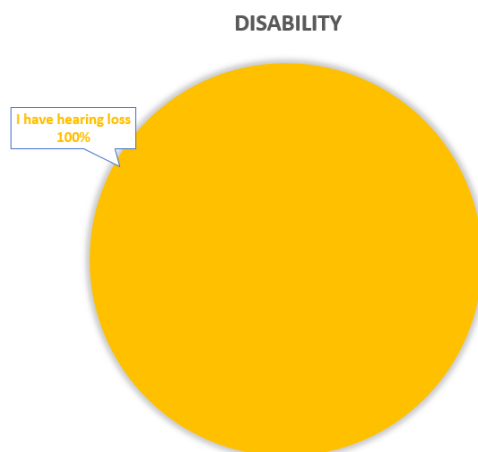


Figure 18: Avatar Greek – Disability Profiles

4.4.2 Content understanding:

Regarding the understanding of the avatar content by the Greek users, Figure 19 demonstrates that all Greek users show a high level of understanding of the content signed by the avatar (average score of 6.5).

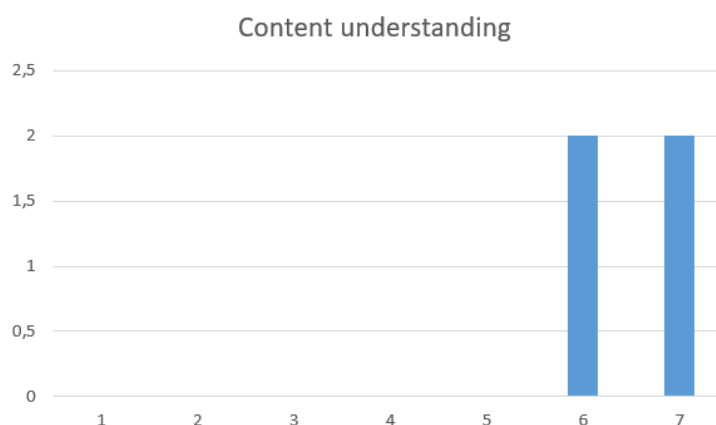


Figure 19: Level (1-7) of content understanding of the avatar reported by the Greek users.

4.4.3 Visibility of facial expressions:

Regarding the visibility of facial expressions of the avatar, Figure 20 demonstrates that all Greek users agree with a high level of confidence (average score of 5.5) that the facial expressions of the avatar are visible.

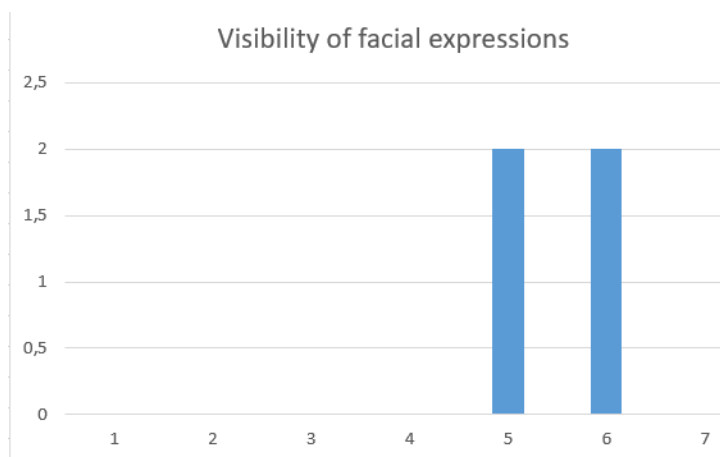


Figure 20: User agreement (1-7) on the visibility of facial expressions of the avatar reported by the

Greek users.

4.4.4 Visibility of hand gestures:

Regarding the visibility of hand gestures of the avatar, Figure 21 demonstrates that all Greek users are very confident (average score of 7) that the hand gestures performed by the avatar are visible.

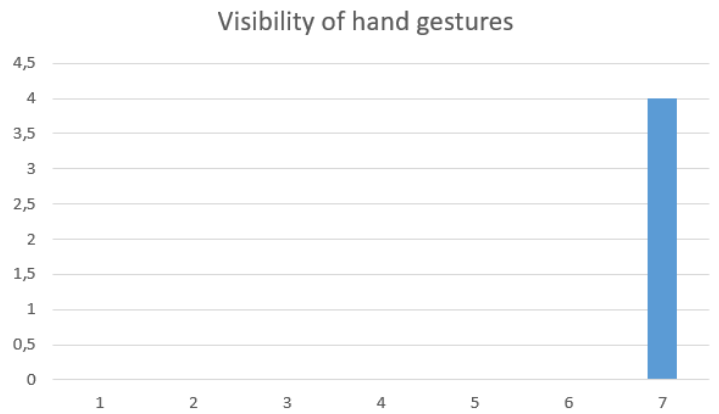


Figure 21: User agreement on the visibility of hand gestures of the avatar reported by the Greek users.

4.4.5 Coordination between hand gestures and facial expressions:

Regarding the level of coordination between hand gestures and facial expressions, Figure 22 demonstrates that all Greek users find that there is a high level of coordination between the hand gestures and the facial expressions of the avatar (average score of 6.5).



Figure 22: Level of coordination between hand gestures and facial expressions of the avatar reported by the Greek users.

4.4.6 Precision of hand gestures:

Regarding the precision of hand gestures, Figure 23 demonstrates that all Greek users find that there is a very high level of precision of the hand gestures of the avatar (average score of 7).

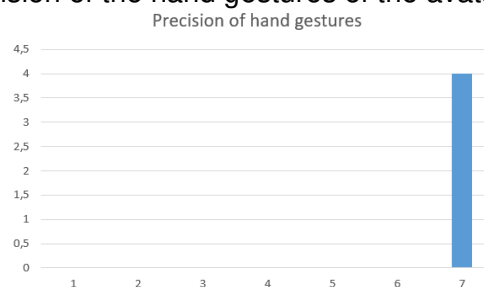


Figure 23: User agreement on the visibility of hand gestures of the avatar reported by the Greek

users.

4.4.7 Realism of avatar movements (irrespective of level of understanding):

Regarding the realism of avatar movements, Figure 24 demonstrates that all Greek users find that there is a high level of realism on the avatar movements (average score of 5.25).

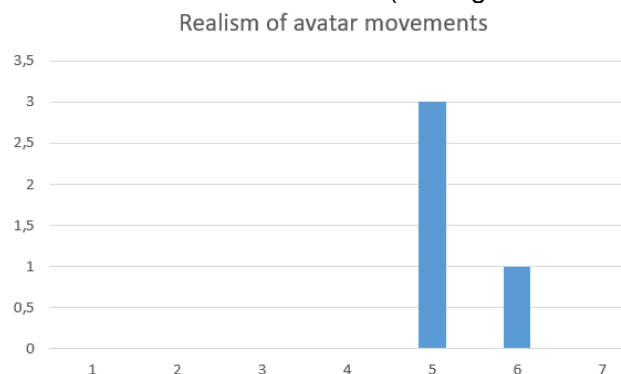


Figure 24: Level of realism of avatar movements reported by the Greek users.

4.4.8 Realism of avatar speed:

Regarding the realism of avatar speed, Figure 25 demonstrates that all Greek users find that there is a high level of realism on the avatar speed (average score of 6.25).

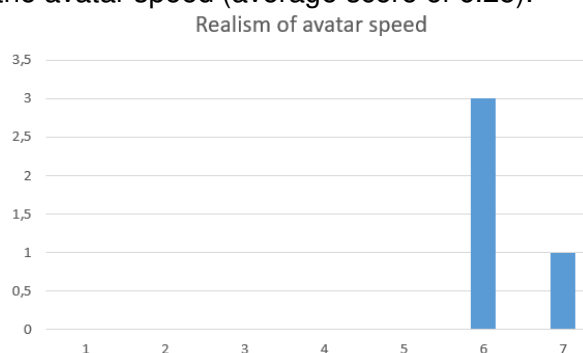


Figure 25: Level of realism of avatar speed reported by the Greek users.

4.4.9 Realism of avatar appearance:

Regarding the realism of avatar appearance, Figure 26 demonstrates that all Greek users find that there is a high level of realism on the avatar appearance (average score of 6.5).

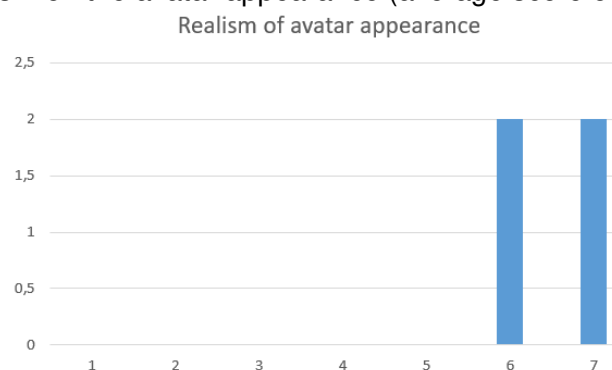


Figure 26: Level of realism of avatar appearance reported by the Greek users.

Regarding the degree of likeness of avatar clothes, Figure 27 demonstrates that all Greek users show that they highly approve the selected avatar clothes with a score of 6.5.

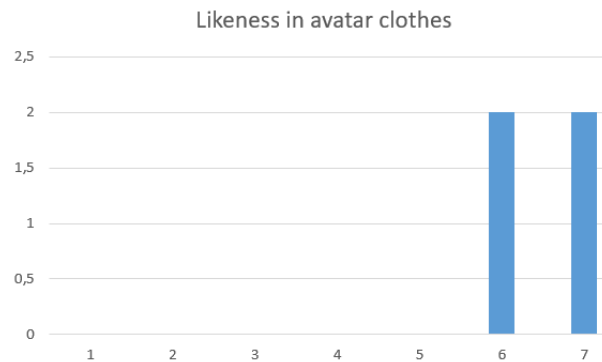


Figure 27: Degree of likeness in avatar clothes reported by the Greek users.

4.4.10 Surrounding lighting and avatar details:

This question asks the Greek users how good the surrounding lighting of the avatar is and how clear the avatar details appear. Figure 28 demonstrates that all Greek users show that they highly approve the surrounding lighting, as well as they believe that the avatar details are well presented (average score of 6.5).

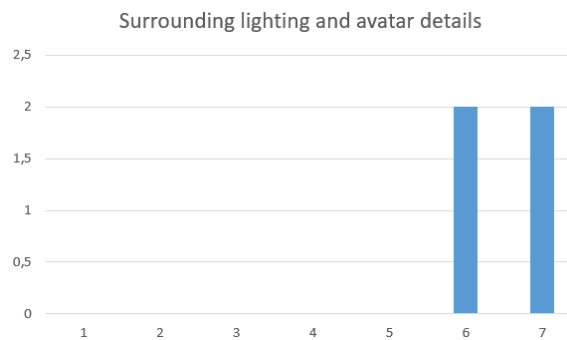


Figure 28: Approval of surrounding lighting and avatar details reported by the Greek users.

4.4.11 Importance of avatar:

Regarding the importance of the avatar service, Figure 29 demonstrates that most Greek users believe that the avatar service is important (average score of 5.5).

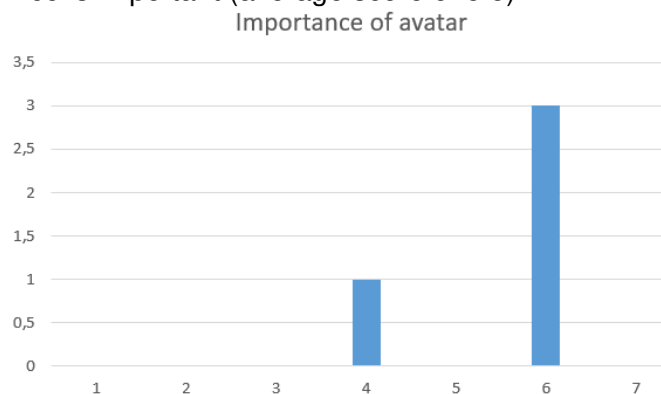


Figure 29: Importance of avatar reported by the Greek users.

4.4.12 Contrast between skin tone and colour of clothes of avatar:

This question asks the Greek users how they find the contrast between the skin tone and the color of the clothes of the avatar. Figure 30 shows that all Greek users believe that the contrast between the skin tones and the color of the clothes of the avatar is appropriate (average score of 6.5).

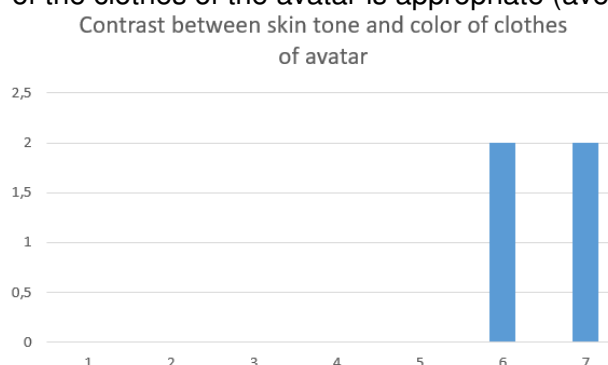


Figure 30: Approval of contrast between skin tone and color of clothes of avatar reported by the Greek users.

4.4.13 Contrast between color of clothes of avatar and background:

This question asks the Greek users how they find the contrast between the color of the clothes of the avatar and the background. Figure 31 shows that all Greek users believe that the contrast between the color of the clothes of the avatar and the background is appropriate (average score of 6.5).

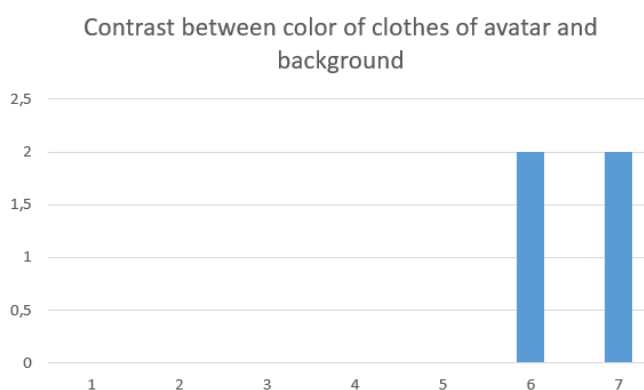


Figure 31: Approval of contrast between color of clothes of avatar and background reported by the Greek users.

4.4.14 Approval of avatar general appearance:

This question asks the Greek users whether they approve the general appearance of the avatar. Figure 32 shows that all Greek users highly approve the general appearance of the avatar (average score of 6.25).

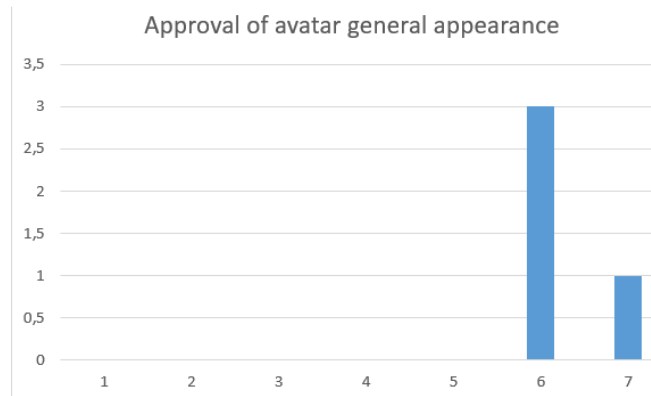


Figure 32: Approval of avatar general appearance reported by the Greek users.

4.4.15 Test conclusions

Based on the obtained results, we can conclude that all Greek users were positively inclined towards the avatar service, praising not only its appearance and contrast with the background, but also the precision of the hand gestures, the coordination between the hand gestures and the facial expressions and the content understanding. The Greek users evaluated with the lowest score (5.25) the realism of the avatar movements, which can be attributed to the difficulty in extracting accurate and robust skeletal points (body and fingers) from a single camera. However, even this score is above average and the realism of avatar movements can still be improved by the research on novel hand detection algorithms performed by CERTH [1].

4.5. Avatar Online (Spanish)

General information about the test

- Testing partner: CERTH, FCNSE
- Service tested: Avatar
- Testing date: From May 27th to May 29th
- Venue: Online
- Number of participants: 24
- Language(s) involved: Spanish SL
- Tasks performed by users to carry out the test: Participants were asked to answer a questionnaire after: Watch one (1) video with AVATAR Service enabled (only parts of the video were signed by the Avatar service).
- Approximate test duration: 10-15 minutes

4.5.1 Description of the informants' demographic profile:

In this section, the demographic data collected during tests is reported for the 24 Spanish participants.

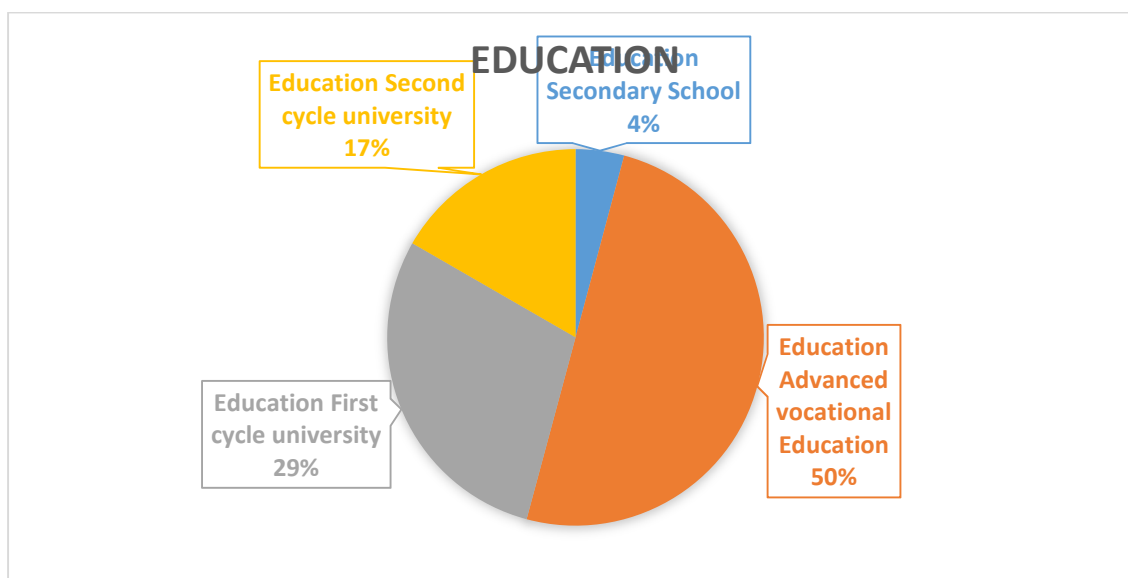


Figure 33 Avatar Spanish - Education Profile

Regarding the demographic profile of the participants, the figure above shows the percentages of the participants' educational level. We can see that 50% have an "Advanced vocational education level", while 4% have not studied to any university.

Regarding Spanish users' profile, all users are identified as being deaf or having hearing loss, as shown in Figure 34.

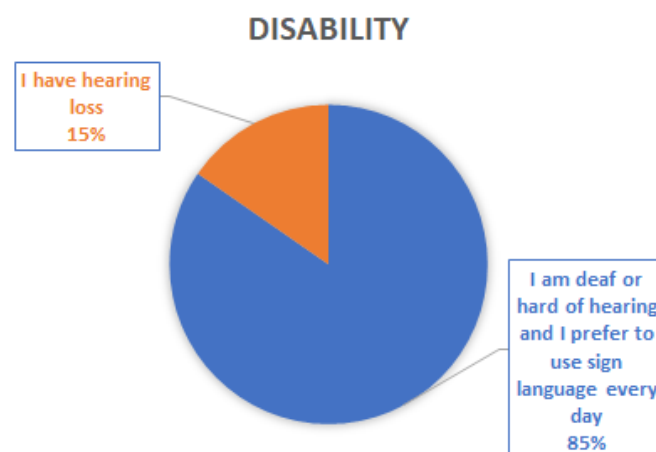


Figure 34: Avatar Spanish – Disability Profiles

4.5.2 Level of Comprehension:

In this section the users asked to make a summary of what understood from the video they have seen. Therefore, this section consists of comments.

For this testing purposes a video of three short weather forecasts were shown in users having the AVATAR Service activated. The subtitle file was used in order to request the corresponding data motion files from the EasyTV Crowdsourcing Platform. When a word is found then the motion file will force the AVATAR to sign. **At the moment only a few words are presented on the video therefore is not expected the users to fully comprehend the content of the video, as there are discontinuities in the avatar signing.**

Reviewing the comments of the Spanish users, it is observed that there are few users that are negative towards the general idea of using an avatar for interpretation. Other users commented on the fact that they expected that the avatar should sign continuously. Finally, there are also a few users that stated that they understood a few signs performed by the 3D avatar.

4.5.3 Content understanding:

Regarding the understanding of the avatar content by the Spanish users, Figure 35 demonstrates that most Spanish users show a low level of understanding of the content signed by the avatar (average score of 1.92).

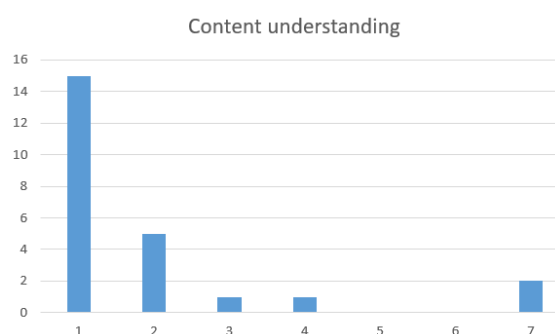


Figure 35: Level of content understanding of the avatar reported by the Spanish users.

4.5.4 Visibility of facial expressions:

Regarding the visibility of facial expressions of the avatar, the following figure demonstrates that most Spanish users show a low level of confidence (average score of 1.75) that the facial expressions of the avatar are visible.

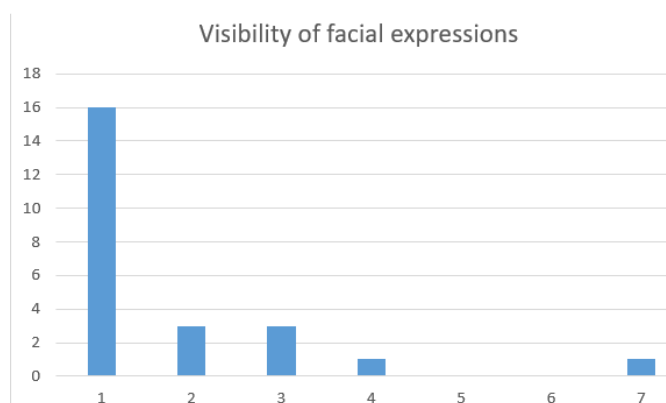


Figure 36: User agreement on the visibility of facial expressions of the avatar reported by the Spanish users.

4.5.5 Visibility of hand gestures:

Regarding the visibility of hand gestures of the avatar, Figure 37 demonstrates that the Spanish users have generally a good level of confidence (average score of 2.58) that the hand gestures performed by the avatar are visible.

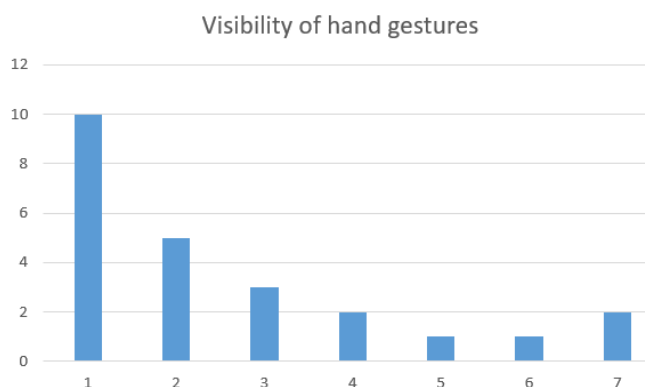


Figure 37: User agreement on the visibility of hand gestures of the avatar reported by the Spanish users.

4.5.6 Coordination between hand gestures and facial expressions:

Regarding the level of coordination between hand gestures and facial expressions, the figure below demonstrates that most Spanish users find that there is a low level of coordination between the hand gestures and the facial expressions of the avatar (average score of 1.5).

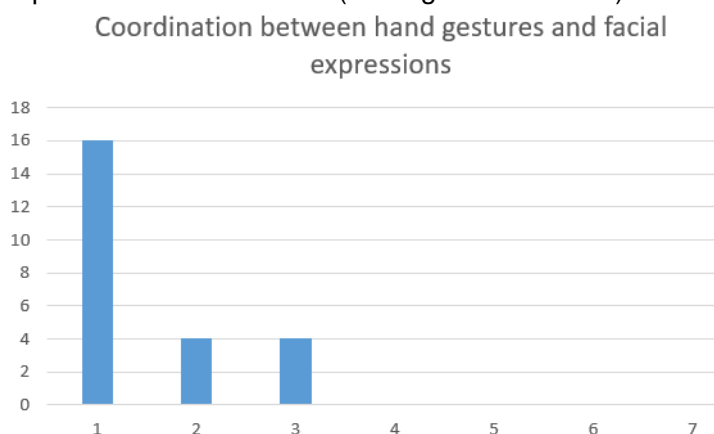


Figure 38: Level of coordination between hand gestures and facial expressions of the avatar reported by the Spanish users.

4.5.7 Precision of hand gestures:

Regarding the precision of hand gestures, Figure 39 demonstrates that most Spanish users find that there is a low level of precision of the hand gestures of the avatar (average score of 1.67).

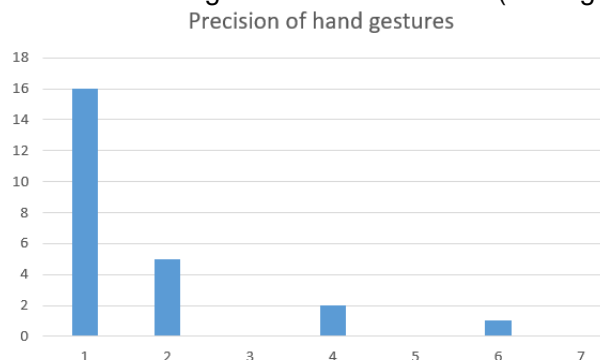


Figure 39: User agreement on the visibility of hand gestures of the avatar reported by the Spanish users.

4.5.8 Realism of avatar movements (irrespective of level of understanding):

Regarding the realism of avatar movements, the figure below demonstrates that most Spanish users find that there is a low level of realism on the avatar movements (average score of 1.38).

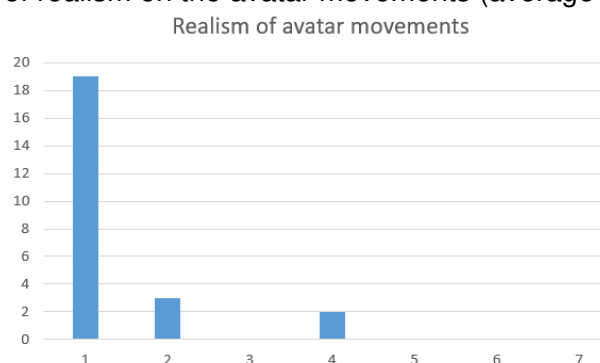


Figure 40: Level of realism of avatar movements reported by the Spanish users.

4.5.9 Realism of avatar speed:

Regarding the realism of avatar speed, Figure 41 demonstrates that the Spanish users find that there is a good level of realism on the avatar speed (average score of 2.04).

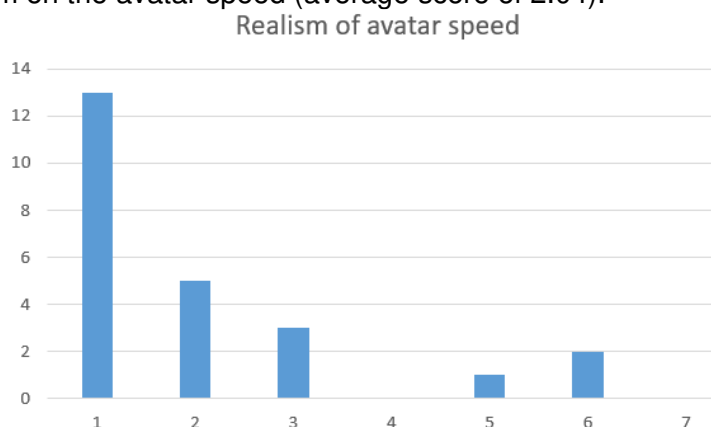


Figure 41: Level of realism of avatar speed reported by the Spanish users.

4.5.10 Realism of avatar appearance:

Regarding the realism of avatar appearance, the following figure demonstrates that the Spanish users find that there is a low level of realism on the avatar appearance (average score of 1.79).

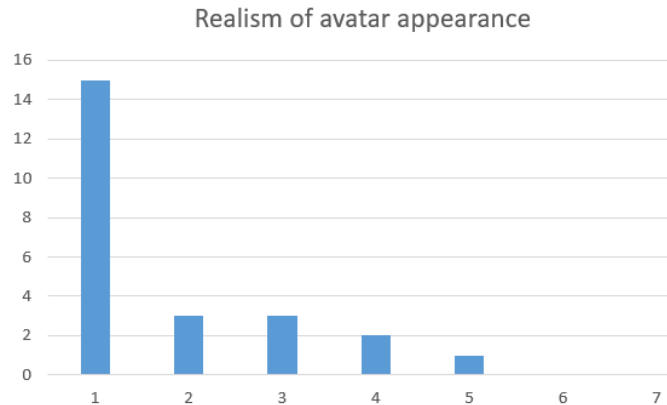


Figure 42: Level of realism of avatar appearance reported by the Spanish users.

4.5.11 Likeness of avatar clothes:

Regarding the degree of likeness of avatar clothes, the following figure demonstrates that the Spanish users approve the selected avatar clothes with a score of 2.54.

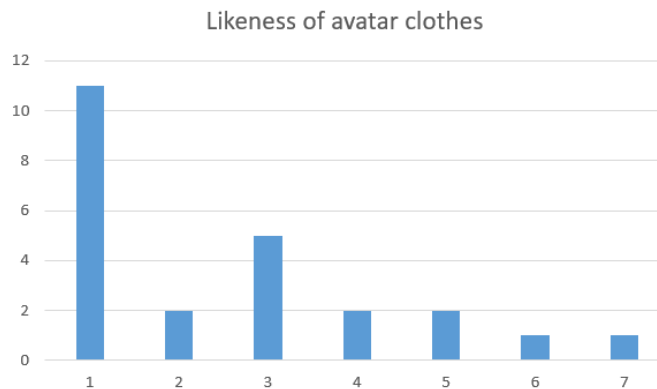


Figure 43: Degree of likeness in avatar clothes reported by the Spanish users.

4.5.12 Surrounding lighting and avatar details:

This question asks the Spanish users how good the surrounding lighting of the avatar is and how clear the avatar details appear. The figure below demonstrates that the Spanish users approve the surrounding lighting, as well as they believe that the avatar details are nicely presented (average score of 2.46), although from the score one can conclude that further improvements can be made.

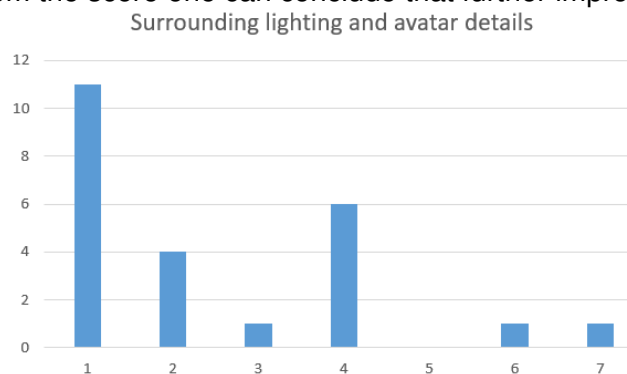


Figure 44: Approval of surrounding lighting and avatar details reported by the Spanish users.

4.5.13 Importance of avatar:

Regarding the importance of the avatar service, Figure 45 demonstrates that most Spanish users underscored the importance of the service (average score of 2.13). However, there are a few Spanish users that see its potential for future use.

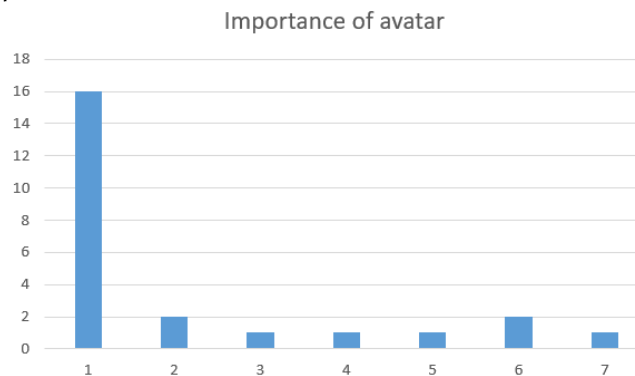


Figure 45: Importance of avatar reported by the Spanish users.

4.5.14 Contrast between skin tone and colour of clothes of avatar:

This question asks the Spanish users how they find the contrast between the skin tone and the color of the clothes of the avatar. The following figure shows that most Spanish users believe that the contrast between the skin tones and the color of the clothes of the avatar is acceptable (average score of 2.75).

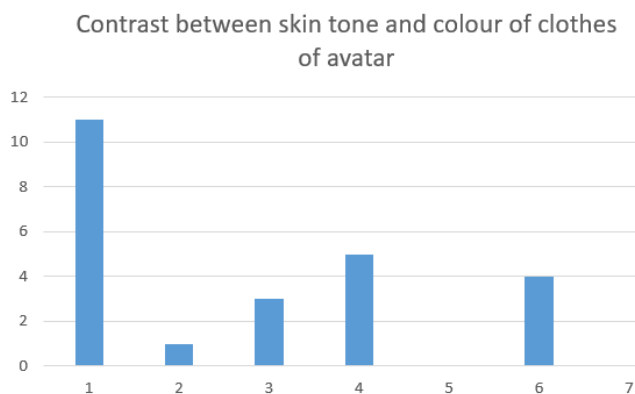


Figure 46: Approval of contrast between skin tone and color of clothes of avatar reported by the Spanish users.

4.5.15 Contrast between color of clothes of avatar and background:

This question asks the Spanish users how they find the contrast between the color of the clothes of the avatar and the background. Figure 47 shows that the Spanish users believe that the contrast between the color of the clothes of the avatar and the background can be improved (average score of 2.17).

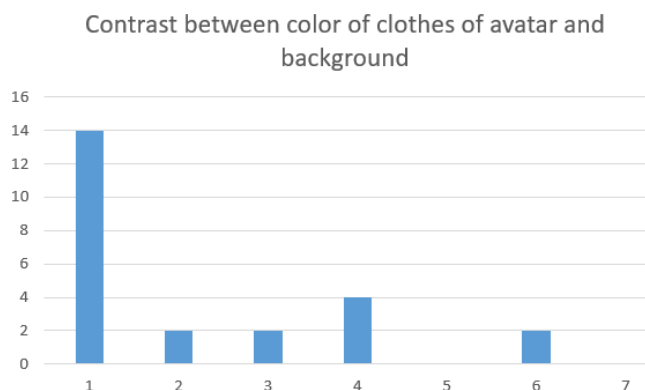


Figure 47: Approval of contrast between color of clothes of avatar and background reported by the Spanish users.

4.5.16 Approval of avatar general appearance:

This question asks the Spanish users whether they approve the general appearance of the avatar. The figure below shows that most Spanish users disapprove the general appearance of the avatar, believing there is room for improvements (average score of 1.71).

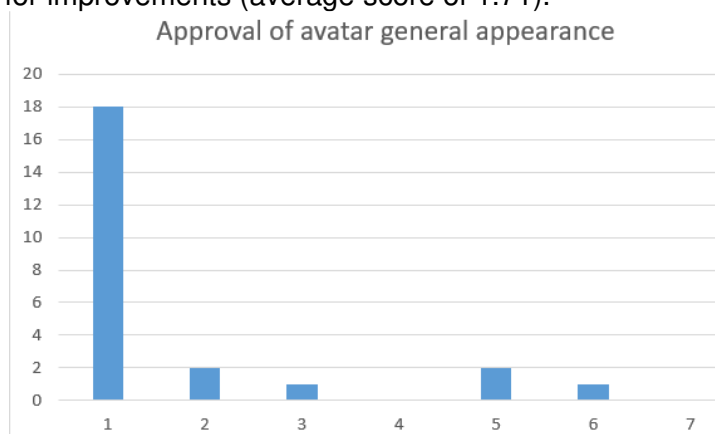


Figure 48: Approval of avatar general appearance reported by the Spanish users.

4.5.17 Test conclusions

Based on the obtained results from the evaluation of the Avatar service on the Spanish users, we conclude that the demo video was not appropriate for demonstrating the purpose of the service. This demo video was based on the concept of a 3D avatar signing Spanish weather, described by a Spanish weather reporter. **However, due to the unprecedented situation with the Covid-19 virus, there was not enough time to create sign representations (i.e., carry out recordings with Spanish signers using capturing module and depth sensor) for the entire vocabulary used by the Spanish weather reporter.** As a result, there were large gaps in the signing of the avatar, which potentially discouraged Spanish users and failed to convey the message on the importance of the avatar service.

4.6. Speech Platform Live

The live tests in Italian were organised by MV with the help of UICI. The tests were carried out from February 26th to March 4th. with the participation of 16 (sixteen) Italian users. The tests were then stopped due to the covid-19 outbreak.

The test of the speech platform took around 30-40 minutes. Informants were asked to carry out different tasks using the Second Screen application from an Android device.

The user had to use the application that can be controlled completely by voice thanks to the EasyTV Speech Platform and perform some of the tasks that have been showed during the information phase of the session. Below we report some of the functionalities of the application:

- Profile and login
- Setting preferences related to the profile and accessibility features
- Search videos in a catalog
- Controlling the video playback.
- Consume accessibility content related to the video i.e.
 - SUBTITLES (TEXT and AUDIO)
 - IMAGE MAGNIFICATION
 - FACE DETECTION
 - AUDIO DESCRIPTION
 - TEXT DETECTION
 - CHARACTER RECOGNITION
 - AUDIO EQUALIZATION
 - SOUND DETECTION

General information about the test are as follows:

- Testing partner: UICI
- Service tested: Speech Platform
- Testing date: from February 26th to March 4th
- Venue: Headquarter of the UICI Rome
- Number of participants: 16
- Language(s) involved: Italian
- Tasks performed by users to carry out the test: Informants were asked to carry out different tasks using the Second Screen application from an Android device
- Approximate test duration: 30-40 minutes.

4.6.1. Description of the informants' demographic profile

In this section, the demographic data collected during the tests are reported below:

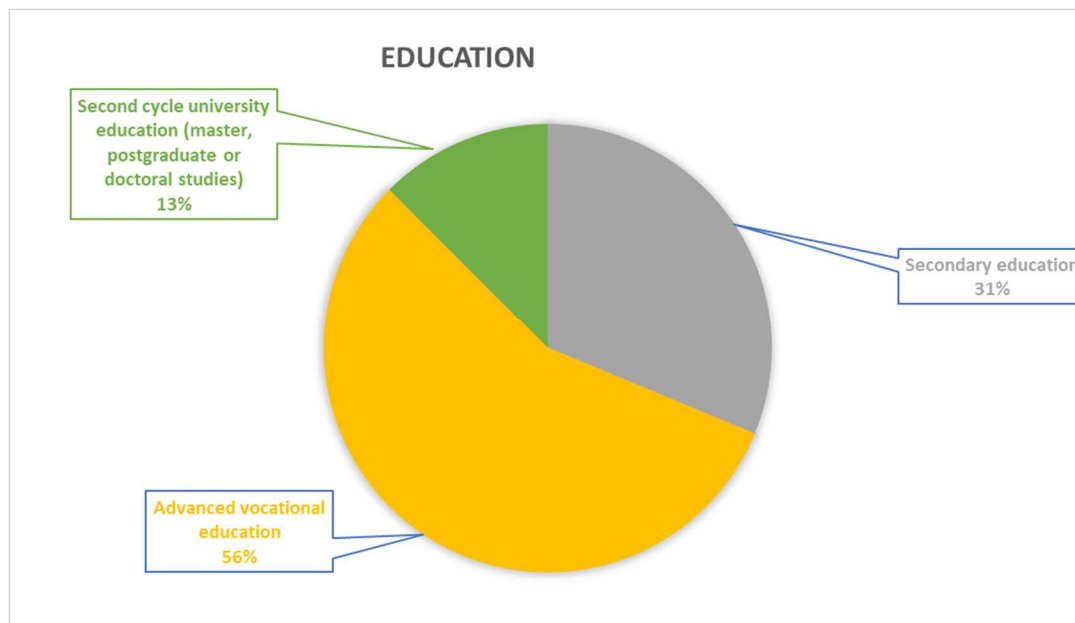
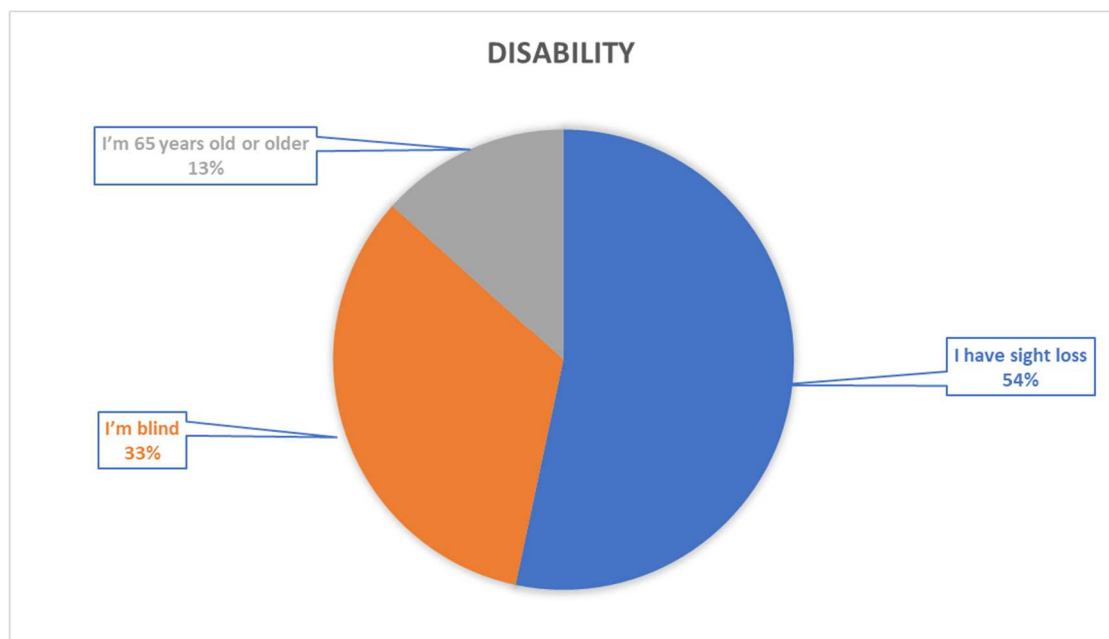


Figure 49: Speech Platform Education Profiles Live

We can say that all of them have a good level of education (Advanced vocational) 56% and a good percent of them with a second cycle of University education (13%). Finally, we have a 31% with a secondary education level.



education.

Figure 50: Speech Platform Disability Profiles Live

Regarding users' profile, we can see that most of the users have visual problems, half of them are visually impaired and 33% of them are total blind. A minor percent of them also are older than 65 years old.

4.6.2. SUS results

In the Table 19 shows the results for the SUS questionnaire while Figure 51, presents a graph with the individual scores. As can be seen, the overall score is 89.2, which is considered excellent looking

at SUS score scale, corresponding to an A in the SUS grade scale. All the scores are high and only one score is below average.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scales			
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.	Odd items	Even items	SUS score	Grades
N.														
user 1	4	1	4	2	3	1	4	2	5	2	15	17	80	B
user 2	3	1	4	1	4	1	4	1	5	2	15	19	85	A
user 3	5	1	5	1	4	1	4	1	5	2	18	19	92,5	A
user 4	3	1	4	2	2	1	4	1	4	1	12	19	77,5	B
user 5	5	1	5	1	4	1	5	1	5	1	19	20	97,5	A
user 6	5	1	5	1	3	1	5	1	5	1	18	20	95	A
user 7	3	3	4	3	3	2	3	3	4	2	12	12	60	D
user 8	5	2	5	1	5	1	5	1	5	1	20	19	97,5	A
user 9	5	1	5	1	3	1	5	1	5	1	18	20	95	A
user 10	4	1	5	1	4	1	5	1	5	1	18	20	95	A
user 11	4	1	5	1	5	1	4	1	5	1	18	20	95	A
user 12	4	1	5	4	4	1	4	1	4	2	16	16	80	B
user 13	4	1	5	1	4	1	5	1	5	1	18	20	95	A
user 14	4	1	5	1	3	2	5	3	5	1	17	17	85	A
user 15	4	1	5	1	5	1	5	1	5	1	19	20	97,5	A
user 16	5	1	5	1	5	1	5	1	5	1	20	20	100	O
													89,2	A

Table 19: Speech Platform SUS Results Live

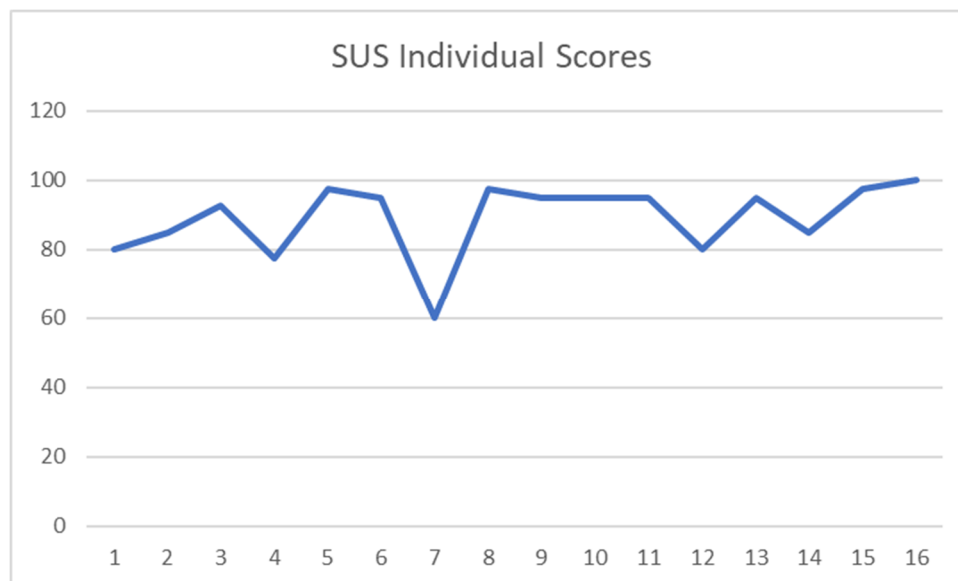


Figure 51: Speech Platform – Chart graph of SUS Scores

4.6.3. NPS results

The scores obtained for the NPS scale shown in Table 20: Speech Platform NPS Individual Scores Live. As can be seen, most of them are promoters (11) and some are neutral (6) so the votes were very high.

Individual Scores			
Response	Scores	Percentage	Comment of the choice
1	7	4,90%	IT IS NOT YET COMPLETE
2	7	4,90%	SIMPLE AND USEFUL WITH SHORT INITIAL TRAINING
3	10	6,99%	USEFUL AND EASY
4	10	6,99%	HELPFUL
5	10	6,99%	FACILITATE ACCESS TO TV SERVICES AND LOW OFFER DOES NOT EXIST ON THE MARKET TODAY
6	10	6,99%	TO HAVE THE SAME OPPORTUNITIES
7	7	4,90%	HELP IN THE SOCIAL LIFE OF PEOPLE
8	9	6,29%	FREEDOM OF HAVING 360 ° INFORMATION
9	10	6,99%	VERY SIMPLE; AVAILABILITY OF SERVICES THAT ARE NOT AVAILABLE NOW
10	9	6,29%	VERY HELPFUL
11	10	6,99%	EASY TO USE; COMFORTABLE
12	9	6,29%	VERY PRACTICAL
13	9	6,29%	VERY USEFUL SERVICES FOR THE BLIND
14	8	5,59%	IT IS A USEFUL SERVICE TO UNDERSTAND TV AND WHAT IT PROPOSES
15	8	5,59%	USEFUL AND EASY TO USE THE TV
16	10	6,99%	ALLOWS TO USE INFORMATION FOR WHICH WITHOUT THIS IT WOULD BE IMPOSSIBLE
Total	143	100%	

Table 20: Speech Platform NPS Individual Scores Live

The following table shows the percentages of the promoters, neutrals and detractors' users, together with the calculation of the Net Promoter Score, which, according to the NPS scale, represents an excellent result.

NPS CALCULATION	Number	%
Promoters	11	69%
Neutrals	5	31%
Detractors	0	0%
Total	16	100%
	NPS SCORE	68,8

Table 21: Speech Platform NPS Calculation Live

Finally, Figure 52 : Speech Platform NPS Classification Live presents the classification of the users according to the three types defined in NPS: promoters, neutrals and detractor.

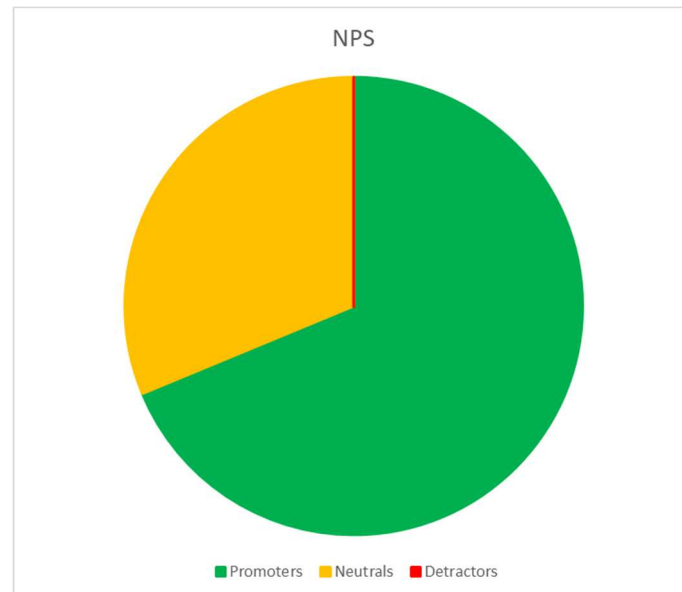


Figure 52 : Speech Platform NPS Classification Live

4.6.4. Qualitative comments made

In Table 22: Speech Platform - User Comments we report some of the qualitative comments made by users in order to have an overview of their thoughts and reactions to the service tested.

No.	COMMENTS
1	I'm satisfied
2	Ability to export content to mobile devices; use for audio descriptions the texts of the samples together with the AI system that analyses the scenes
3	Improve help features
4	Integration of the audio description (e.g. description of the panoramas, how the characters are dressed, etc.)
5	Simplify language even more.
6	More research for the blind than visually impaired
7	Explicit the commands to be learned in the help prompts

Table 22: Speech Platform - User Comments

4.6.5. Test conclusions

The final live test of the speech platform gave excellent results looking at the SUS and NPS scales. Despite these excellent results, the informants wanted to underline some aspects that could be improved and that will be taken into consideration in future developments.

Moreover, looking at the comparative table of results we can see a confirmation of both usability the acceptance of the whole service and some improvements in the SUS score. Also, the opinion to continue research in this service are widely approved.

Test	Number of users	SUS score	NPS score
Intermediate	17	75,4	-2.5
Final	16	89.2	68.8

Table 23: Speech Platform - Comparative table of results Live

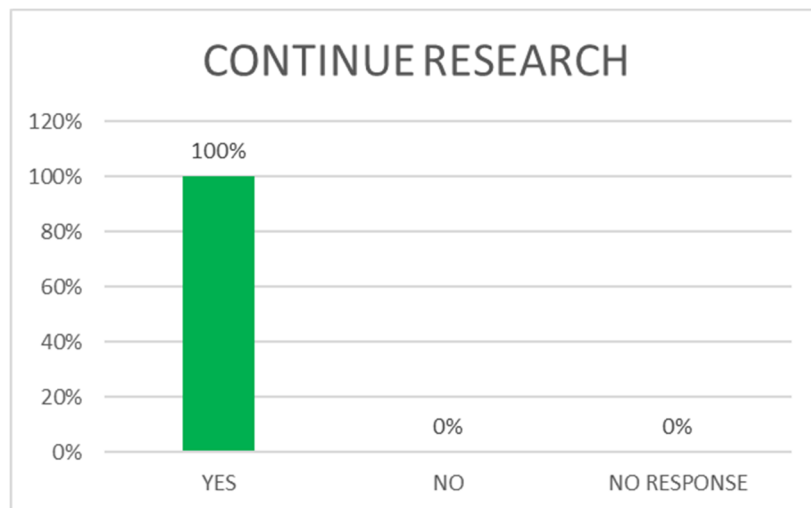


Figure 53: Speech Platform Live - Results for keeping on working on the service

4.6.6. Actions to be taken for service improvement

According to the comments made and the overall results for this service we must say that apart from the new functionalities that can be integrated time by time, the Voice User Interface remain the most important part of the product for blind and visually impaired users that needs to be improved and customised based on the user profile or based on the level of expertise of the end user.

4.7. Speech Platform Online

The online testing of the Speech Platform service was done in two different languages (Italian, and Spanish). The testers where shown a video that presented the functionalities of the EasyTV companion application and the accessibility features developed. Included in the video we had also a demonstration of the use of the application through voice commands.

The user watched the whole video to understand how the system works and how a final user interacts with the application by voice thanks to the EasyTV Speech Platform. Below we report some of the functionalities of the application:

- Profile and login
- Setting preferences related to the profile and accessibility features
- Search videos in a catalog
- Controlling the video playback.
- Consume accessibility content related to the video i.e.
 - SUBTITLES (TEXT and AUDIO)
 - IMAGE MAGNIFICATION
 - FACE DETECTION
 - AUDIO DESCRIPTION
 - TEXT DETECTION
 - CHARACTER RECOGNITION
 - AUDIO EQUALIZATION
 - SOUND DETECTION

General information about the test are as follows:

- Testing partner: UICI and FCNSE
- Service tested: Speech Platform
- Testing date: from March-May 2020
- Venue: online
- Number of participants: 91
- Language(s) involved: Italian and Spanish
- Tasks performed by users to carry out the test: the online test has been demonstrated with a video showing the interaction and functionalities of the whole companion application.
- Approximate test duration: 20-30 minutes.

4.7.1. Description of the informants' demographic profile

In this section, the demographic data collected during the tests is reported below:

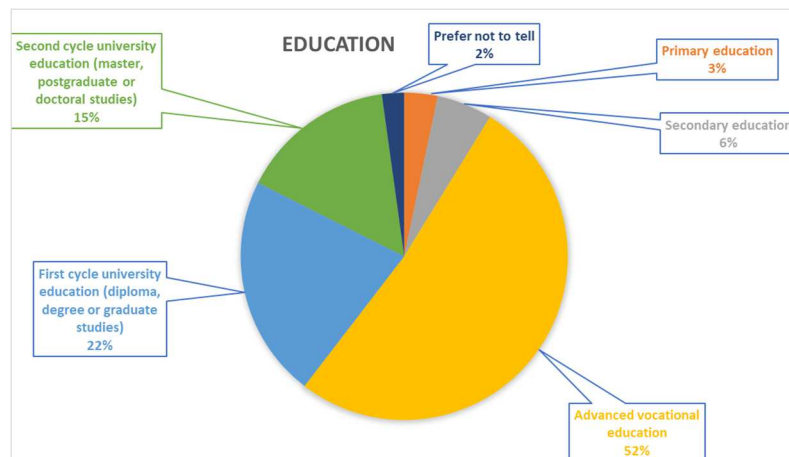


Figure 54: Speech Platform - Education Profile

We can say that a good percentage of them have a good level of education: Advanced vocational 52%, first cycle of University 22% and second cycle of University education (15%). Finally, only 3% have primary education and 6% a secondary education.

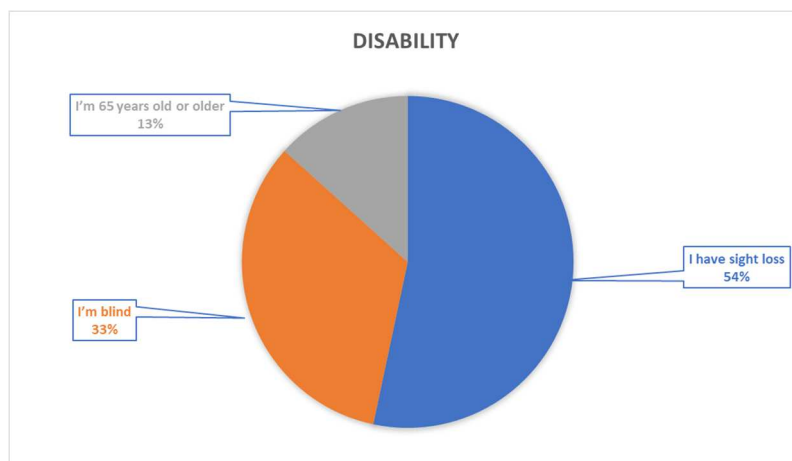


Figure 55: Speech Platform - Disability Profile

Regarding users' profile, we can see that most of the users have visual problems, more than half of them (54%) are visually impaired and 33% of them are total blind. A minor percent of them (13%) also are older than 65 year old

4.7.2. SUS results

N.	Q1 I think that I would like to use this feature frequently.	Q2 I found the feature unnecessarily complex.	Q3 I thought the feature was easy to use.	Q4 I think that I would need the support of a technical person to be able to use this feature.	Q5 I found the various functions in this feature were well integrated.	Q6 I thought there was too much inconsistency in this feature.	Q7 I would imagine that most people would learn to use this feature very quickly.	Q8 I found the feature very cumbersome to use.	Q9 I felt very confident using the feature.	Q10 I needed to learn a lot of things before I could get going with this feature.	Scales			
											Odd Items	Even Items	SUS score	Grades
user 1	3	2	3	5	3	5	3	4	2	5	9	4	32.5	F
user 2	3	2	3	5	1	3	1	1	3	1	6	13	47.5	F
user 3	4	3	3	5	3	2	3	2	3	2	11	11	55	D
user 4	2	5	5	1	4	5	5	5	5	1	16	8	60	D
user 5	3	5	5	3	4	1	4	4	2	4	13	8	52.5	D
user 6	3	2	4	3	4	2	4	3	3	4	13	11	60	D
user 7	4	2	4	4	3	1	5	4	4	1	15	13	70	B
user 8	3	2	4	1	3	2	4	3	3	1	12	16	70	B
user 9	5	1	5	1	5	1	5	1	5	1	20	20	100	O
user 10	5	1	5	1	5	1	5	1	5	1	20	20	100	O
user 11	4	3	3	5	3	2	3	3	2	2	10	10	50	F
user 12	3	1	3	3	3	1	3	1	1	1	8	18	65	D
user 13	3	3	3	1	4	1	2	1	4	1	11	18	72.5	B
user 14	3	3	4	1	1	2	3	3	5	1	11	15	65	D
user 15	1	5	4	1	5	3	1	2	4	1	10	13	57.5	D
user 16	3	2	4	1	4	2	4	2	5	1	15	17	80	B
user 17	3	1	4	1	3	1	4	1	3	2	12	19	77.5	B
user 18	3	2	4	1	3	1	3	1	4	1	12	19	77.5	B
user 19	5	1	5	1	5	1	5	1	5	1	20	20	100	O
user 20	5	1	5	1	5	1	5	1	5	1	20	20	100	O
user 21	4	1	5	1	5	1	5	1	4	5	18	16	85	A
user 22	5	3	3	4	4	1	4	3	3	3	14	11	62.5	D
user 23	2	3	4	1	5	1	3	1	4	1	13	18	77.5	B
user 24	5	3	5	4	5	1	5	1	4	1	19	15	85	A
user 25	1	1	5	1	5	1	5	1	5	4	16	17	82.5	A
user 26	5	2	5	1	4	1	3	2	2	3	14	16	75	B
user 27	5	1	5	1	5	1	5	1	4	5	19	16	87.5	A
user 28	5	5	5	1	5	5	5	5	5	1	20	8	70	B
user 29	4	1	4	1	4	1	4	1	1	1	12	20	80	B
user 30	3	3	4	3	3	1	3	2	3	2	11	14	62.5	D
user 31	5	1	5	1	5	1	5	1	5	1	20	20	100	O
user 32	5	1	5	1	5	1	5	1	5	1	20	20	100	O
user 33	5	1	5	2	5	1	4	5	5	1	19	15	85	A
user 34	5	3	5	5	5	1	5	1	5	1	20	14	85	A
user 35	3	2	4	2	3	2	4	2	4	2	13	15	70	B
user 36	5	1	5	1	5	1	5	1	5	1	20	20	100	O
user 37	5	1	5	1	5	1	3	1	5	1	18	20	95	A
user 38	4	3	5	2	3	3	5	4	5	1	17	12	72.5	B
user 39	5	1	5	3	5	1	5	4	5	2	20	14	85	A
user 40	3	2	3	2	2	2	3	3	2	2	8	14	55	D
user 41	5	1	5	1	5	1	5	1	5	5	20	16	90	A
user 42	5	1	5	1	5	1	5	1	5	1	20	20	100	O
user 43	3	3	5	1	5	1	4	2	1	2	13	16	72.5	B
user 44	3	1	4	1	3	1	3	1	4	1	12	20	80	B
user 45	5	1	5	1	5	1	5	1	5	5	20	16	90	A
user 46	5	1	5	1	5	1	5	1	5	1	20	20	100	O
user 47	5	1	5	1	5	1	5	5	5	1	20	16	90	A
user 48	3	2	4	1	3	2	4	2	5	1	14	17	77.5	B
user 49	4	2	4	1	4	1	5	2	2	1	14	18	80	B
user 50	3	2	4	1	3	1	4	2	3	2	12	17	72.5	B
user 51	4	2	4	2	3	3	4	2	3	2	13	14	67.5	D
user 52	4	1	5	1	5	1	5	1	4	1	18	20	95	A
user 53	3	2	5	1	3	3	3	4	5	1	14	14	70	B
user 54	5	1	5	1	5	1	4	1	4	1	18	20	95	A
user 55	4	2	4	1	4	1	3	2	3	2	13	17	75	B
user 56	3	1	3	3	4	1	4	1	3	3	12	16	70	B
user 57	5	1	5	1	5	1	5	1	2	3	17	18	87.5	A
user 58	5	5	5	5	5	1	5	1	5	1	20	12	80	B
user 59	3	3	5	5	3	3	5	1	3	1	14	12	65	D
user 60	5	1	5	1	5	1	1	1	5	1	16	20	90	A
user 61	5	1	5	1	5	1	5	1	5	1	20	20	100	O
user 62	5	4	4	1	5	1	4	3	5	1	18	15	82.5	A
user 63	3	1	5	1	5	1	5	1	4	1	17	20	92.5	A
user 64	3	2	3	2	3	2	4	1	3	2	11	16	67.5	D
user 65	5	1	5	5	5	5	5	3	5	5	20	6	65	D
user 66	5	1	5	1	5	1	5	1	5	5	20	16	90	A
user 67	5	3	3	1	3	1	3	3	5	3	14	14	70	B
user 68	5	3	5	3	3	1	5	1	3	1	16	16	80	B
user 69	5	5	5	1	5	1	5	1	5	1	20	16	90	A
user 70	3	5	5	1	5	1	5	1	5	1	18	16	85	A
user 71	5	1	5	1	5	1	5	1	5	1	20	20	100	O
user 72	3	1	5	2	5	1	3	1	5	1	16	19	87.5	A
user 73	3	3	5	1	4	1	5	2	4	2	16	16	80	B
user 74	4	3	5	1	5	1	5	2	4	1	18	17	87.5	A
user 75	3	3	5	1	5	3	5	1	5	1	18	16	85	A
user 76	3	3	3	3	5	3	5	3	5	3	16	10	65	D
user 77	4	1	4	4	4	1	4	1	4	3	15	15	75	B
user 78	4	1	5	2	5	2	4	1	4	2	17	17	85	A
user 79	5	5	5	3	5	5	5	5	5	3	20	4	60	D
user 80	5	2	5	1	4	1	5	4	5	3	19	14	82.5	A
user 81	3	3	4	3	3	2	5	2	4	2	14	13	67.5	D
user 82	4	4	5	2	5	5	4	4	5	2	18	8	65	D
user 83	3	3	4	2	3	1	4	1	4	1	13	17	75	B
user 84	5	1	5	1	5	1	5	1	5	1	20	20	100	O
user 85	3	3	5	1	5	3	5	3	5	1	18	14	80	B
user 86	3	2	3	1	2	3	5	5	5	1	13	13	65	D
user 87	5	4	4	3	5	3	5	3	3	3	17	9	65	D
user 88	3	3	5	3	5	1	4	3	3	1	15	14	72.5	B
user 89	5	3	5	5	4	3	5	3	3	3	17	8	62.5	D
user 90	5	3	3	1	3	3	3	1	4	1	13	16	72.5	B
user 91	4	5	5	1	5	1	5	1	5	5	19	12	77.5	B
													77.9	B

Table 24: Speech Platform - SUS Results

Table 24: Speech Platform - SUS Results shows the results for the SUS questionnaire while Figure 56: Speech Platform - Chart Graph of individual scores, presents a graph with the individual scores. As can be seen, the overall score is 77,9, which is considered very good looking at SUS score scale, corresponding to an B in the SUS grade scale. Most of the scores are above the average (75%) while the rest are under the average (25%).

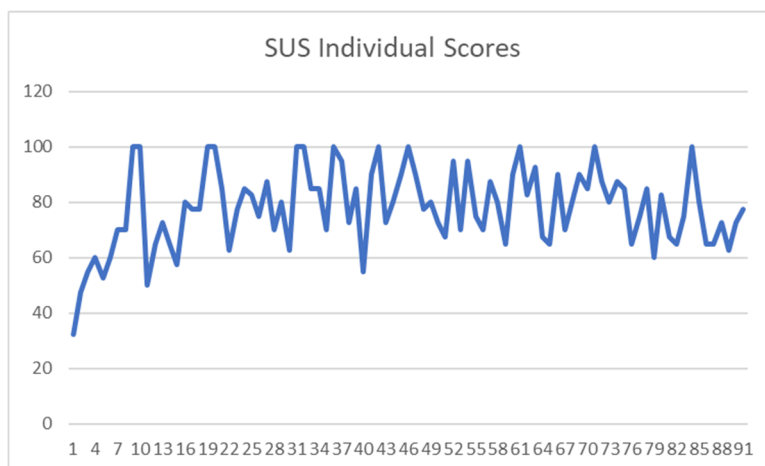


Figure 56: Speech Platform - Chart Graph of individual scores

4.7.3. NPS results

We report here only the NPS calculation and classification since the individual table is not readable due to the number of informants. The individual votes are also available in the document repository of the project. The scores obtained for the NPS scale is shown in Table 25 : Speech Platform - NPS calculation. As can be seen, most of them are promoters (58%) but also a good percentage are also neutrals (29%) and detractors (19%). The final score of 34,1 is hence considered good according to the NPS scale.

NPS CALCULATION	Number	%
Promoters	48	53%
Neutrals	26	29%
Detractors	17	19%
Total	91	100%
	NPS SCORE	34,1

Table 25 : Speech Platform - NPS calculation

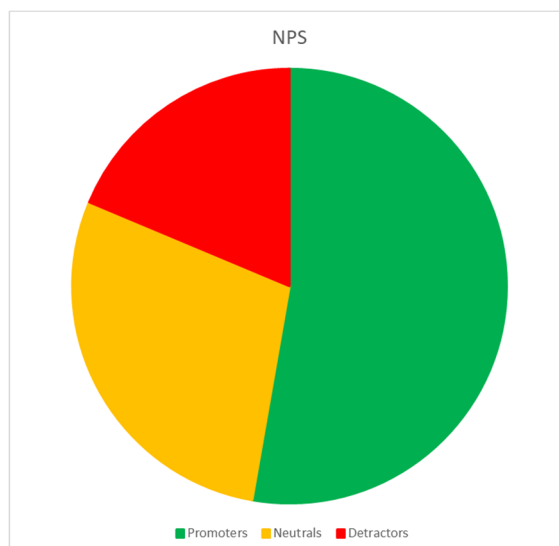


Figure 57: Speech Platform - Chart of NPS data

4.7.4. Qualitative comments made

Most of the comment made are related to the request of some functionalities already available. Also, many suggestions are related to some functionalities that already have been considered for future development. In Table 26: Speech Platform - User Comments we report only few qualitative comments made by users in order to have an overview of their thoughts and reactions to the service tested.

No.	COMMENTS
1	Improve translations of subtitles and texts
2	Possibility to choose the preferred vocal synthesis
3	I wish this voice user interface to be available also for DVD reading
4	Think about using subtitles with a braille display
5	hope to be able to use your EasyTV soon

Table 26: Speech Platform - User Comments

4.7.5. Test conclusions

The final online test of the speech platform gave very good results looking at the SUS and good for the NPS scale. Despite these good results, the informants wanted to underline some aspects that could be improved and that will be taken into consideration in future developments.

Moreover, looking at the comparative table of results we can see a confirmation of both usability the acceptance of the whole service and some improvements in the SUS score. Also, the opinion to continue research in this service are widely approved.

Test	Number of users	SUS score	NPS score
Intermediate	48	67.71	53.2
Final	91	77.9	34.1

Table 27: Speech Platform - Comparative table of results Online

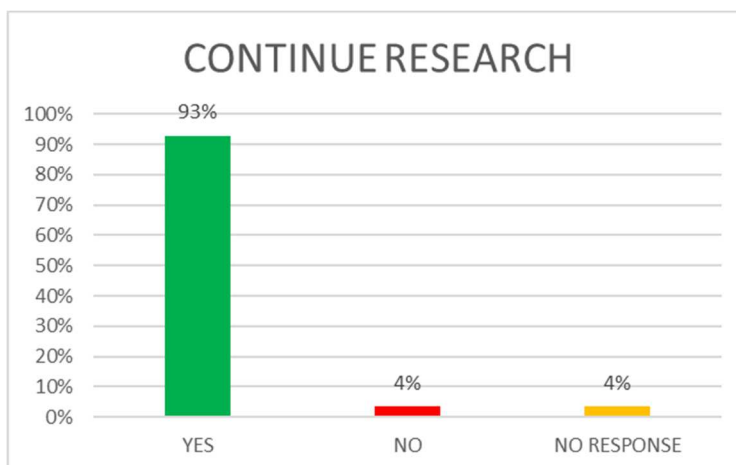


Figure 58: Speech Platform Online - Results for keeping on working on the service

4.7.6. Actions to be taken for service improvement

As already reported in the live tests, also for online tests we can say that according to the comments made and the overall results for this service and apart from the new functionalities that can be integrated time by time, the Voice User Interface and the possibility to interact in different ways, remain the most important part of the product for blind and visually impaired users that needs to be improved and customised based on the user profile or based on the level of expertise of the end user.

4.8. Text Detection Online

The general information about the tests is:

- Testing partner: UICI and FCNSE
- Testing date: April - May 2020
- Venue: Online
- Number of participants: 15
- Language(s) involved: Spanish and Italian
- Tasks performed by users to carry out the test: the online test has been demonstrated with a video showing the interaction and functionalities of the “Text detection” service.
- Approximate test duration: 20 minutes.

4.8.1. Description of the informants’ demographic profile

With regards to the demographic profile of the participants, Figure 59: Text Detection - Education Profiles shows the percentages based on users’ educational level. As it can be seen, more than a half of them have a high level of education (Advanced vocational education level and beyond).

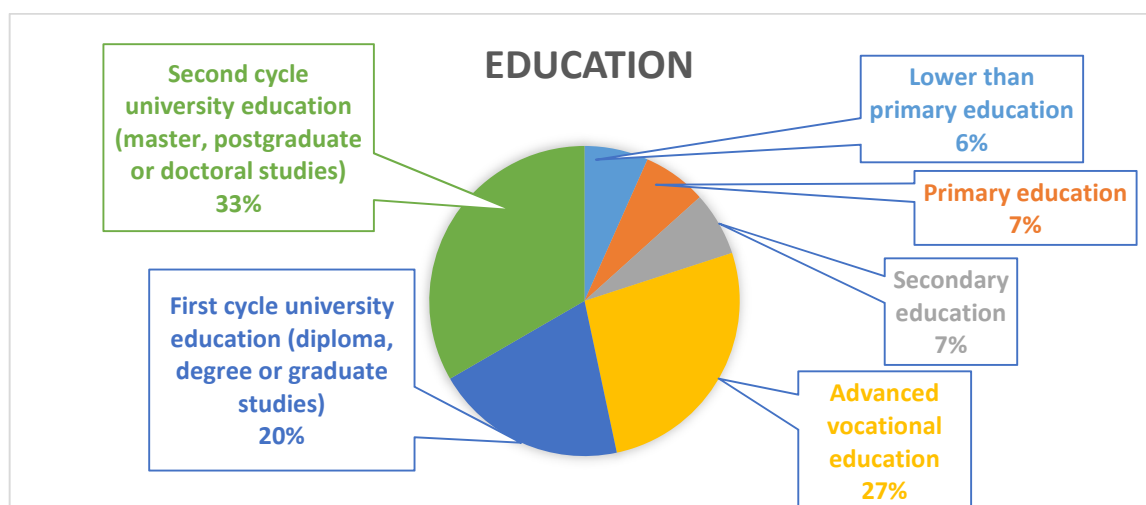


Figure 59: Text Detection - Education Profiles

Regarding users’ profile, most of the users present visual problems (total or partial). Besides, only one person is older than 65 years old.

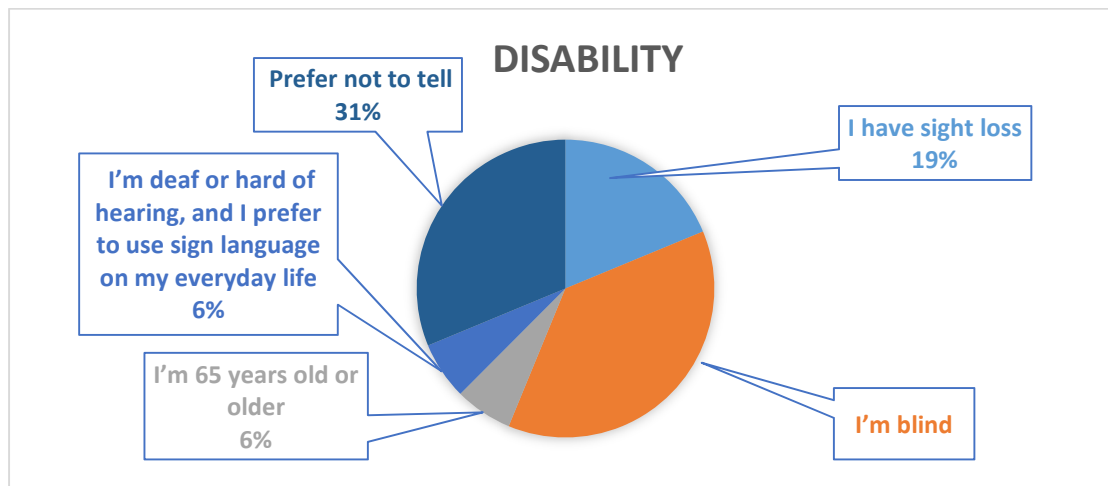


Figure 60: Text Detection - Disability profiles

4.8.2. SUS results

Table 28: Text Detection - SUS results shows the results for the SUS questionnaire while Figure 61 : Text Detection - Chart Graph of individual scores, presents a graph with the individual scores. As can be seen, the overall score is 73.30, which can be consider as good looking at SUS score scale, corresponding to an B in the SUS grade scale. Nevertheless, there are five scores really low (under 50) that should be taken into consideration. On the other hand, up to 4 users give the maximum score.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scales			
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.	Odd items	Even items	SUS score	Grades
N.														
user 1	4	3	3	1	4	3	4	2	2	2	12	14	65	D
user 2	3	3	1	4	3	2	3	2	1	1	6	13	47,5	F
user 3	5	5	5	5	5	5	5	4	4	4	18	2	50	F
user 4	2	3	3	3	2	3	2	3	4	4	8	9	42,5	F
user 5	5	1	5	1	5	1	5	1	5	1	20	20	100	O
user 6	5	1	5	3	4	1	4	5	5	2	18	13	77,5	B
user 7	5	1	5	1	5	1	5	1	5	1	20	20	100	A
user 8	1	3	4	1	3	2	4	3	4	2	11	14	62,5	D
user 9	5	1	5	1	5	1	5	1	5	1	20	20	100	A
user 10	4	2	4	1	4	2	4	1	4	1	15	18	82,5	A
user 11	3	4	2	4	3	2	4	4	1	4	8	7	37,5	F
user 12	3	3	3	2	3	3	2	3	3	3	9	11	50	F
user 13	5	1	5	1	5	1	5	1	5	1	20	20	100	A
user 14	5	1	5	1	5	1	5	1	4	5	19	16	87,5	A
user 15	5	1	5	1	5	1	5	1	4	1	19	20	97,5	A
													73,3	B

Table 28: Text Detection - SUS results

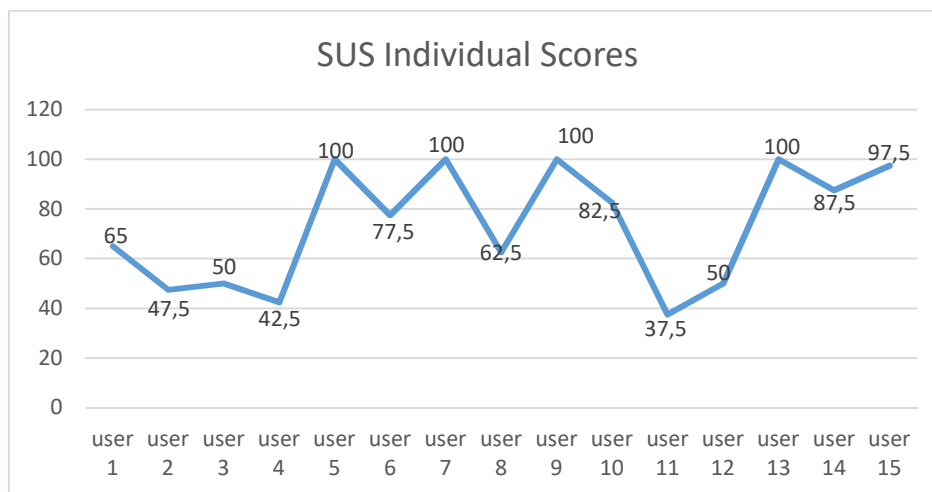


Figure 61 : Text Detection - Chart Graph of individual scores

4.8.3. NPS results

The scores obtained for the NPS scale are included in Table 29: Text Detection - NPS Individual scores. As can be seen, up to 8 users give a very high punctuation, becoming promoter users, while six of them provide low scores, becoming detractors. The remaining user, although classified as neutral user, also provided a valuable score.

Individual Scores		
Response	Scores	Percentage
1	8	7,27%
2	6	5,45%
3	1	0,91%
4	5	4,55%
5	10	9,09%
6	9	8,18%
7	9	8,18%
8	2	1,82%
9	9	8,18%
10	10	9,09%
11	6	5,45%
12	5	4,55%
13	10	9,09%
14	10	9,09%
15	10	9,09%
Total	110	100%

Table 29: Text Detection - NPS Individual scores

The following table shows the percentages of the promoters, neutrals and detractors users, together with the calculation of the Net Promoter Score, which, according to the NPS scale, represents a good result.

NPS CALCULATION	Number	%
Promoters	8	53%
Neutrals	1	7%
Detractors	6	40%
Total	15	100%
	NPS SCORE	13,3

Table 30: Text Detection - NPS Calculation

Finally, the following figure presents the classification of the users according to the three types defined in NPS: promoters, neutrals and detractor.

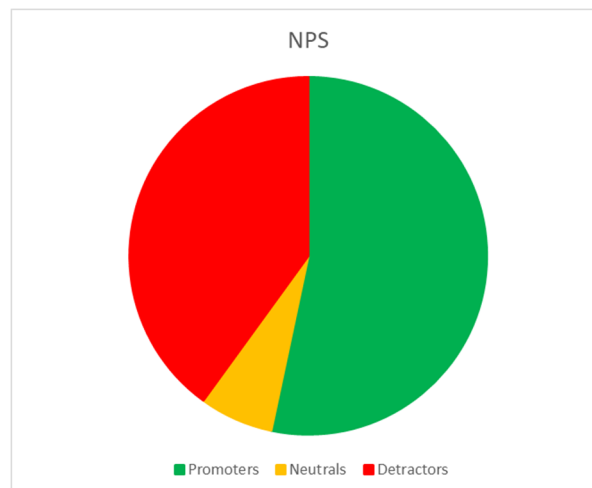


Figure 62: Text Detection - Chart of NPS data

4.8.4. Qualitative comments made

The main qualitative comments provided by the users during the test are included in Table 31: Text Detection - User Comments. In this sense, the main complaints are related to the complexity of the functionality execution and with delay problems.

N	COMMENT
1	Usefull and simply
2	the system does not present a fluid content
3	Too difficult to use it
4	Need to be improved
5	The system presents some delays

Table 31: Text Detection - User Comments

4.8.5. Test conclusions

Based on the obtained results and considering the comparative with the intermediate ones (see Table 32. Text Detection - Comparative between intermediate tests results and final results), we can conclude that we have achieved a slight improvement of the service perception. Both the SUS score and the NPS score have increased thanks to the modifications that have been applied based on the comments given during the intermediate tests. Nevertheless, and considering the qualitative comments given by the users, we still have room for improvement. In this regard, as you can see in Figure 63: Text Detection - Results for keeping on working on the service, most of the users allow us to continue working in the service to obtain a better one.

Test	Number of users	SUS score	NPS score
Intermediate	8	69.69	-12.5
Final	15	73.3	13.3

Table 32. Text Detection - Comparative between intermediate tests results and final results

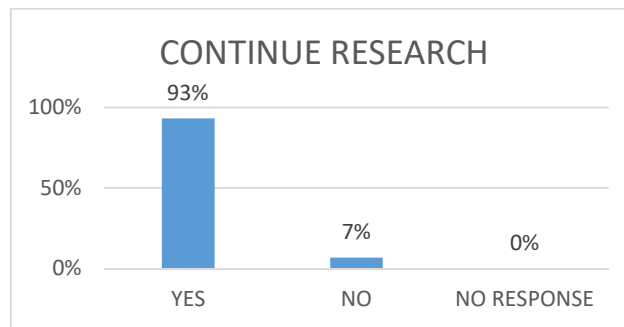


Figure 63: Text Detection - Results for keeping on working on the service

4.8.6. Actions to be taken for service improvement

According to the comments made, there are still two main lines of improvement:

- We need to reduce the complexity of the functionality within the app.
- We need to improve the synchronization when presenting the text detected.

4.9. Face Magnification Online

The general information about the tests is:

- Testing partner: UICI and FCNSE
- Service tested: Face magnification
- Testing date: April - May 2020
- Venue: Online
- Number of participants: 38
- Language(s) involved: Spanish and Italian
- Tasks performed by users to carry out the test: the online test has been demonstrated with a video showing the interaction and functionalities of the “Face magnification” service
- Approximate test duration: 20 minutes.

4.9.1. Description of the informants’ demographic profile

Whit regards to the demographic profile of the participants. The following figure shows the percentages based on users’ educational level. As it can be seen, more than a half of them have a good level of education (Advanced vocational education level and beyond).

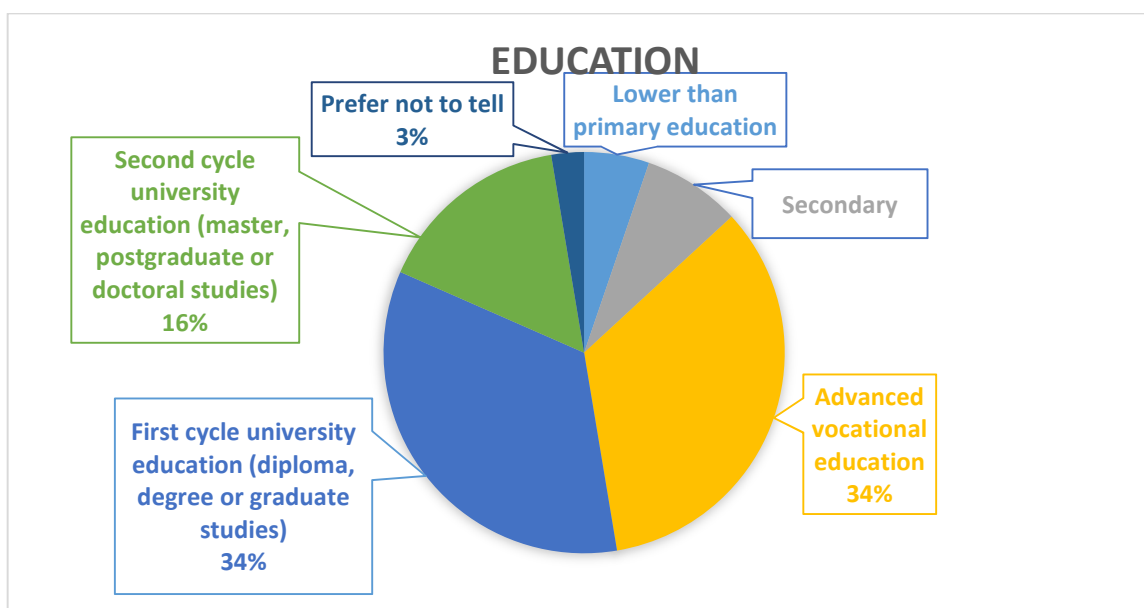


Figure 64: Face Magnification - Education Profiles

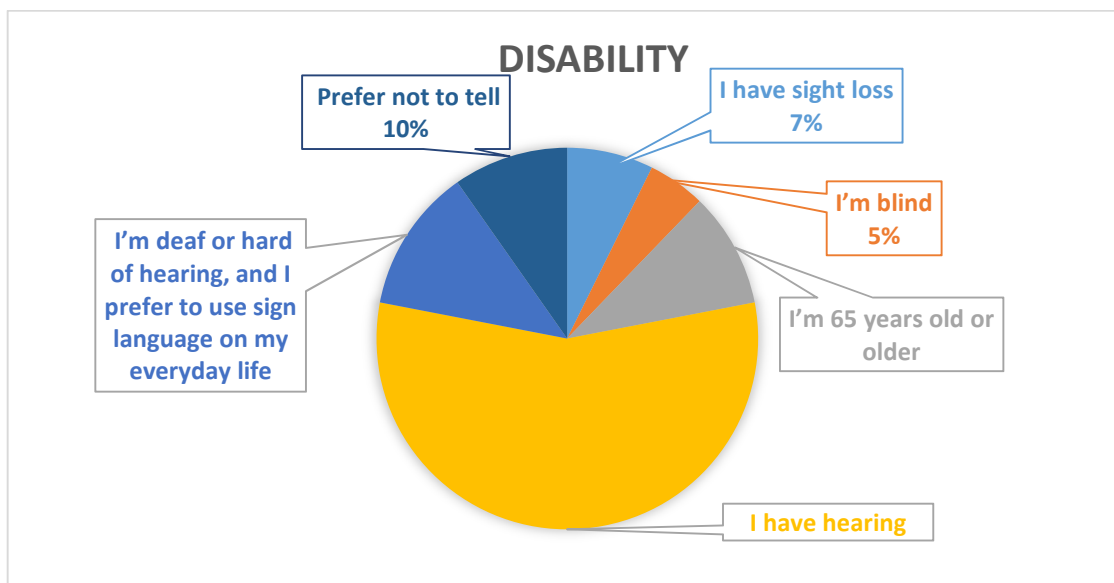


Figure 65: Face Magnification - Disability Profiles

4.9.2. SUS results

Table 33: Face Magnification - SUS Results shows the results for the SUS questionnaire while Figure 66: Face Magnification - Chart Graph of SUS individual scores, presents a graph with the individual scores. As can be seen, the overall score is 63.6, which can be considered as poor at SUS score scale, corresponding to an D in the SUS grade scale. Nevertheless, there are nine scores really low (under 50) that should be taken into consideration. On the other hand, up to 9 users give the maximum score.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scales				
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.					
N.											Odd items	Even items	SUS score	Grades	
user 1	2	3	4	3	5	5	4	3	2	1	12	10	55	D	
user 2	4	1	2	1	5	1	3	1	5	1	14	20	85	A	
user 3	5	1	5	1	5	1	5	1	5	1	20	20	100	A	
user 4	5	2	5	1	5	1	5	1	5	2	20	18	95	A	
user 5	5	1	5	1	5	1	5	1	5	1	20	20	100	A	
user 6	1	2	4	2	3	2	4	2	4	1	11	16	67,5	D	
user 7	5	1	5	1	5	1	5	1	5	1	20	20	100	A	
user 8	4	2	4	2	5	1	5	1	5	1	18	18	90	A	
user 9	4	1	5	1	4	1	5	1	3	1	16	20	90	A	
user 10	4	1	4	1	5	1	5	1	5	1	18	20	95	A	
user 11	5	4	4	4	5	4	4	4	4	5	17	4	52,5	D	
user 12	3	3	3	3	3	3	3	3	3	4	3	11	10	52,5	D
user 13	5	2	4	5	2	2	3	2	3	3	12	11	57,5	D	
user 14	4	3	3	2	3	3	4	3	3	3	12	11	57,5	D	
user 15	5	5	5	5	5	5	5	5	5	5	20	0	50	F	
user 16	4	1	3	2	4	3	2	2	4	2	12	15	67,5	D	
user 17	2	2	2	3	2	3	3	2	2	3	6	12	45	F	
user 18	2	3	3	1	2	2	4	3	3	2	9	14	57,5	D	
user 19	5	4	4	4	4	1	4	4	4	4	16	8	60	D	
user 20	1	4	2	3	2	5	1	3	1	4	2	6	20	F	
user 21	1	1	3	3	5	1	3	3	3	3	10	14	60	D	
user 22	4	2	2	3	3	3	3	2	3	2	10	13	57,5	D	
user 23	1	4	1	5	2	1	2	1	2	2	3	12	37,5	F	
user 24	3	3	3	1	3	3	4	4	3	2	11	12	57,5	D	
user 25	1	5	3	2	3	5	3	5	3	2	8	6	35	F	
user 26	5	4	4	5	4	4	4	4	4	4	16	4	50	F	
user 27	2	1	5	1	3	3	5	5	4	1	14	14	70	B	
user 28	5	3	5	1	5	1	3	3	3	3	16	14	75	B	
user 29	5	4	5	5	4	3	5	3	5	5	19	5	60	D	
user 30	5	3	3	3	4	3	4	4	4	4	15	8	57,5	D	
user 31	4	2	4	1	3	3	4	2	4	1	14	16	75	B	
user 32	1	5	2	2	2	5	3	5	1	3	4	5	22,5	F	
user 33	3	1	5	1	5	1	5	1	5	1	18	20	95	A	
user 34	1	2	2	3	3	1	3	4	1	3	5	12	42,5	F	
user 35	3	3	4	3	3	3	3	2	3	3	11	11	55	D	
user 36	1	4	3	1	3	2	4	3	3	1	9	14	57,5	D	
user 37	5	3	5	5	5	3	3	3	3	3	16	8	60	D	
user 38	4	4	4	4	4	3	3	4	5	5	15	5	50	F	
													63,6	D	

Table 33: Face Magnification - SUS Results

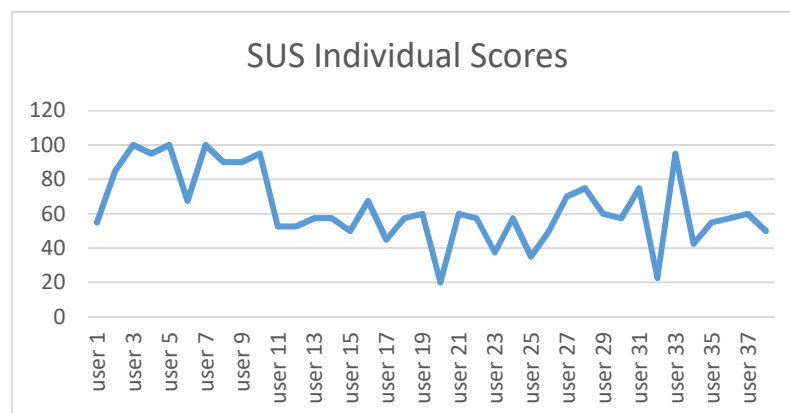


Figure 66: Face Magnification - Chart Graph of SUS individual scores

It is worth noting that the SUS score is a little under the average so we want to distinguish the

different scores obtained from visual impaired users (10 users) and deaf people (28 users). In this case the service, for visual impaired obtained from them a very high score (87.8) which is considered excellent in the SUS grade scale. Instead, the score obtained from deaf people is right under the average (54.9). This result may be due to the fact that for the visually impaired it is considered an indispensable service while for the deaf not.

N.	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scales			
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.	Odd items	Even items	SUS score	Grades
user 1	2	3	4	3	5	5	4	3	2	1	12	10	55	D
user 2	4	1	2	1	5	1	3	1	5	1	14	20	85	A
user 3	5	1	5	1	5	1	5	1	5	1	20	20	100	A
user 4	5	2	5	1	5	1	5	1	5	2	20	18	95	A
user 5	5	1	5	1	5	1	5	1	5	1	20	20	100	A
user 6	1	2	4	2	3	2	4	2	4	1	11	16	67,5	D
user 7	5	1	5	1	5	1	5	1	5	1	20	20	100	A
user 8	4	2	4	2	5	1	5	1	5	1	18	18	90	A
user 9	4	1	5	1	4	1	5	1	3	1	16	20	90	A
user 10	4	1	4	1	5	1	5	1	5	1	18	20	95	A
													87,8	A

Table 34: Face Magnification (Visual Impaired) - SUS Results

N.	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scales			
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.	Odd items	Even items	SUS score	Grades
user 1	5	4	4	4	5	4	4	4	4	5	17	4	52,5	D
user 2	3	3	3	3	3	3	3	3	4	3	11	10	52,5	D
user 3	5	2	4	5	2	2	3	2	3	3	12	11	57,5	D
user 4	4	3	3	2	3	3	4	3	3	3	12	11	57,5	D
user 5	5	5	5	5	5	5	5	5	5	5	20	0	50	F
user 6	4	1	3	2	4	3	2	2	4	2	12	15	67,5	D
user 7	2	2	2	3	2	3	3	2	2	3	6	12	45	F
user 8	2	3	3	1	2	2	4	3	3	2	9	14	57,5	D
user 9	5	4	4	4	4	1	4	4	4	4	16	8	60	D
user 10	1	4	2	3	2	5	1	3	1	4	2	6	20	F
user 11	1	1	3	3	5	1	3	3	3	3	10	14	60	D
user 12	4	2	2	3	3	3	3	2	3	2	10	13	57,5	D
user 13	1	4	1	5	2	1	2	1	2	2	3	12	37,5	F
user 14	3	3	3	1	3	3	4	4	3	2	11	12	57,5	D
user 15	1	5	3	2	3	5	3	5	3	2	8	6	35	F
user 16	5	4	4	5	4	4	4	4	4	4	16	4	50	F
user 17	2	1	5	1	3	3	5	5	4	1	14	14	70	B
user 18	5	3	5	1	5	1	3	3	3	3	16	14	75	B
user 19	5	4	5	5	4	3	5	3	5	5	19	5	60	D
user 20	5	3	3	3	4	3	4	4	4	4	15	8	57,5	D
user 21	4	2	4	1	3	3	4	2	4	1	14	16	75	B
user 22	1	5	2	2	2	5	3	5	1	3	4	5	22,5	F
user 23	3	1	5	1	5	1	5	1	5	1	18	20	95	A
user 24	1	2	2	3	3	1	3	4	1	3	5	12	42,5	F
user 25	3	3	4	3	3	3	3	2	3	3	11	11	55	D
user 26	1	4	3	1	3	2	4	3	3	1	9	14	57,5	D
user 27	5	3	5	5	5	3	3	3	3	3	16	8	60	D
user 28	4	4	4	4	4	3	3	4	5	5	15	5	50	F
													54,9	D

Table 35: Face Magnification (Deaf and Low Deaf) - SUS Results

4.9.3. NPS results

The scores obtained for the NPS scale are included in Table 36: Face Magnification - NPS Individual Scores. As can be seen, thirteen users give a very high punctuation, becoming promoter users, but sixteen of them provide low scores, becoming detractors. The remaining user, although classified as neutral users, also provides a valuable score.

Individual Scores		
Response	Scores	Percenta
1	10	4,15%
2	8	3,32%
3	10	4,15%
4	10	4,15%
5	10	4,15%
6	1	0,41%
7	9	3,73%
8	9	3,73%
9	8	3,32%
10	9	3,73%
11	7	2,90%
12	4	1,66%
13	10	4,15%
14	6	2,49%
15	10	4,15%
16	7	2,90%
17	5	2,07%
18	5	2,07%
19	9	3,73%
20	1	0,41%
21	0	0,00%
22	8	3,32%
23	1	0,41%
24	5	2,07%
25	1	0,41%
26	3	1,24%
27	8	3,32%
28	10	4,15%
29	8	3,32%
30	8	3,32%
31	6	2,49%
32	2	0,83%
33	10	4,15%
34	0	0,00%
35	5	2,07%
36	0	0,00%
37	10	4,15%
38	8	3,32%
Total	241	35%

Table 36: Face Magnification - NPS Individual Scores

Table 37: Face Magnification - NPS Calculation shows the percentages of the promoters, neutrals and detractors users, together with the calculation of the Net Promoter Score, which is very low.

NPS CALCULATION	Number	%
Promoters	13	34%
Neutrals	9	24%
Detractors	16	42%
Total	38	100%
	NPS SCORE	-7,9

Table 37: Face Magnification - NPS Calculation

Finally, Figure 67: Face Magnification - Chart of NPS data presents the classification of the users according to the three types defined in NPS: promoters, neutrals and detractor. As it can be seen, promoters represent only the 34% of the users.

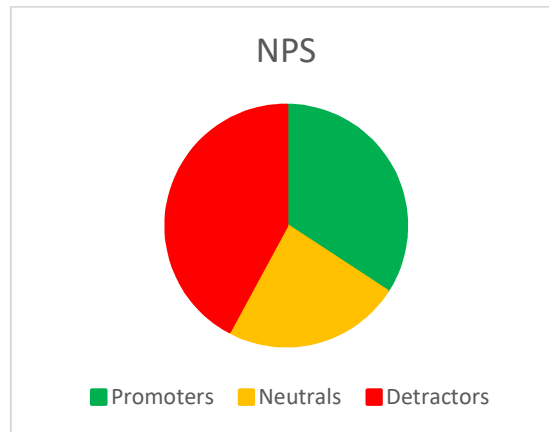


Figure 67: Face Magnification - Chart of NPS data

4.9.4. Qualitative comments made

The main qualitative comments provided by the users during the test are included in Table 38: Face Magnification - User Comments. In this sense, the main complaints are related to the possibility of losing the rest of the information when magnification only the face. On the other hand, thanks to the improvements there is no comment related to the movement of the face that is magnified, which represented an important problem.

N	COMMENT
1	It would be useful for those who does not hear, allowing the reading of lips
2	It is difficult to understand and content dependant
3	It could make the user loses additional information
4	It could be interesting for loss of hearing people with reading problems.

Table 38: Face Magnification - User Comments

4.9.5. Test conclusions

Based on the obtained results, and taking into account the comparative with the intermediate ones (see Table 39: Face Magnification - Comparative between intermediate tests results and final results), we can conclude that the perception of the users has decreased. One of the main reasons is that the number of users involved in the test is bigger than in the first place. Nevertheless, and considering the qualitative comments given by the users, there is still room for improvement. In this regard, as you can see in Figure 68: Face Magnification - Results for keeping on working on the service, most of the users allow us to continue working in the service to obtain a better one.

Test	Number of users	SUS score	NPS score
Intermediate	5	73.5	0.0
Final	38	63.6	-7.9

Table 39: Face Magnification - Comparative between intermediate tests results and final results

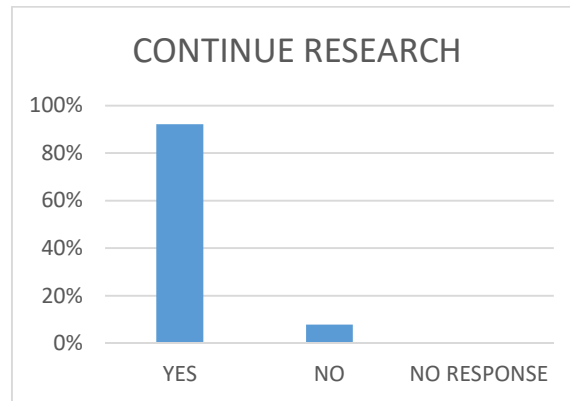


Figure 68: Face Magnification - Results for keeping on working on the service

4.9.6. Actions to be taken for service improvement

According to the comments, particularly with the one regarding the additional information lost when magnifying the face, the most proper solution is to use the companion screen for presenting this while in the principal screen the content is being presented in a common way.

4.10. Character Detection Online

The general information about the tests is:

- Testing partner: UICI and FCNSE
- Service tested: Character detection online
- Testing date: April - May 2020
- Venue: Online
- Number of participants: 13
- Language(s) involved: Spanish and Italian
- Tasks performed by users to carry out the test: the online test has been demonstrated with a video showing the interaction and functionalities of the “Character detection” service.
- Approximate test duration: 20 minutes.

4.10.1. Description of the informants’ demographic profile

With regards to the demographic profile of the participants. The following figure shows the percentages based on users’ educational level. As it can be seen, most of them have a good level of education (Advanced vocational education level and beyond)

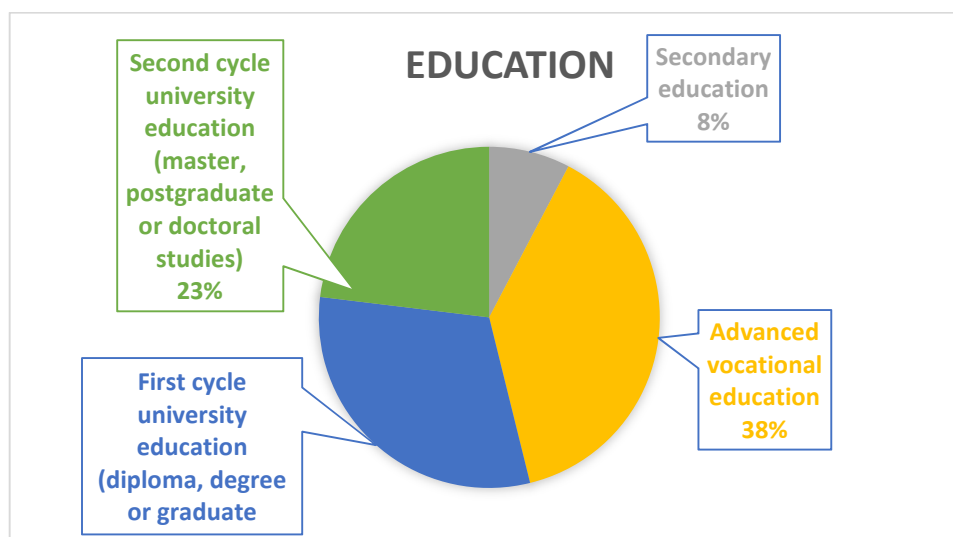


Figure 69: Character Detection - Education Profiles

Regarding users’ profile, we can see that 54% users are blind and 15% more have visual problems.

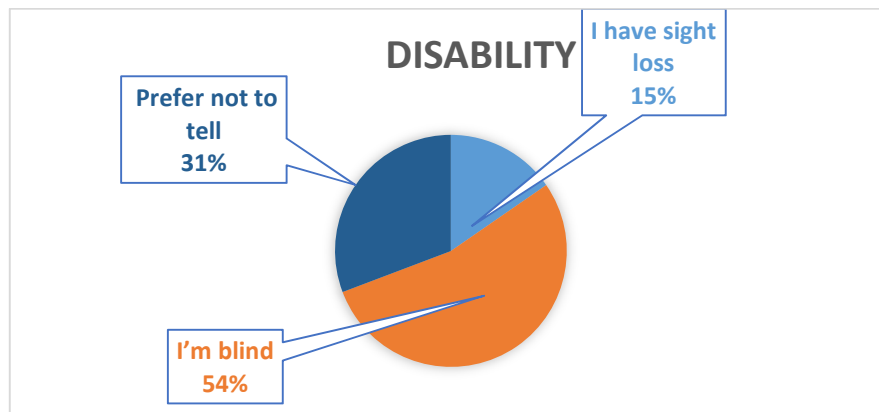


Figure 70: Character Detection - Disability Profiles

4.10.2. SUS results

Table 40: Character Detection - SUS Results shows the results for the SUS questionnaire while Figure 71: Character Detection - Chart Graph of SUS individual scores, presents a graph with the individual scores. As can be seen, the overall score is 69, which can be considered as good at SUS score scale, corresponding to an B in the SUS grade scale. Nevertheless, there are four scores really low (under 50) that should be taken into consideration. On the other hand, up to 8 users give high scores.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scales			
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.	Odd items	Even items	SUS score	Grades
N.														
user 1	1	5	1	1	1	5	1	5	1	5	0	4	10	F
user 2	3	4	2	5	2	4	2	2	2	4	6	6	30	F
user 3	1	3	3	1	2	4	2	5	2	1	5	11	40	F
user 4	5	1	5	1	5	1	5	1	5	1	20	20	100	A
user 5	5	1	5	2	4	1	5	1	4	1	18	19	92,5	A
user 6	5	1	5	1	5	1	5	1	5	1	20	20	100	A
user 7	4	3	4	3	5	3	5	3	5	3	18	10	70	B
user 8	5	1	2	1	4	2	1	5	1	3	8	13	52,5	D
user 9	3	2	2	3	2	1	4	4	1	2	7	13	50	F
user 10	2	2	5	1	2	2	5	3	5	1	14	16	75	B
user 11	5	1	5	1	5	1	5	1	5	1	20	20	100	A
user 12	2	1	4	1	3	1	4	1	4	1	12	20	80	B
user 13	5	1	5	1	5	1	5	1	4	1	19	20	97,5	A
													69,0	B

Table 40: Character Detection - SUS Results

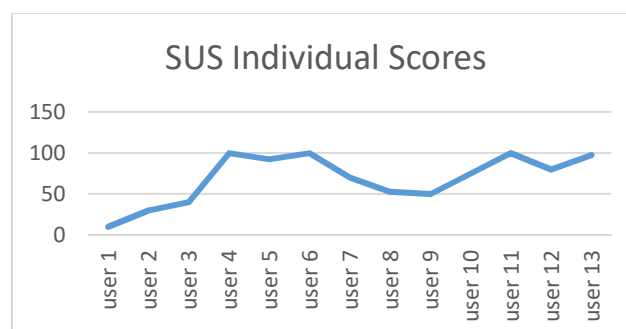


Figure 71: Character Detection - Chart Graph of SUS individual scores

4.10.3. NPS results

The scores obtained for the NPS scale are included in the following table. As can be seen, seven users give a very high punctuation, becoming promoter users, while five of them provides a low score, becoming detractor. The remaining user, although classified as neutral user, also provided a valuable score.

Response	Scores	Percentage
1	1	1,11%
2	3	3,33%
3	2	2,22%
4	10	11,11%
5	9	10,00%
6	10	11,11%
7	9	10,00%
8	9	10,00%
9	4	4,44%
10	8	8,89%
11	10	11,11%
12	5	5,56%
13	10	11,11%
Total	90	100%

Table 41: Character Detection - NPS Individual Scores

The following table shows the percentages of the promoters, neutrals and detractors users, together with the calculation of the Net Promoter Score.

NPS CALCULATION	Number	%
Promoters	7	54%
Neutrals	1	8%
Detractors	5	38%
Total	13	100%
	NPS SCORE	15,4

Table 42: Character Detection - NPS Calculation

Finally, the following figure presents the classification of the users according to the three types defined in NPS: promoters, neutrals and detractor. As it can be seen, more than a half are promoters of the solution.

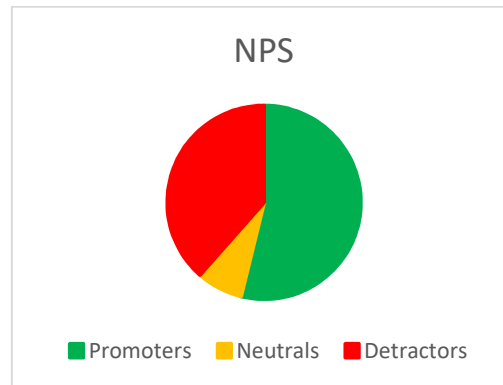


Figure 72: Character Detection - Chart of NPS data

4.10.4. Qualitative comments made

The main qualitative comments provided by the users during the test are included in the following table. In this sense, the main complaints are related to its use. Moreover, some users provide some suggestions to improve the service, as to include additional info or showing a list of the characters to let the users select from which of them, they want to obtain the info.

N	COMMENT
1	It is difficult to activate because of the icon size
2	To include other character's physical info besides the age
3	It could be interesting if the character are listed and the user is allowed to chose one of them
4	The function that describes the characters, when they are many, risks disturbing the dialogues

Table 43: Character Detection - User Comments

4.10.5. Test conclusions

Based on the obtained results and taking into account the comparative with the intermediate ones, we can conclude that the perception of the users has been maintained. In fact, both SUS and NPS scores are similar although the number of users has increased. Nevertheless, and considering the qualitative comments given by the users, there is still room for improvement as previously. In this regard, as you can see in Figure 73: Character Detection - Results for keeping on working on the service, most of the users allow us to continue working in the service to obtain a better one.

Test	Number of users	SUS score	NPS score
Intermediate	6	77.08	16.7
Final	13	69.0	15.4

Table 44. Comparative between intermediate tests results and final results

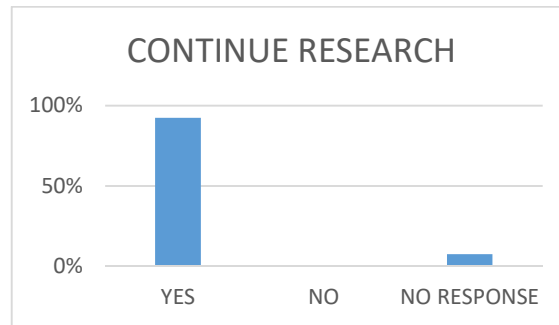


Figure 73: Character Detection - Results for keeping on working on the service

4.10.6. Actions to be taken for service improvement

Based on the comments given by the users, the main action that can be done to improve the service is related to the definition of additional physical characteristics to be analysed and presented for each character. In this regard, an analysis about which one is feasible needs to be done.

4.11. Custom Magnification Online

The general information about the tests is:

- Testing partner: UICI and FCNSE
- Service tested: Custom magnification online
- Testing date: April - May 2020
- Venue: Online
- Number of participants: 24
- Language(s) involved: Spanish and Italian
- Tasks performed by users to carry out the test: the online test has been demonstrated with a video showing the interaction and functionalities of the “Custom magnification” service.
- Approximate test duration: 20 minutes.

4.11.1. Description of the informants’ demographic profile

With regards to the demographic profile of the participants. The following figure shows the percentages based on users’ educational level. As it can be seen, most of them have a high educational level (Advanced vocational education level and beyond)

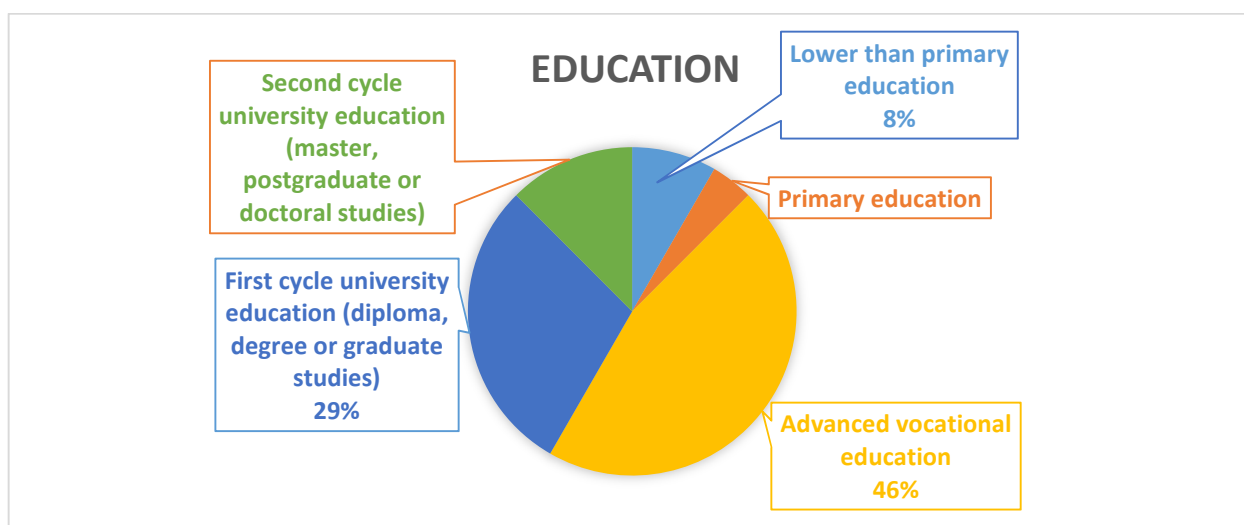


Figure 74: Custom Magnification - Education Profiles

Regarding users’ profile, we can see that most of them have hearing problems, which are the target of this service.

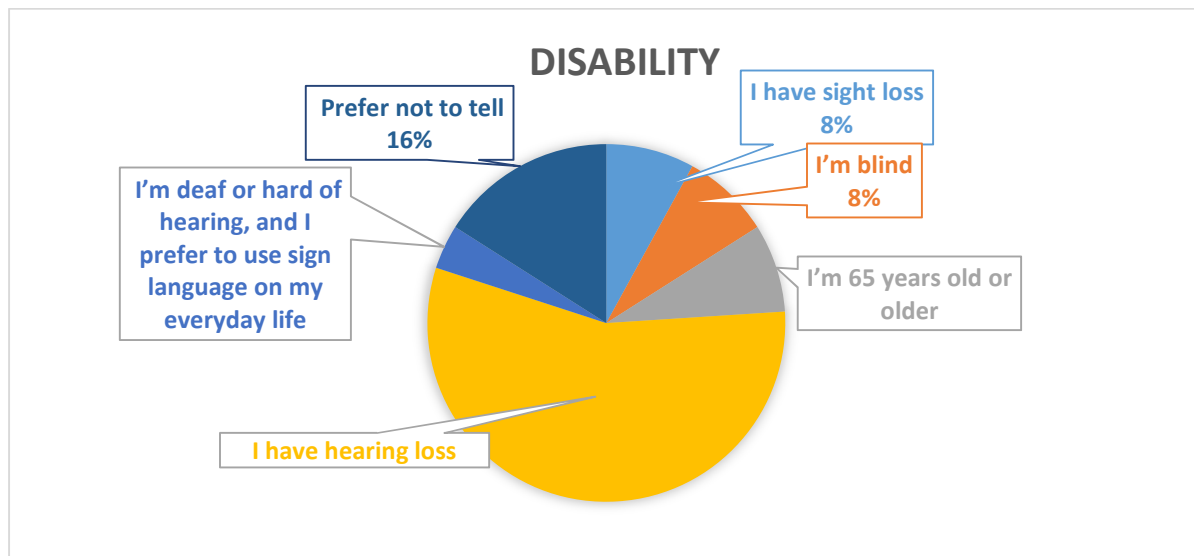


Figure 75: Custom Magnification - Disability Profiles

4.11.2. SUS results

Table 45: Custom Magnification - SUS Results shows the results for the SUS questionnaire while Figure 76: Custom Magnification - Chart Graph of SUS individual scores, presents a graph with the individual scores. As can be seen, the overall score is 68.8, which can be considered as good looking at SUS score scale, corresponding to a C in the SUS grade scale. Nevertheless, there are seven scores lower than the average that should be taken into consideration.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scales			
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.	Odd items	Even items	SUS score	Grades
N.														
user 1	5	1	3	2	4	1	4	3	3	2	14	16	75	B
user 2	5	1	5	1	5	1	5	1	5	1	20	20	100	O
user 3	5	2	4	1	5	1	5	1	5	1	19	19	95	A
user 4	5	1	5	1	5	1	5	1	5	1	20	20	100	O
user 5	4	2	4	2	4	2	4	2	4	2	15	15	75	B
user 6	5	1	5	1	4	2	5	1	5	1	19	19	95	A
user 7	4	1	5	1	4	1	3	1	2	1	13	20	82,5	A
user 8	5	1	5	1	5	1	5	1	5	1	20	20	100	A
user 9	5	1	4	1	4	2	2	4	4	4	14	13	67,5	D
user 10	1	1	3	5	3	5	4	3	3	3	9	8	42,5	F
user 11	1	1	1	2	2	2	2	2	1	1	2	17	47,5	F
user 12	2	3	4	1	3	1	5	3	5	1	14	16	75	B
user 13	3	3	4	1	4	3	4	2	5	2	15	14	72,5	B
user 14	1	3	3	3	3	3	3	3	3	3	8	10	45	F
user 15	3	2	4	1	3	2	4	2	5	1	14	17	77,5	B
user 16	4	1	5	1	5	2	4	1	5	1	18	19	92,5	A
user 17	4	4	4	4	4	4	4	3	4	4	15	6	52,5	D
user 18	1	3	2	2	3	3	3	3	3	2	7	12	47,5	F
user 19	1	3	2	4	2	5	1	1	3	4	4	8	30	F
user 20	5	5	5	5	5	4	4	4	5	4	19	3	55	D
user 21	5	5	3	5	5	5	3	3	3	3	14	4	45	F
user 22	1	1	3	3	2	3	2	3	3	3	6	12	45	F
user 23	4	3	5	4	4	4	3	3	4	4	15	7	55	D
user 24	4	3	4	1	4	1	3	2	4	1	14	17	77,5	B
													68,8	C

Table 45: Custom Magnification - SUS Results

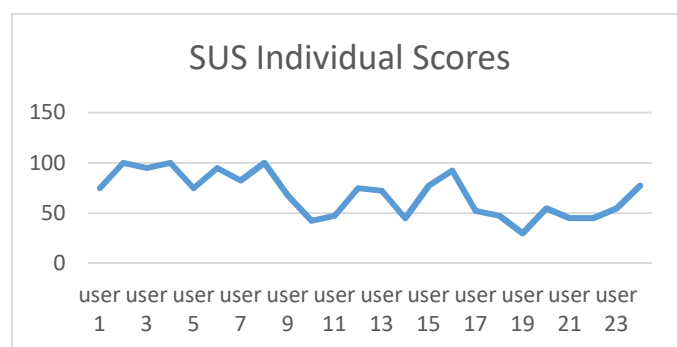


Figure 76: Custom Magnification - Chart Graph of SUS individual scores

Despite the SUS score is a little above average it is worth distinguishing the different score obtained from visual impaired users (8 users) and deaf people (16 users). In this case the service, mostly useful for visual impaired obtained from them a very high score (90.3 Table 46: Custom Magnification (Visual Impaired) - SUS Results) which is considered excellent in the SUS grade scale. Instead, the score obtained from deaf people is right under the average (58.0 Table 47: Custom Magnification (Deaf and low deaf) - SUS Results). this result may be due to the fact that for the visually impaired it is considered an indispensable service while for the deaf not.

N.	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scales			
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.	Odd items	Even items	SUS score	Grades
user 1	5	1	3	2	4	1	4	3	3	2	14	16	75	B
user 2	5	1	5	1	5	1	5	1	5	1	20	20	100	0
user 3	5	2	4	1	5	1	5	1	5	1	19	19	95	A
user 4	5	1	5	1	5	1	5	1	5	1	20	20	100	0
user 5	4	2	4	2	4	2	4	2	4	2	15	15	75	B
user 6	5	1	5	1	4	2	5	1	5	1	19	19	95	A
user 7	4	1	5	1	4	1	3	1	2	1	13	20	82,5	A
user 8	5	1	5	1	5	1	5	1	5	1	20	20	100	A
													90,3	A

Table 46: Custom Magnification (Visual Impaired) - SUS Results

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scales			
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.	Odd items	Even items	SUS score	Grades
N.														
user 1	5	1	4	1	4	2	2	4	4	4	14	13	67,5	D
user 2	1	1	3	5	3	5	4	3	3	3	9	8	42,5	F
user 3	1	1	1	2	2	2	2	2	1	1	2	17	47,5	F
user 4	2	3	4	1	3	1	5	3	5	1	14	16	75	B
user 5	3	3	4	1	4	3	4	2	5	2	15	14	72,5	B
user 6	1	3	3	3	3	3	3	3	3	3	8	10	45	F
user 7	3	2	4	1	3	2	4	2	5	1	14	17	77,5	B
user 8	4	1	5	1	5	2	4	1	5	1	18	19	92,5	A
user 9	4	4	4	4	4	4	4	3	4	4	15	6	52,5	D
user 10	1	3	2	2	3	3	3	3	3	2	7	12	47,5	F
user 11	1	3	2	4	2	5	1	1	3	4	4	8	30	F
user 12	5	5	5	5	5	4	4	4	5	4	19	3	55	D
user 13	5	5	3	5	5	5	3	3	3	3	14	4	45	F
user 14	1	1	3	3	2	3	2	3	3	3	6	12	45	F
user 15	4	3	5	4	4	4	3	3	4	4	15	7	55	D
user 16	4	3	4	1	4	1	3	2	4	1	14	17	77,5	B
													58,0	D

Table 47: Custom Magnification (Deaf and low deaf) - SUS Results

4.11.3. NPS results

The scores obtained for the NPS scale are included in the following table. As can be seen, nine users give a very high punctuation, becoming promoter users, while twelve of them provide low scores, becoming detractor.

Individual Scores		
Response	Scores	Percentage
1	10	6,29%
2	10	6,29%
3	10	6,29%
4	10	6,29%
5	9	5,66%
6	9	5,66%
7	4	2,52%
8	10	6,29%
9	5	3,14%
10	6	3,77%
11	3	1,89%
12	6	3,77%
13	6	3,77%
14	0	0,00%
15	6	3,77%
16	8	5,03%
17	7	4,40%
18	3	1,89%
19	3	1,89%
20	10	6,29%
21	7	4,40%
22	2	1,26%
23	6	3,77%
24	9	5,66%
Total	159	45%

Table 48: Custom Magnification - NPS Individual Scores

The following table shows the percentages of the promoters, neutrals and detractors users, together with the calculation of the Net Promoter Score.

NPS CALCULATION	Number	%
Promoters	9	38%
Neutrals	3	13%
Detractors	12	50%
Total	24	100%
	NPS SCORE	-12,5

Table 49: Custom Magnification - NPS Calculation

Finally, the following figure presents the classification of the users according to the three types defined in NPS: promoters, neutrals and detractor.

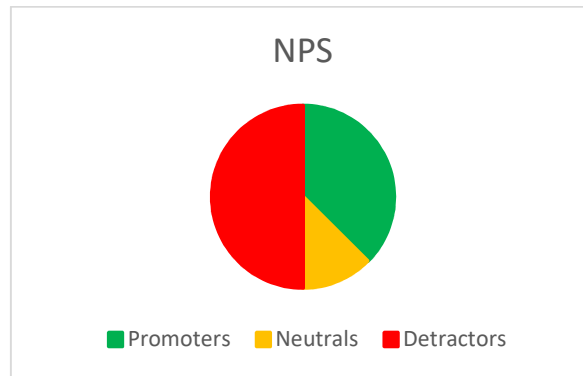


Figure 77: Custom Magnification - Chart of NPS data

4.11.4. Qualitative comments made

The main qualitative comments provided by the users during the test are included in Table 50: Custom Magnification - User Comments. In this sense, the main complaints are related to ease of use.

N	COMMENT
1	It could be usefull for small details and character lips reading
2	It is difficult to be used due to the content flow.

Table 50: Custom Magnification - User Comments

4.11.5. Test conclusions

Based on the obtained results and taking into account the comparative with the intermediate ones (see Table 51. Comparative between intermediate tests results and final results), we can conclude that the perception of the users changed. In fact, the SUS score, although decreased, it is still in a good position but the NPS score has decreased a lot. For this reason, we have to consider the qualitative comments given by the users in order to improve the solution. In this regard, as you can see in Figure 78: Custom Magnification - Results for keeping on working on the service, most of the users allow us to continue working on the service to obtain a better one.

Test	Number of users	SUS score	NPS score
Intermediate	11	80.23	36.4
Final	24	68.8	-12.5

Table 51. Comparative between intermediate tests results and final results

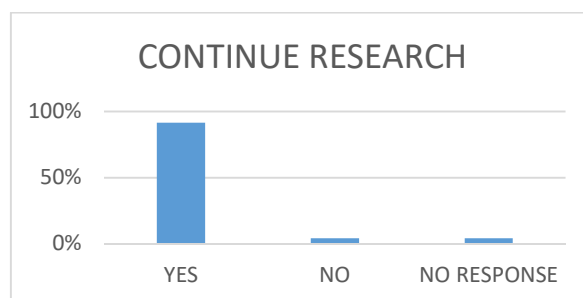


Figure 78: Custom Magnification - Results for keeping on working on the service

4.11.6. Actions to be taken for service improvement

Based on the comments given by the users, the main action that can be done to improve the service is related to the ease of use, so a new way of accessing it must be provided.

4.12. Audio Subtitles Online

The general information about the tests is:

- Testing partner: UICI and FCNSE
- Service tested: Audio subtitles online
- Testing date: April - May 2020
- Venue: Online
- Number of participants: 16
- Language(s) involved: Spanish and Italian
- Tasks performed by users to carry out the test: the online test has been demonstrated with a video showing the interaction and functionalities of the “Audio subtitles” service.
- Approximate test duration: 20 minutes.

4.12.1. Description of the informants’ demographic profile

With regards to the demographic profile of the participants. The following figure shows the percentages based on users’ educational level. As it can be seen, most of them have a high educational level (Advanced vocational education level and beyond).

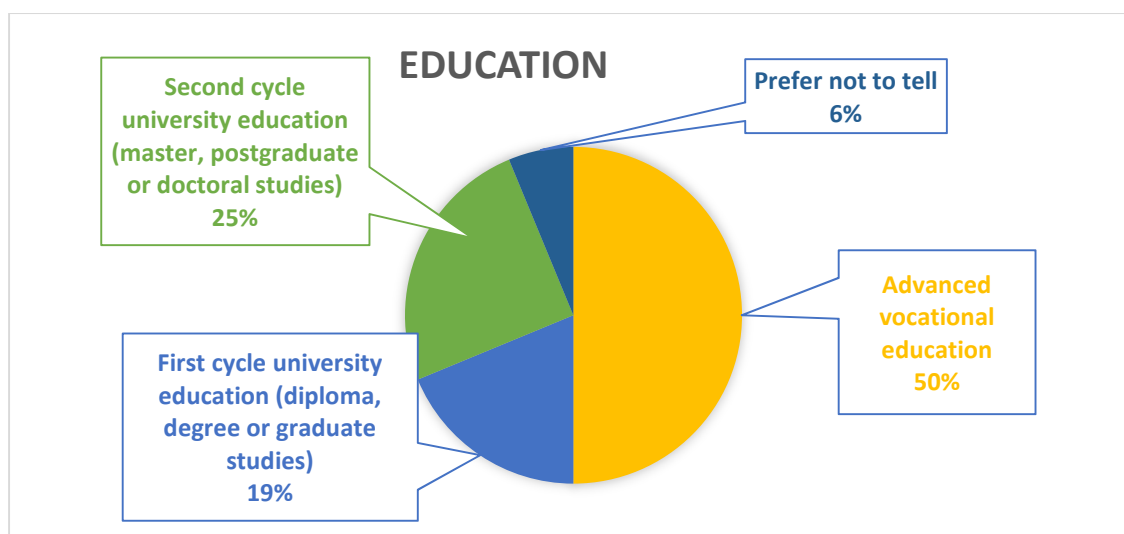


Figure 79: Audio Subtitles - Education Profiles

Regarding users’ profile, we can see that half of the users have sight problems, which are the target of this service.

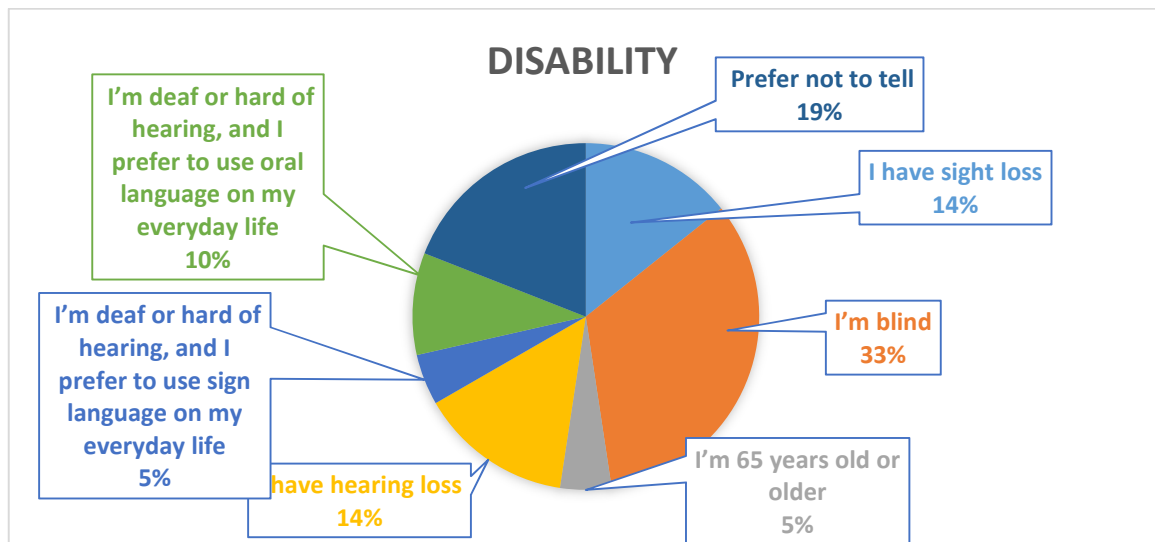


Figure 80: Audio Subtitles - Disability Profiles

4.12.2. SUS results

Table 52: Audio Subtitles - SUS Results shows the results for the SUS questionnaire while Figure 81: Audio Subtitles - Chart Graph of SUS individual scores, presents a graph with the individual scores. As can be seen, the overall score is 80, which can be consider as good looking at SUS score scale, corresponding to an B in the SUS grade scale. Nevertheless, there are seven scores lower than the average that should be taken into consideration.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scales			
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.	Odd items	Even items	SUS score	Grade s
N.														
user 1	4	2	4	1	2	2	4	3	2	1	11	16	67,5	D
user 2	3	4	2	5	2	1	3	2	2	3	7	10	42,5	F
user 3	4	5	5	3	5	3	5	2	5	5	19	7	65	D
user 4	4	2	5	3	4	2	4	2	4	4	16	12	70	B
user 5	1	4	2	2	2	2	3	4	4	1	7	12	47,5	F
user 6	5	1	5	1	5	1	5	1	5	1	20	20	100	A
user 7	3	1	4	1	3	1	4	1	3	1	12	20	80	B
user 8	5	1	5	1	5	1	5	1	5	1	20	20	100	A
user 9	5	2	4	2	5	1	4	1	4	1	17	18	87,5	A
user 10	5	1	5	1	5	1	5	1	5	1	20	20	100	A
user 11	4	1	5	1	3	1	5	1	5	1	17	20	92,5	A
user 12	3	2	3	2	3	1	4	2	4	1	12	17	72,5	B
user 13	5	1	5	1	5	1	5	1	5	1	20	20	100	A
user 14	5	2	5	2	5	2	5	2	5	2	20	15	87,5	A
user 15	5	1	5	1	5	1	5	2	5	1	20	19	97,5	A
user 16	3	2	4	1	3	2	4	3	3	1	12	16	70	B
													80	B

Table 52: Audio Subtitles - SUS Results

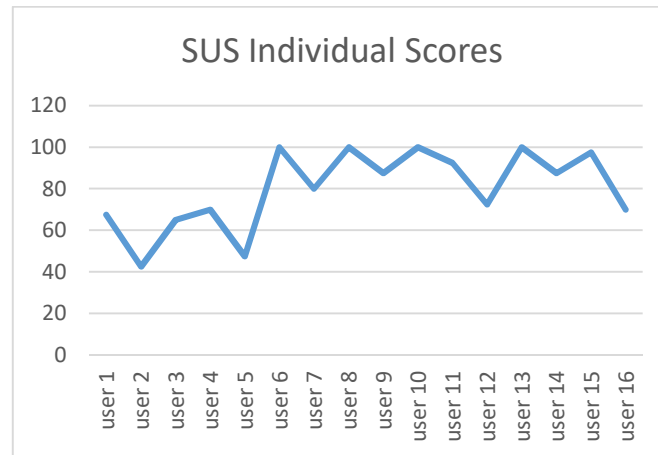


Figure 81: Audio Subtitles - Chart Graph of SUS individual scores

4.12.3. NPS results

The scores obtained for the NPS scale are included in the following table. As can be seen, nine users give a very high punctuation, becoming promoter users, while three of them provide low scores, becoming detractors. The remaining users, although classified as neutral users, also provides a valuable score.

Individual Scores		
Response	Scores	Percentage
1	9	7,09%
2	7	5,51%
3	8	6,30%
4	9	7,09%
5	2	1,57%
6	10	7,87%
7	7	5,51%
8	10	7,87%
9	10	7,87%
10	10	7,87%
11	10	7,87%
12	3	2,36%
13	9	7,09%
14	8	6,30%
15	10	7,87%
16	5	3,94%
Total	127	100%

Table 53: Audio Subtitles - NPS Individual Scores

The following table shows the percentages of the promoters, neutrals and detractors users, together with the calculation of the Net Promoter Score.

NPS CALCULATION	Number	%
Promoters	9	56%
Neutrals	4	25%
Detractors	3	19%
Total	16	100%
	NPS SCORE	37,5

Table 54: Audio Subtitles - NPS Calculation

Finally, in the following figure we presents the classification of the users according to the three types defined in NPS: promoters, neutrals and detractor. As it can be seen, more than a half are promoters.

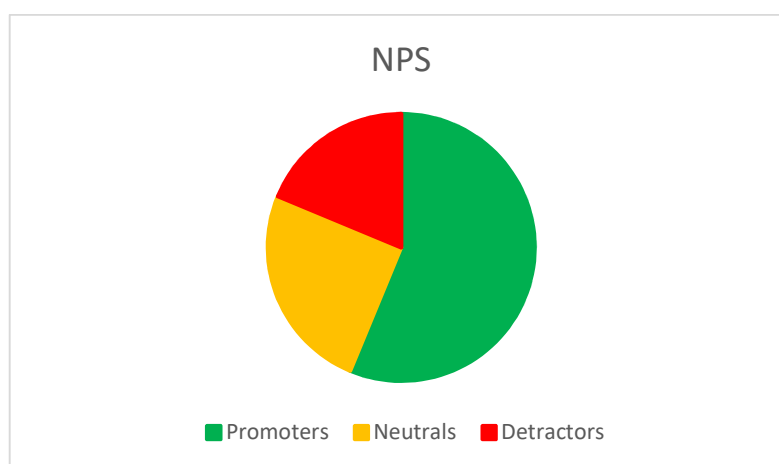


Figure 82: Audio Subtitles - Chart of NPS data

4.12.4. Qualitative comments made

The main qualitative comments provided by the users during the test are included in Table 55: Audio Subtitles - User Comments. In this sense, the main complaints are related to ease of use.

N	COMMENT
1	I think that despite being very useful, indeed I thought it several times. I'm afraid of losing the authenticity of the film or what you watch, it seems very convenient when there is small dialogue
2	Ease of use

Table 55: Audio Subtitles - User Comments

4.12.5. Test conclusions

This service has obtained good results both in SUS and NPS scores, so we can derive that it is interesting for the users. Nevertheless, there is still room for improvement.

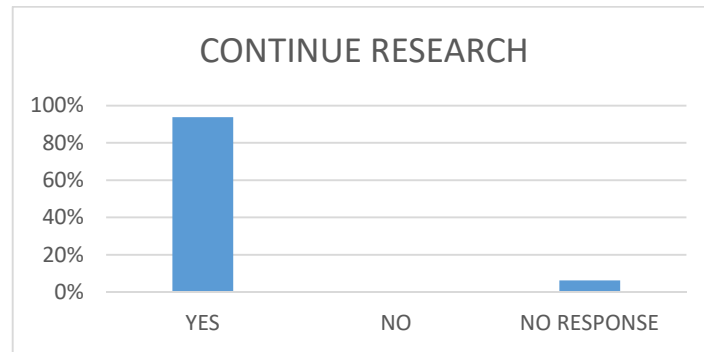


Figure 83: Audio Subtitles - Results for keeping on working on the service

4.12.6. Actions to be taken for service improvement

None of the users has provided any idea about how to improve the service so, in order to define any further action, a deep analysis should be made.

4.13. Audio Equalization Online

The general information about the tests is:

- Testing partner: UICI and FCNSE
- Service tested: Audio equalization
- Testing date: April - May 2020
- Venue: Online
- Number of participants: 15
- Language(s) involved: Spanish and Italian
- Tasks performed by users to carry out the test: the online test has been demonstrated with a video showing the interaction and functionalities of the “Audio subtitles” service.
- Approximate test duration: 20 minutes.

4.13.1. Description of the informants’ demographic profile

With regards to the demographic profile of the participants. The following figure shows the percentages based on users’ educational level. As it can be seen, most of them have a high educational level (Advanced vocational education level and beyond).

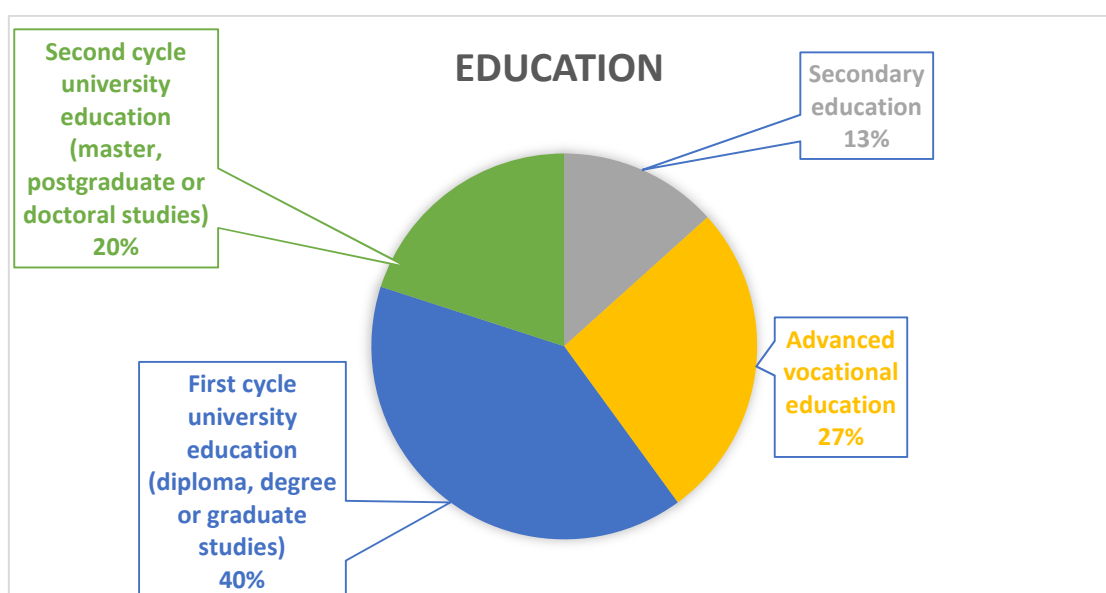


Figure 84: Audio Equalization - Education Profiles

Regarding users’ profile, we can see that all of them have hearing problems, which are the target of this service.

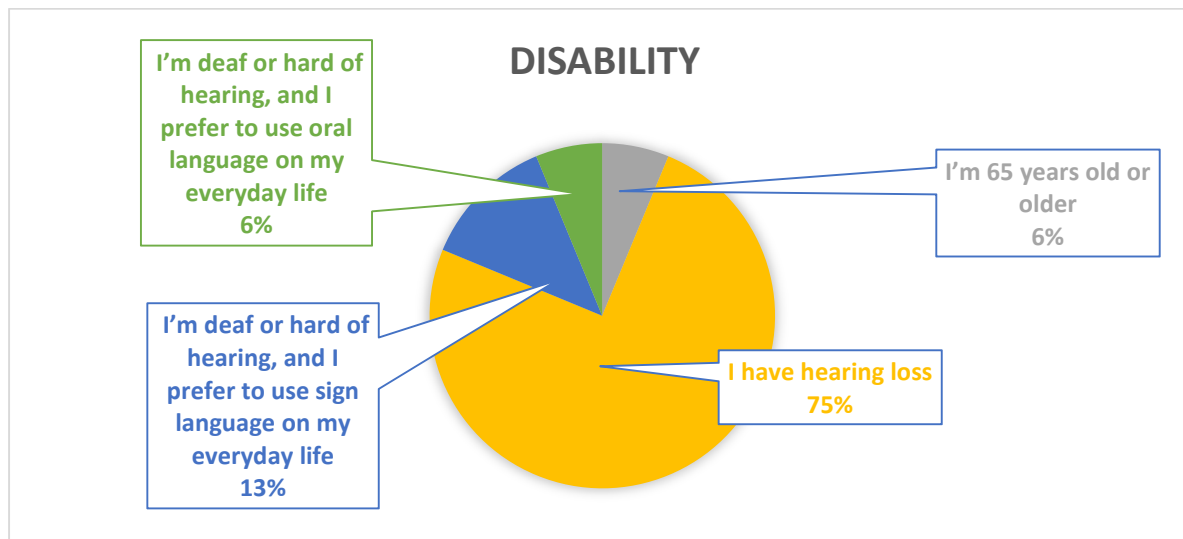


Figure 85: Audio Equalization - Disability Profiles

4.13.2. SUS results

Table 56: Audio Equalization - SUS Results shows the results for the SUS questionnaire while Figure 86: Audio Equalization - Chart Graph of SUS individual scores, presents a graph with the individual scores. As can be seen, the overall score is 41.3, which can be considered as poor looking at SUS score scale, corresponding to an F in the SUS grade scale. In fact, only two users give a high score to the solution.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scales			
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.	Odd items	Even items	SUS score	Grade s
N.														
user 1	1	5	1	5	1	5	3	3	1	3	2	4	15	F
user 2	2	3	3	3	2	2	2	2	2	2	6	13	47,5	F
user 3	3	3	1	3	3	2	2	2	2	3	6	12	45	F
user 4	1	5	3	3	3	4	4	3	3	1	9	9	45	F
user 5	1	5	1	5	1	4	3	5	1	2	2	4	15	F
user 6	1	3	3	3	3	3	3	3	3	3	8	10	45	F
user 7	1	1	1	5	1	1	1	1	1	1	0	16	40	F
user 8	3	1	4	1	3	2	4	1	4	1	13	19	80	B
user 9	1	3	2	4	2	4	2	4	1	3	3	7	25	F
user 10	2	1	5	1	4	1	5	1	5	1	16	20	90	A
user 11	1	3	3	4	3	3	4	3	2	3	8	9	42,5	F
user 12	1	5	1	2	1	5	1	5	3	5	2	3	12,5	F
user 13	1	1	1	5	1	5	1	5	2	5	1	4	12,5	F
user 14	3	2	3	4	3	3	3	3	3	3	10	10	50	F
user 15	3	3	4	4	4	3	4	3	3	3	13	9	55	D
													41,3333	F

Table 56: Audio Equalization - SUS Results

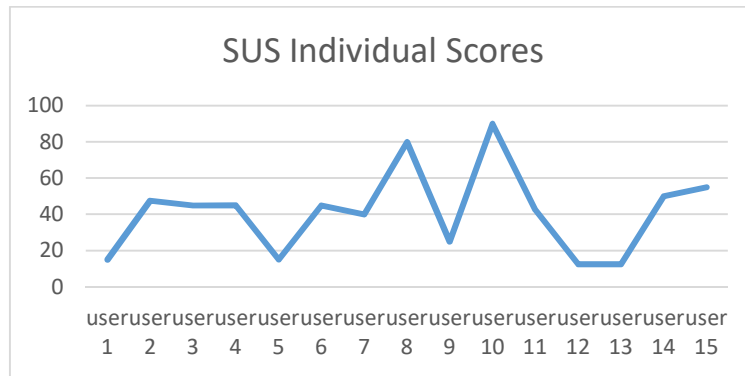


Figure 86: Audio Equalization - Chart Graph of SUS individual scores

4.13.3. NPS results

The scores obtained for the NPS scale are included in the following table. As can be seen, most of the users give a very low punctuation, becoming detractor, while there is no promoter this time.

Individual Scores		
Response	Scores	Percentage
1	6	11,54%
2	3	5,77%
3	6	11,54%
4	2	3,85%
5	1	1,92%
6	0	0,00%
7	0	0,00%
8	6	11,54%
9	1	1,92%
10	7	13,46%
11	7	13,46%
12	2	3,85%
13	0	0,00%
14	7	13,46%
15	4	7,69%
Total	52	100%

Table 57: Audio Equalization - NPS Individual Scores

The following table shows the percentages of the promoters, neutrals and detractors users, together with the calculation of the Net Promoter Score.

NPS CALCULATION	Number	%
Promoters	0	0%
Neutrals	3	20%
Detractors	12	80%
Total	15	100%
	NPS SCORE	-80,0

Table 58: Audio Equalization - NPS Calculation

Finally, the next figure presents the classification of the users according to the three types defined in

NPS: promoters, neutrals and detractor. As it can be seen, most of the users are detractors, while there are no promoters.

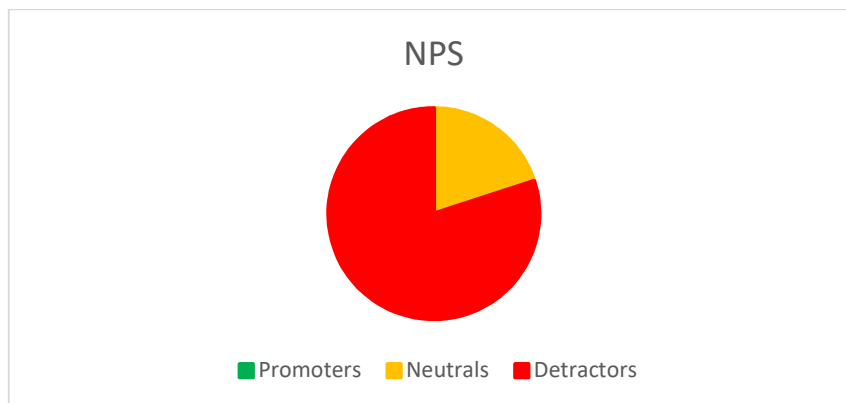


Figure 87: Audio Equalization - Chart of NPS data

4.13.4. Qualitative comments made

The main qualitative comments provided by the users during the test are included in Table 59: Audio Equalization - User Comments. In this sense, the main complaints are related to ease of use.

N	COMMENT
1	It could be useful for some kind of hearing problems
2	User needs to learn to use it

Table 59: Audio Equalization - User Comments

4.13.5. Test conclusions

Although most of the users are agree on continuing with the research of the service, due to the SUS and NPS punctuation it seems to be not so relevant or even interesting for them. In fact, none of the users will allow other people to use it, so, according to this, this service is not going to be continued.

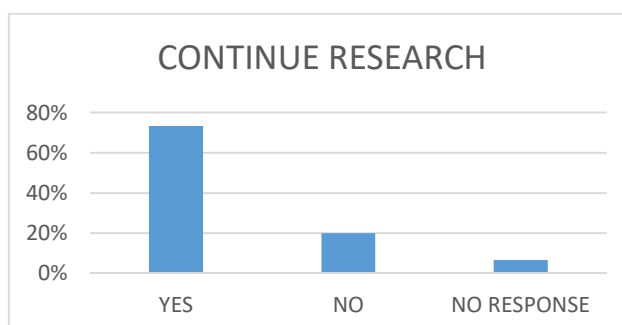


Figure 88: Audio Equalization - Results for keeping on working on the service

4.13.6. Actions to be taken for service improvement

There is no action to be taken to improve this service.

4.14. Sound Recognition Online

The general information about the tests is:

- Testing partner: UICI and FCNSE
- Service tested: Sound recognition
- Testing date: April - May 2020
- Venue: Online
- Number of participants: 15
- Language(s) involved: Spanish and Italian
- Tasks performed by users to carry out the test: the online test has been demonstrated with a video showing the interaction and functionalities of the “Sound recognition” service.
- Approximate test duration: 20 minutes.

4.14.1. Description of the informants’ demographic profile

With regards to the demographic profile of the participants. The following figure shows the percentages based on users’ educational level. As it can be seen, most of them have a high educational level (Advanced vocational education level and beyond).

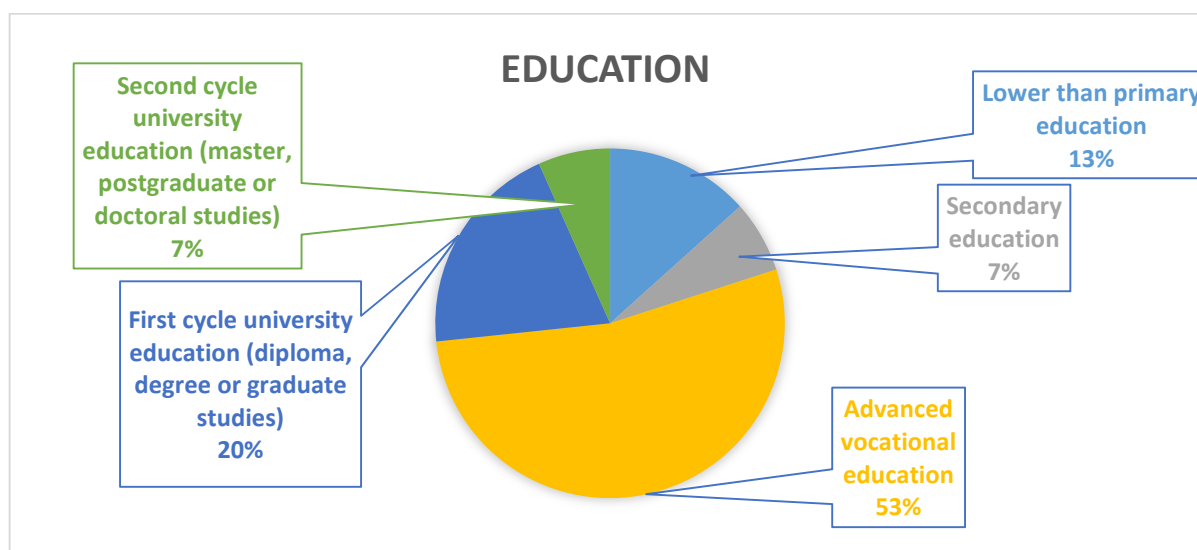


Figure 89: Sound Recognition - Education Profiles

Regarding users’ profile, we can see that all of them have hearing problems, which are the target of this service.

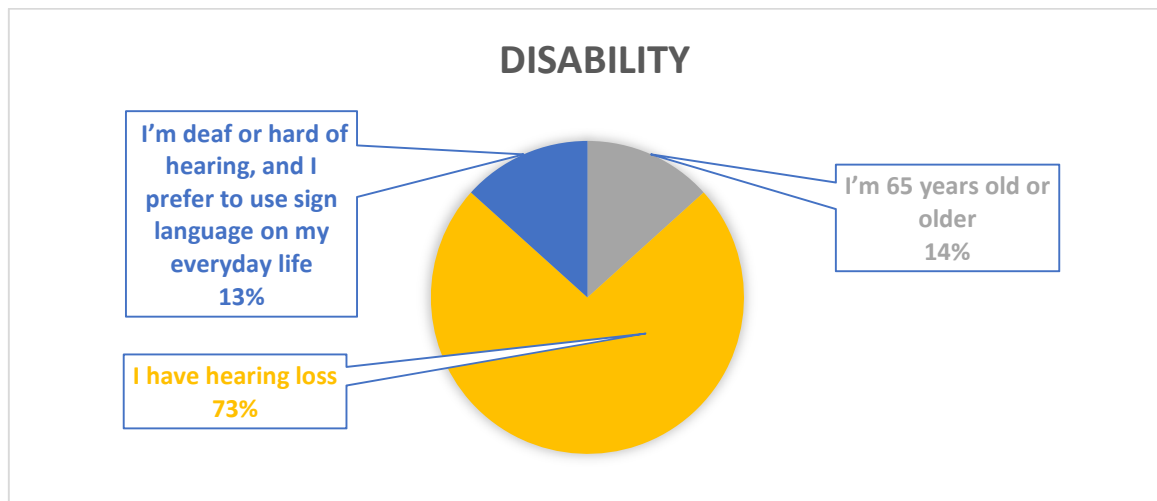


Figure 90: Sound Recognition - Disability Profiles

4.14.2. SUS results

Table 60: Sound Recognition - SUS Results shows the results for the SUS questionnaire while Figure 91: Sound Recognition - Chart Graph of SUS individual scores, presents a graph with the individual scores. As can be seen, the overall score is 67, which is really near to be considered as good looking at SUS score scale, corresponding to a D in the SUS grade scale. Nevertheless, there are nine scores lower than the average that should be taken into consideration.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scales			
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.	Odd items	Even items	SUS score	Grade s
N.														
user 1	5	1	5	3	5	1	4	3	5	2	19	15	85	A
user 2	4	4	5	5	4	3	5	3	4	5	17	5	55	D
user 3	5	1	5	1	5	2	5	2	5	1	20	18	95	A
user 4	5	1	5	1	5	1	5	1	3	3	18	18	90	A
user 5	3	3	3	3	3	3	3	3	3	3	10	10	50	F
user 6	5	1	5	3	5	1	5	1	5	5	20	14	85	A
user 7	4	2	3	2	4	3	4	2	3	2	13	14	67,5	D
user 8	5	1	5	1	5	1	5	1	5	1	20	20	100	A
user 9	5	4	3	4	2	3	2	4	3	4	10	6	40	F
user 10	5	5	5	5	5	2	4	1	5	5	19	7	65	D
user 11	3	3	2	3	3	3	3	2	3	3	9	11	50	F
user 12	5	1	3	5	3	3	3	3	3	3	12	10	55	D
user 13	5	3	3	5	4	4	4	4	4	4	15	5	50	F
user 14	4	4	4	4	4	3	3	2	2	3	12	9	52,5	D
user 15	3	2	4	2	3	1	3	2	3	3	11	15	65	D
													67	D

Table 60: Sound Recognition - SUS Results

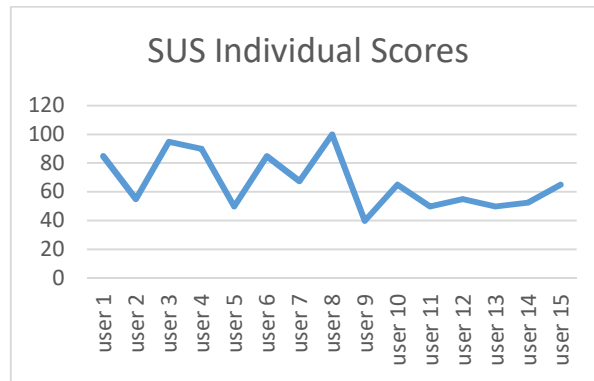


Figure 91: Sound Recognition - Chart Graph of SUS individual scores

4.14.3. NPS results

The scores obtained for the NPS scale are included in the following table. As can be seen, four users give a very high punctuation, becoming promoter users, while five of them provide low scores, becoming detractors. The remaining users, although classified as neutral users, also provides a valuable score.

Individual Scores		
Response	Scores	Percentage
1	10	9,26%
2	8	7,41%
3	10	9,26%
4	5	4,63%
5	5	4,63%
6	7	6,48%
7	5	4,63%
8	10	9,26%
9	7	6,48%
10	10	9,26%
11	3	2,78%
12	6	5,56%
13	7	6,48%
14	7	6,48%
15	8	7,41%
Total	108	100%

Table 61: Sound Recognition - NPS Individual Scores

The following table shows the percentages of the promoters, neutrals and detractors users, together with the calculation of the Net Promoter Score.

NPS CALCULATION	Number	%
Promoters	4	27%
Neutrals	6	40%
Detractors	5	33%
Total	15	100%
	NPS SCORE	-6,7

Table 62: Sound Recognition - NPS Calculation

Finally, the next figure presents the classification of the users according to the three types defined in NPS: promoters, neutrals and detractor. As it can be seen, most of the users are detractors plus neutral.

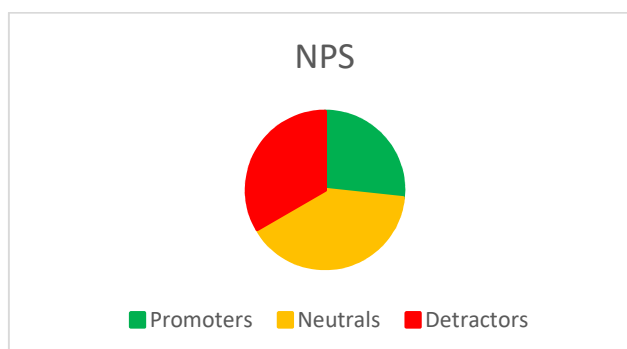


Figure 92: Sound Recognition - Chart of NPS data

4.14.4. Qualitative comments made

The main qualitative comments provided by the users during the test are included in Table 63: Sound Recognition - User Comments. In this sense, the main complaints are related to the place where the info is presented.

N	COMMENT
1	It is so important to note the different sound in the content
2	It provides additional information for content contextualization
3	To change the place where the info is provided
4	It is very intuitive

Table 63: Sound Recognition - User Comments

4.14.5. Test conclusions

Although most of the users are agree on continuing with the research of the service, according to the SUS and NPS results there is still room for improvement.

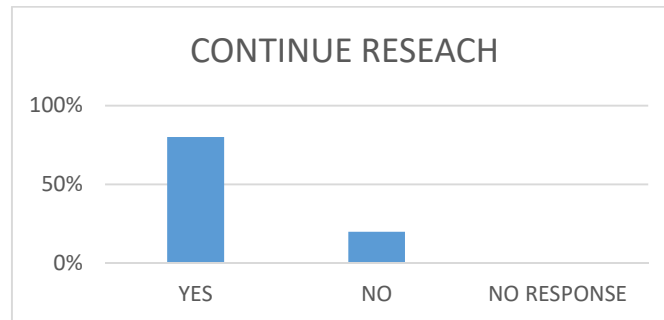


Figure 93: Sound Recognition - Results for keeping on working on the service

4.14.6. Actions to be taken for service improvement

The main suggestion given by the users according to this service is regarding the place where the detected information is presented. In this regard, a possible improvement is to let the user to select this place.

4.15. Multilingual Subtitles Online

In this section, we give details of the multilingual subtitling pilot conducted by the CCMA, covering production tools and the applications to consume that content.

Previously, consulting statistic data from IDESCAT (Official statistics of Catalonia) we identified the main groups of residents in Catalonia who do not understand Catalan, as potential users of multilingual subtitles. The total number of residents in Catalonia who do not understand Catalan is around half million people. As consequence, to address these communities, we selected English, Spanish and Arabic languages, for the multilingual subtitles pilot.

In order to simplify the execution and maximize the results, the pilot has been limited to TV3 channel. A generalist channel and audience's leader in the region of Catalonia. We have offered three subtitles' consumption possibilities, starting by: live DTT linear broadcast and on demand thanks to HbbTV red button application, also on demand at the CCMA's web portal.



Figure 94: Subtitling samples (Multilingual Subtitles, online)

However, the Catalan language do not take part on the pilot, although we offer data as solid reference to compare with. TV3 channel have a 77% of subtitling coverage in Catalan, which were helpful as starting point for the automatic translation process, designed for the EasyTV pilot.

4.15.1. Content generation by volunteers

The first phase began on January 15th, calling for volunteers on twitter. Two hundred fifteen people were enrolled, in response to this call. Twenty-four of whom were considered eligible, after pass an aptitude test. This test was performed to avoid contributions below the expected quality.

Regarding the content generation tools, we present the results from nine volunteer's that have tested through, the crowdsourcing platform, the subtitle-editing tool. They have helped on the production workflow, to review the automatic translation proposals, to modify, split or rewrite and validate the subtitles translation finally.

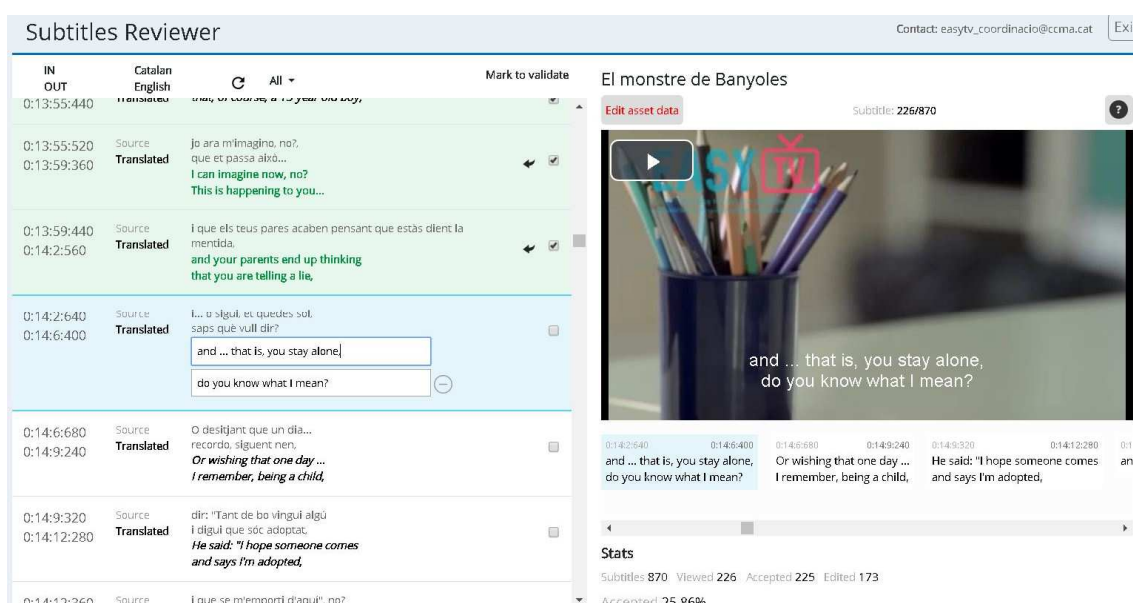


Figure 95: Subtitling editing tool (Multilingual Subtitles – content generation, online)

The multi-language subtitles content offered during the pilot was composed by new content, never broadcasted before, a very confidential material, for this reason it was reviewed just by professionals (which opinion is not included on this deliverable), using the same tools and workflows as the volunteers. At the same time, it was useful to test the whole system from a new edge. This content was broadcasted and finally it was available on demand.

On the other hand, crowdsourcing collaborators helped to translate archive content, already broadcasted and only available on demand. Conversely, before being published, the subtitles was approved by professionals, to fit with the expected quality by the audience.

Test profile information:

- Testing partner: CCMA, S.A.
- Service tested: Multilingual Subtitling Editing tool
- Testing date: (January - April 2020).
- Venue: online.
- Number of participants: 9
- Language(s) involved: Catalan as content origin language. English, Spanish and Arabic as subtitles translation languages.
- Tasks performed by users to carry out the test: The crowdsourcing platform offered a pool of translation tasks. The collaborators once they have the task assigned. They could work on the task with the subtitle-editing tool, saving progress and finishing it.
- Approximate test duration: it depends on the dedication. A collaborator could generate from 0 to n translations.

4.15.1.1 Description of the informants' demographic profile

In this section, the demographic data collected during the tests is reported below

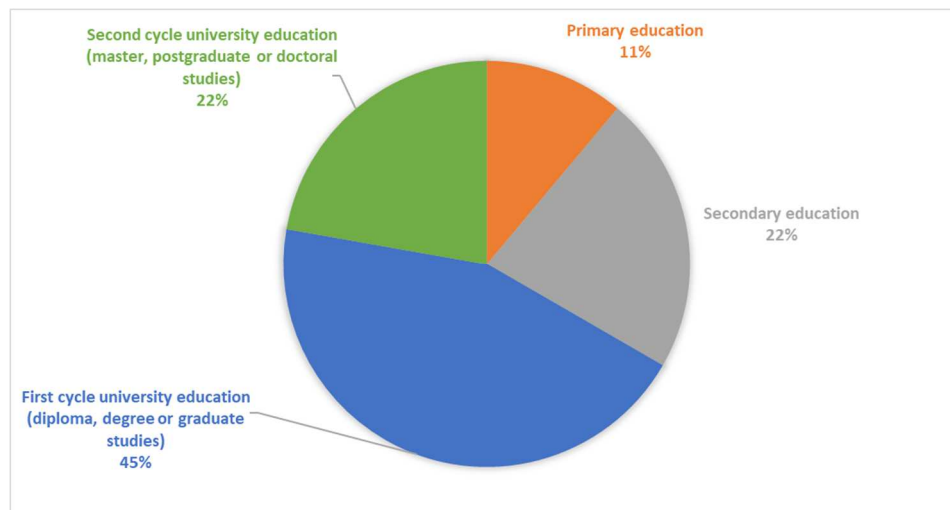


Figure 96: Education Level (Multilingual Subtitles – content generation, online)

In this case, the panel have a good education level distribution. Regarding the disabilities, it includes a person with low vision and another older than 65 years, and the rest prefer not to tell.

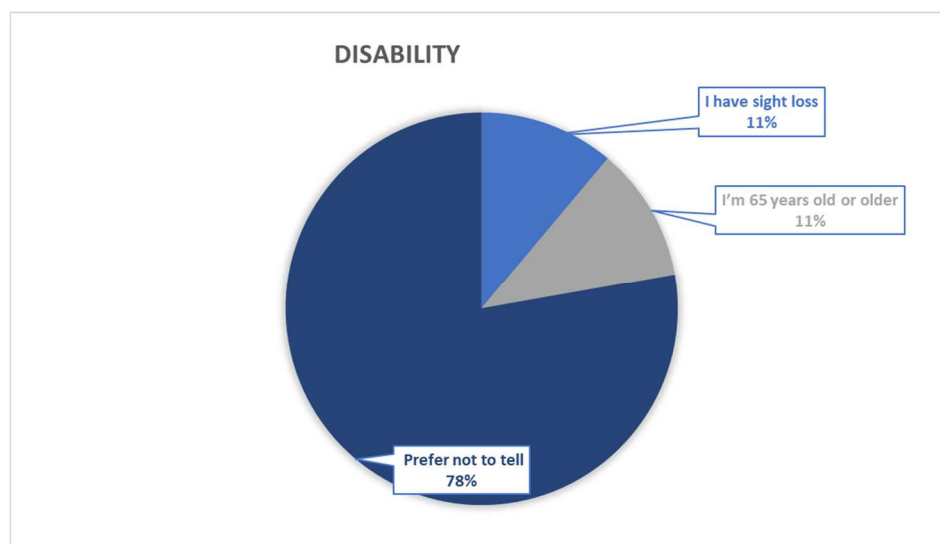


Figure 97: Disability profile (Multilingual Subtitles – content generation, online)

4.15.1.2 SUS results

The results obtained in regarding the SUS are presented in this section. Note: Answer by choosing a value from one (totally disagree) to five (totally agree)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scales			
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.	Odd items	Even items	SUS score	Grades
N.														
user 1	4	1	5	1	3	3	4	1	3	1	14	18	80	B
user 2	4	1	5	3	4	1	4	2	4	3	16	15	77,5	B
user 3	5	1	1	1	5	1	3	1	4	1	13	20	82,5	A
user 4	4	1	5	1	4	1	5	2	5	1	18	19	92,5	A
user 5	3	5	5	1	5	1	5	1	3	4	16	13	72,5	B
user 6	3	3	2	1	1	1	5	1	3	1	9	18	67,5	D
user 7	5	1	5	3	4	1	4	3	5	1	18	16	85	A
user 8	5	4	1	3	3	3	3	4	3	3	10	8	45	F
user 9	5	1	5	1	5	2	5	1	5	1	20	19	97,5	A
													77,7778	B

Table 64: SUS Results Online (Multilingual Subtitles – content generation)

The overall SUS score is almost 77.77, which corresponding grade on SUS scale is hence B, and is considered as ‘Good’.

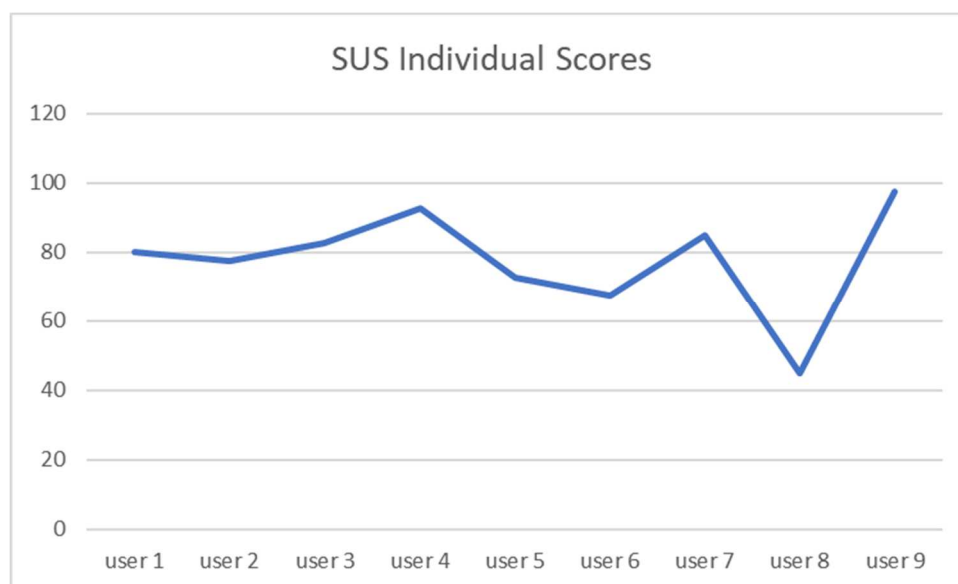


Figure 98: chart graph of SUS scores (Multilingual Subtitles – content generation)

4.15.1.3 NPS results

Next table reports the scores given by each participant, as well as the score justification:

Individual Scores			
Response	Scores	Percentage	Comment of the choice
1	8	11,11%	The learning and help you can offered to others
2	10	13,89%	The reason is the cultural and functional diversity of the public in our societies.
3	7	9,72%	It is a very interesting service.
4	8	11,11%	
5	10	13,89%	I find that for people who need it or just don't understand Catalan, it's a very good tool.
6	3	4,17%	
7	8	11,11%	
8	8	11,11%	I think it is very interesting to learn our language for people who do not have easy access to it due to language problems.
9	10	13,89%	It is a very useful system and easy to access for
Total	72	100%	

Table 65: NPS individual scores and comments (Multilingual Subtitles – content generation)

Thus, the NPS obtained:

NPS CALCULATION	Number	%
Promoters	3	33%
Neutrals	5	56%
Detractors	1	11%
Total	9	100%
	NPS SCORE	22,2

Table 66: NPS score calculation (Multilingual Subtitles – content generation)

The results can be considered to be 'Good' in the grade scale of NPS.

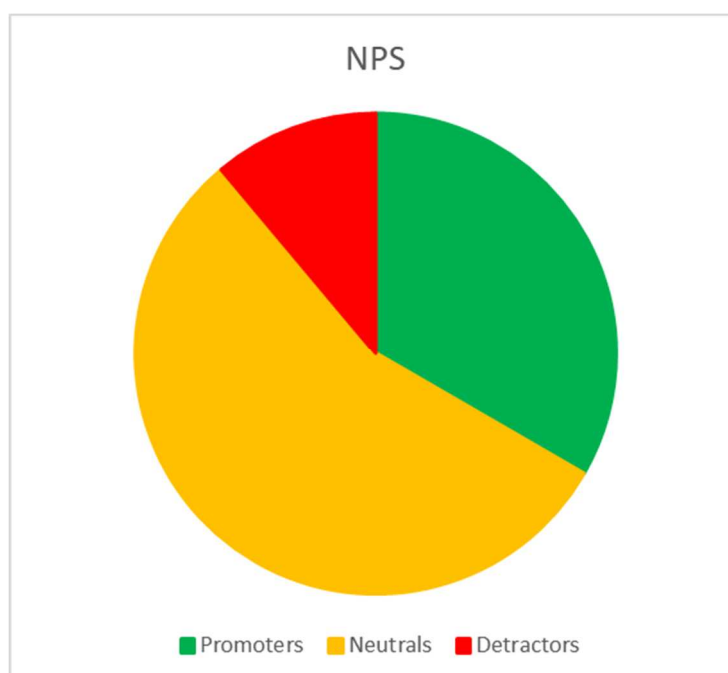


Figure 99: Chart of NPS data (Multilingual Subtitles – content generation)

Most of participants were neutrals and the minority were detractors.

4.15.1.4 Qualitative comments made

All the participants recruited thought we should continue researching and developing this service.

CONTINUE RESEARCH	Response	%
YES	9	100%
NO	0	0%
NO RESPONSE	0	0%
Total	9	100%

Table 67: Continue with the research (Multilingual Subtitles – content generation)

They also made the following comments:

N	COMMENT
1	As a volunteer translator of the project, I think the translation system is very slow and therefore to review the automatic translation of the subtitles of a one-hour program may require 10 hours for the worker / volunteer who is doing the task
2	It would help me to have guidelines when subtitling. If names need to be translated, cities, towns.... The same goes for the songs, both in Catalan and English.
3	When subtitles are added, or corrections are made, in the box where you have to write,... you have to wait a few seconds after clicking to let it do so, if it is not typed in end of the sentence and you have to be careful about

Table 68: Main qualitative comments (Multilingual Subtitles – content generation)

4.15.1.5 Test conclusions

EasyTV has developed the crowdsourcing platform to generate multi-language subtitle services, and the outcome has been a great success. To illustrate with some relevant data the CCMA open pilot, it has produced near 200 subtitles, what means approximately 300 hours of linear TV, and extra 100 hours of archive content produced by volunteers. About the participation: the entire catalogue available in Spanish was translated, few contents in English and only one content in Arabic. Despite this, the translation cost savings have also been demonstrated.

Running the pilot, have demonstrated the third-party integration with the platform, in that case a broadcaster, posting subtitling translation jobs. A volunteers' management by the crowdsourcing platform and the necessary editing tools to create the content. Besides, the complex workflow existing behind, that also requires the users' pre-selection, content validation, content reviewers, job rejections, communication among volunteers and evaluators task who finally give the approval to the subtitles. Without forget, all the work did until broadcast or publish the subtitles.

In the case of the CCMA pilot, volunteers' participation public call generated a strong rejection within the professional sector of translators and writers' associations, influencing the communication plan.

4.15.1.6 Actions to be taken for service improvement

Automatic translation tools offer a good help to accelerate the subtitle translation. Nevertheless, the accuracy of translation depends on the origin-destiny language combination, as result it requires more or less corrections. During the development, we realized it and we decided to some extra-steps related to the automatic translation itself, for example to translate from Catalan to other language we always pass through Spanish, and then to the destiny language. All the research or improvement in

this kind of tools is a key point for service improvement; however, as an external cloud service is not difficult to change. Also is important improve the bilingual source language detection and be able to send each piece to Google's translation tools.

The subtitle web-editing tool has points to improve. In that direction we continued in parallel during and after the pilot working on several improvements such as timecode modification, create new subtitles, modify style and region, and text search and replace. The web tool itself still requires some performance optimizations. In addition, there is a demand to add more keyboard shortcuts, because editors are more productive without rise the hands from the keyboard.

Another point from the whole chain is that the task published on the platform, can be created or cancelled, but not updated, and that could be useful to update in case an episode suffer a delay or airing date modification.

From volunteers' point of view, as is said on previous comments, they expect more subtitling guidelines.

4.15.2. Content delivery and consumption

This section contains feedback gathered from viewers, regarding multi language subtitles pilot. Remember the presence on live content and on demand through HbbTV standard, and on demand at the website.

Together with the applications to consume subtitles, we offered questionnaires specifically to the pilot languages. In addition, we did efforts to contact with cultural associations, promoting the pilot and inviting them to provide feedback through the questionnaires.

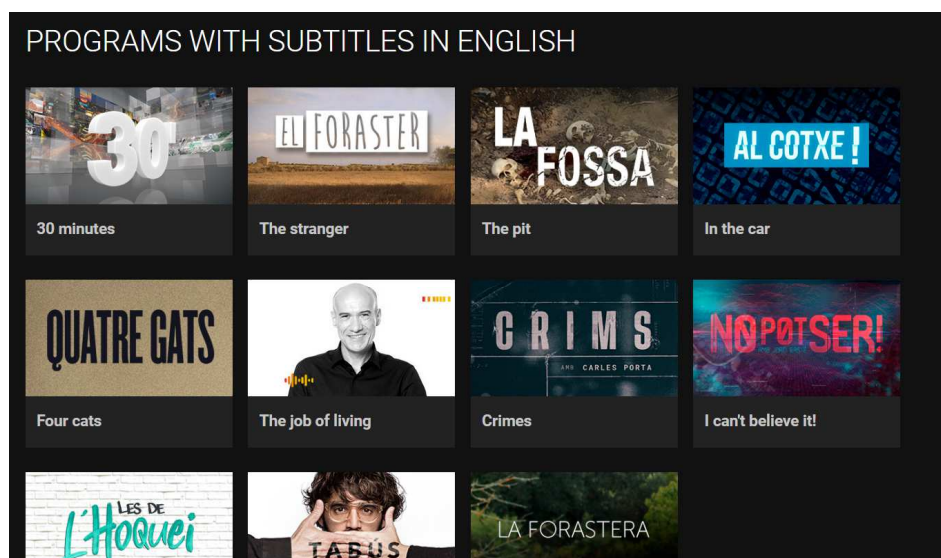


Figure 100: CCMA web portal. Filtering programs by subtitle language

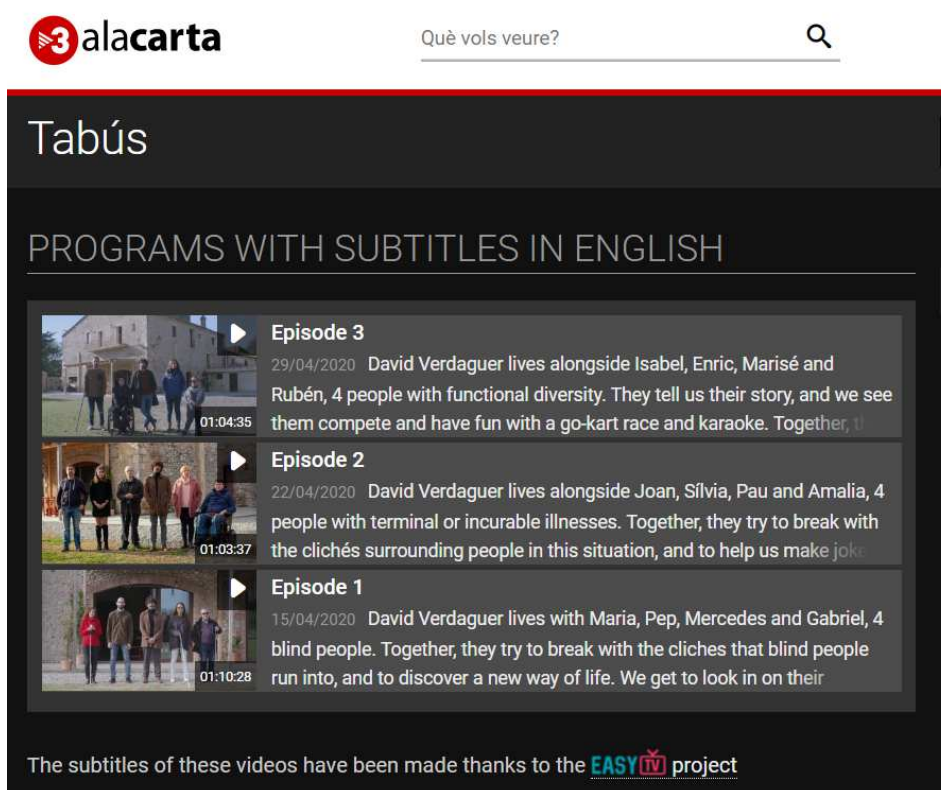


Figure 101: CCMA web portal. Episodes available by language and program preferences

However, HbbTV technology developments also added the possibility for users to add accessibility functions such as customize subtitles, being able to change the size, position and background of subtitles.



Figure 102: HbbTV - live multi-lingual subtitle configuration

In terms of DTT linear broadcasting, the interactive layer of HbbTV has been used to display multi-language subtitles in a synchronized manner from broadcast premises using stream events. Because we do not have the bandwidth needed to broadcast these subtitles using the standard DTT format, due to the congestion of the multiplex channel. However, the big data information shows the presence of around 800.000 HbbTV enabled and connected households in Catalonia, enough potential to achieve a massive use.

Test profile information:

- Testing partner: CCMA, S.A.
- Service tested: Multilingual Subtitles clients
- Testing date: (February - April 2020).
- Venue: online.
- Number of participants: 9 questionnaire participants
- Language(s) involved English, Spanish and Arabic.
- Tasks performed by users to carry out the test
 - The test was online accessible. Related to linear TV, users can select a preferred subtitle language and watch TV as usual. Those programs that have subtitles and match user preferences, so automatically the subtitles start presenting, as usually did on DTT. At on demand scenario, the player remembers last subtitle language choice, becoming next time preference when user consumes further content.
- Approximate test duration: -.

4.15.2.1 Description of the informants' demographic profile

In this section, we describe the participants profile data collected during final tests under different

classifications.

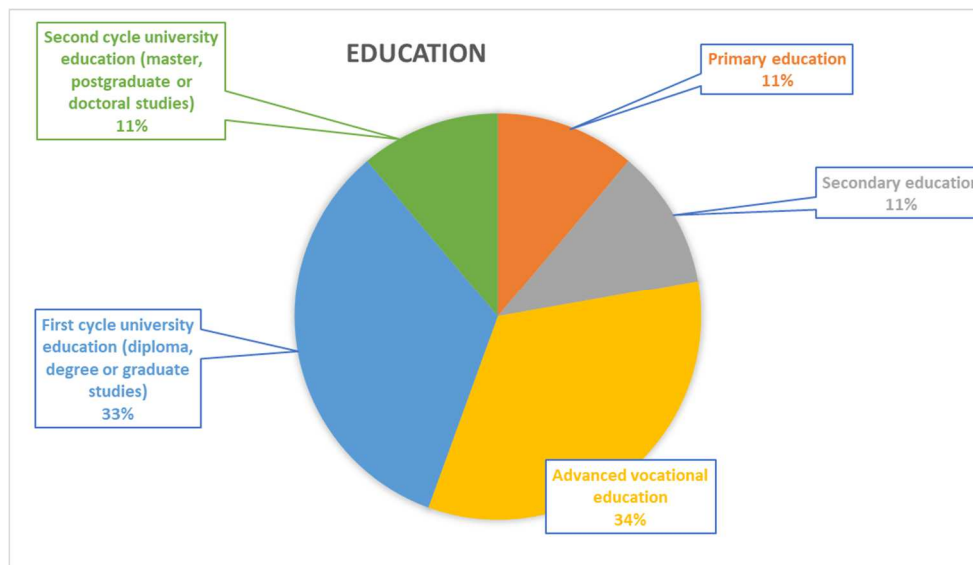


Figure 103: Education Level (Multi-lingual subtitle content consumption)

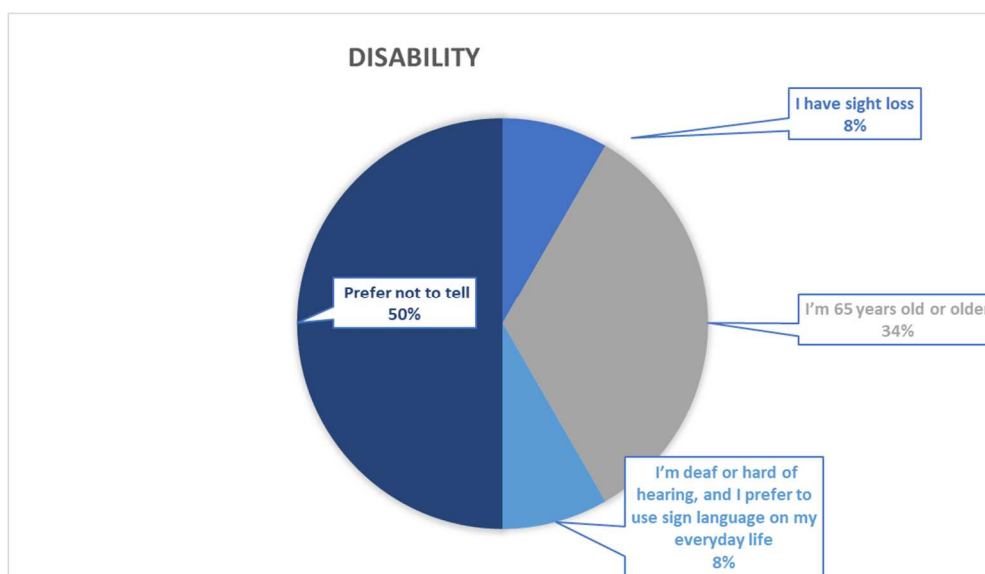


Figure 104: Demographic Info (Multi-lingual subtitle content consumption)

4.15.2.2 SUS results

The results obtained in regarding the SUS are presented in this section. Note: Answer by choosing a value from 1 (totally disagree) to 5 (totally agree)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.
N.										
user 1	5	1	5	1	5	1	5	1	5	1
user 2	4	2	3	1	2	3	3	4	2	2
user 3	2	4	1	5	4	2	1	5	1	5
user 4	1	5	1	4	2	5	2	4	1	4
user 5	4	4	2	3	3	1	2	3	3	1
user 6	5	3	3	2	4	4	4	3	3	2
user 7	5	2	5	4	5	2	3	2	4	2
user 8	1	5	2	2	4	2	5	1	4	2
user 9	5	1	5	1	5	3	5	1	5	1

Table 69: SUS responses (Multi-lingual subtitle content consumption)

Scales			
Odd items	Even items	SUS score	Grades
20	20	100	A
9	13	55	D
4	4	20	F
2	3	12,5	F
9	13	55	D
14	11	62,5	D
17	13	75	B
11	13	60	D
20	18	95	A
Total Score		59,44	D

Table 70: SUS score (Multi-lingual subtitle content consumption)

The overall SUS score is almost **59.44**, which is considered 'Good' looking at sus score scale. The corresponding grade scale of SUS is hence D grade.

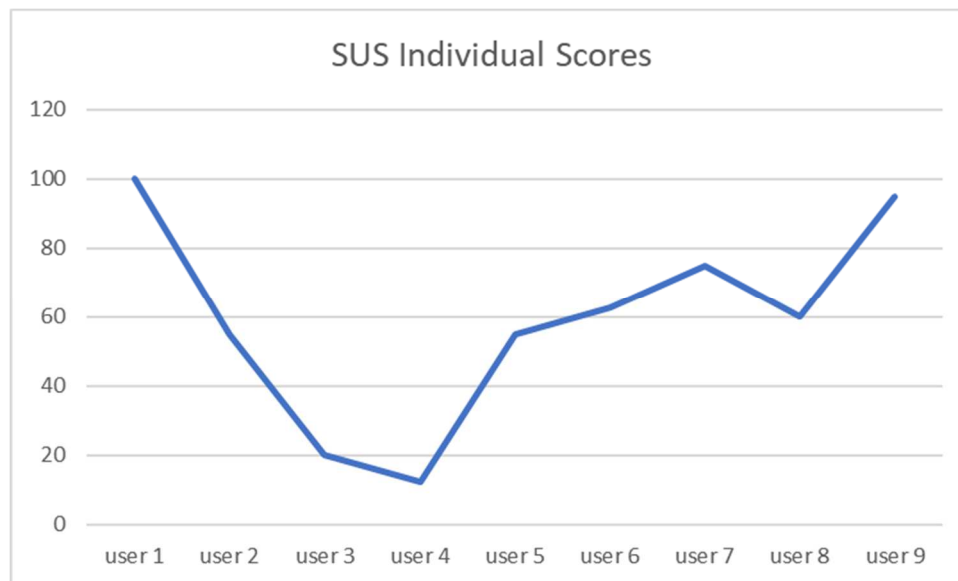


Figure 105: graph chart of SUS score (Multi-lingual subtitle content consumption)

4.15.2.3 NPS results

Next table reports the scores given by each participant, as well as the score justification:

Individual Scores			
Response	Scores	Percentage	Comment of the choice
1	10	12,99%	I feel that the system is made to help selflessly.
2	6	7,79%	it depends on the person if you like a series, I will gladly recommend it.
3	9	11,69%	I think it can help to consume content and learn Catalan
4	10	12,99%	I can follow live broadcast subtitles in large size
5	5	6,49%	It is interesting but it is not easy.
6	10	12,99%	Because I learn a lot, I would like more content in english
7	9	11,69%	I can read scenes in Spanish in silence while I work
8	10	12,99%	I like to watch movies with subtitles in English, easy to read
9	8	10,39%	Subtitles English that are not uploaded
Total	77	100%	

Table 71: NPS individual scores and comments (Multi-lingual subtitle content consumption)

In addition, the final NPS score calculation:

NPC CALCULATION	Number	%
Promoters	6	67%
Neutrals	1	11%
Detractors	2	22%
Total	9	100%
	NPS SCORE	44,4

Table 72: NPS score calculation (Multi-lingual subtitle content consumption)

Therefore, the results consider the multi-lingual subtitles as 'Good' according NPS scale.

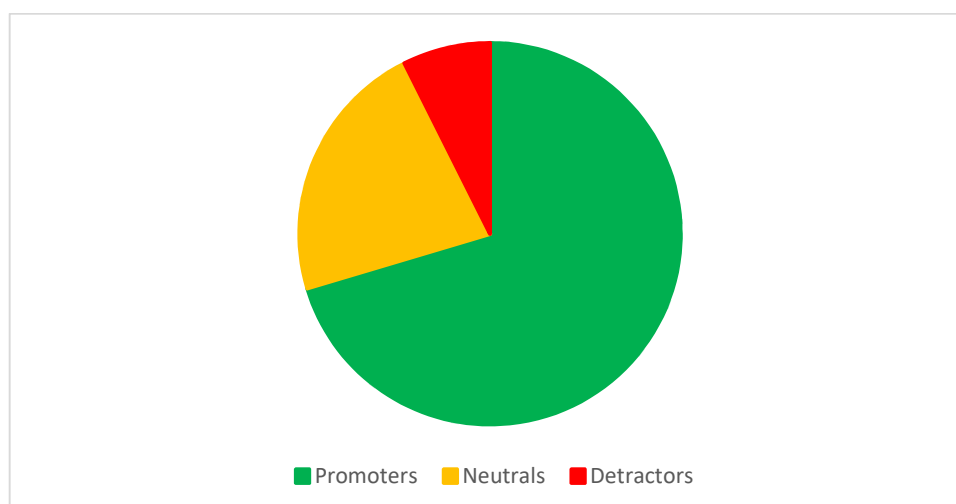


Figure 106: NPS data chart (Multi-lingual subtitle content consumption)

Most participants were promoters of that kind of service.

4.15.2.4 Qualitative comments made

An adjusted majority of participants agrees to continue with the research.

CONTINUE RESEARCH	Response	%
YES	5	56%
NO	4	44%
NO RESPONSE	0	0%
Total	9	100%

Table 73: Continue with research (Multi-lingual subtitle content consumption, online)

They also made the following comments:

N	COMMENT
1	Add more content in English
2	more live content subtitles coverage
3	thanks for your time
4	take into account previous request

Table 74: comments (Multi-lingual subtitle content consumption, online)

4.15.2.5 Quantitative results

The pilot started mid-January 2020 producing content and one month later offering ways to consume it. The planned duration was two months and half, from mid-February until end of April. The idea was to produce a notable amount of content and announce the new service to the audience at mid-pilot.

Let us start analysing live content results. During the first days of April the project was publicly announced, a bit late from initial plan due to post-crisis covid-19, as consequence we found a clear tendency configuring English preferentially on live content.

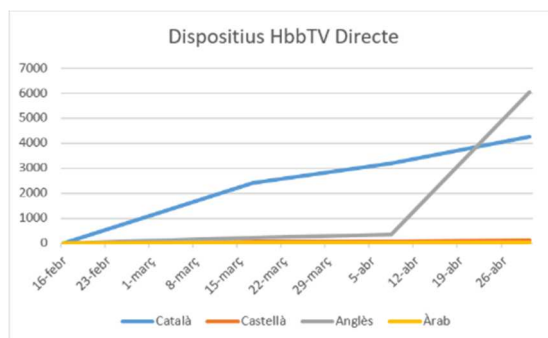


Figure 107: Language preference by device (Multi-lingual subtitle content consumption)

Obviously, this preference impacts on an increase in English subtitles consumption; however, the Catalan offer is much higher. As we can see below, the total amount of consumption in English is quite relevant, compared to Spanish and Arabic. That could be due to a couple of reasons, English speaking people learning Catalan and vice versa. Also is notably the low impact of Arabic.

	<i>Devices</i>	<i>Hours</i>	<i>Hours by device</i>
<i>Catalan</i>	4.282	33.935	7,93
<i>Spanish</i>	132	65	0,49
<i>English</i>	6.059	3.464	0,57
<i>Arabic</i>	45	7	0,16

Table 75: TV3 DTT linear channel consumption data. (Multi-lingual subtitle content consumption)

The second preferred option is Catalan, out of the scope. Just remark, that deaf community use DTT subtitling, but they have also discovered and adopted the new way to consume live subtitles thorough HbbTV client. Which offers the same subtitled content available adding the customization options offered by HbbTV, and a clear improvement in readability compared to traditional subtitles (DVB), as consequence is the second language preference choice and accumulates more consumption time.



Figure 108: Tweets in Spanish demanding more content subtitled. (Multi-lingual subtitle content consumption)

Add to this report, some tweets showing Spanish speakers' interest from Málaga, Seville, Madrid, Santiago, towards content in Catalan. Doing a search on twitter "subtitulos TV3", they are fans from the 'Les de l'Hockey' series on a national broadcaster, and they have interest to watch the new season on the web in Catalan and Spanish subtitled.

	<i>Hours</i>	<i>Devices</i>	<i>Plays Totals</i>	<i>Plays HbbTV</i>	<i>Plays web</i>	<i>Hours by device</i>
<i>Catalan</i>	80.045	53.969	228.870	31.476	197.134	1,5
<i>Spanish</i>	17.222	11.291	32.703	472	32.202	1,5
<i>English</i>	1.321	1.906	4.052	546	3.493	0,7
<i>Arabic</i>	39	196	304	86	218	0,2
<i>TOTAL</i>	98.626	63.826	264.504	20.525	233.047	

Table 76: On demand subtitle consumption data (HbbTV and web portal) (Multi-lingual subtitle content consumption)

4.15.2.6 Test conclusions

The response from viewers has been an unexpected success, reaching interesting figures in the consumption of subtitles in English (in linear broadcasts) and in Spanish (in on demand services). These results seem to indicate that there is a significant potential demand for this service, both in linear on demand consumption. The EasyTV multi-language subtitles pilot offer has been modest compared to the content offered on all channels. The coronavirus crisis influenced on the communication plan, another reason to give value to the audiences.

We registered 13.400 unique on demand users and 6.300 live content users during the pilot. Moreover, nine of them as questionnaire participants, where we had estimated more participation. Sometimes users just contribute to reflect a negative opinion and not always related to the matter. Nevertheless, the SUS and NPS scores are not bad, we celebrate it nevertheless a better result was expected.

From end user perspective, they want more content. CCMA is analysing the results and studying how to continue offering multi-lingual subtitle service and make it available on other SmartTV applications, YouTube, etc.

4.15.2.7 Actions to be taken for service improvement

However, we think that the service requires more communication and perhaps simplify subtitle and language preferences, now the live and on demand subtitles have separated configurations and could be unified.

On technical side, the stream Events solution used for live subtitling synchronization caused some problems on a specific manufacturer, despite being a functionality fully compatible. We tried to fix it before starting the pilot, and we continue testing alternatives aiming to add more devices compatible.

4.16. Screen Reader Online

This section contains feedback gathered from the audience, regarding HbbTV screen reader pilot in Catalonia (Spain). The HbbTV screen reader service layer is offered over an existing tv3alacarta HbbTV application and was deployed on production since February 2020. A remarkable fact, thanks to the EasyTV speech platform is the first example HbbTV with that feature. Before going live, the HbbTV launcher also added the screen reader functionality, so users could receive the proper guidance since the first interaction with the service.

Initially, UICI was in charge to find users with vision problems to conduct live interviews and complete the questionnaires. Due to coronavirus, it was impossible to carry out the planned live interviews. Alternatively, we tried contact with blind's associations aiming to do phone guided interviews, but in the middle of the crisis, it was not feasible also. Finally, all of a sudden, we published links to carry out online tests.



Figure 109: Education (HbbTV screen reader, online)

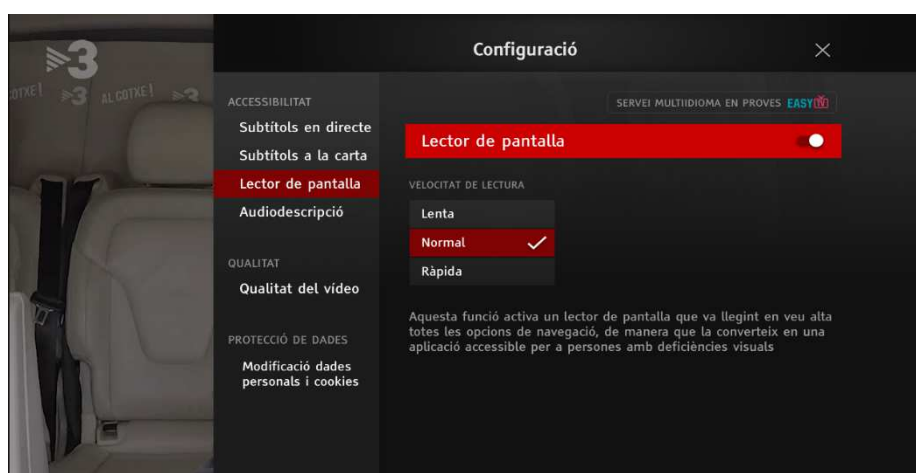


Figure 110: Configuration tab (HbbTV screen reader, online)

Test profile information:

- Testing partner: CCMA, S.A.
- Service tested: HbbTV Screen Reader
- Testing date: (February - April 2020).
- Venue: online.
- Number of participants: 3 on the questionnaires
- Language(s) involved: Catalan.
- Tasks performed by users to carry out the test
 - The users where invited to use this service, navigate through the application using the screen reader and consume content. Then, provide their opinion freely.

4.16.1. Description of the informants' demographic profile

In this section, we describe the participants profile data collected during final tests under different classifications.

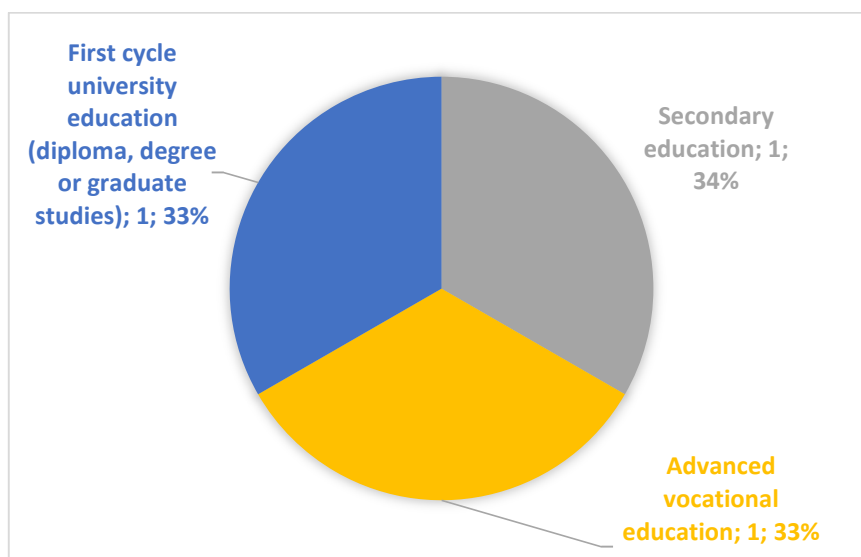


Figure 111: Education Profiles (HbbTV screen reader, online)

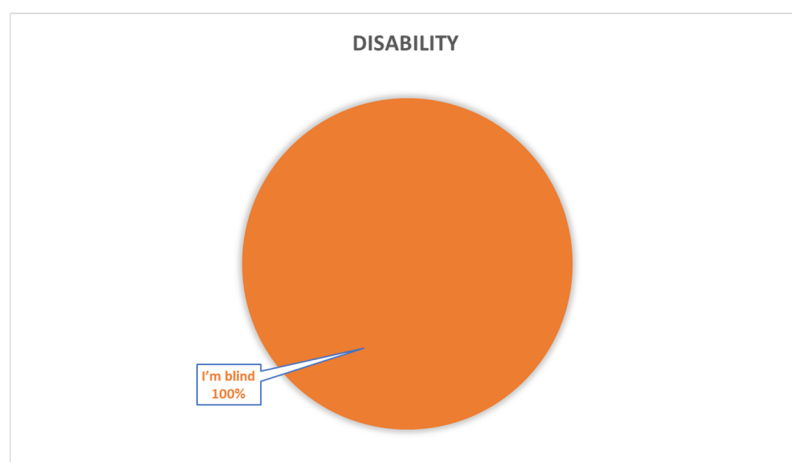


Figure 112: Demographic Info – (HbbTV screen reader, online)

4.16.2. SUS results

The results obtained in regarding the SUS are presented in this section. Note: Answer by choosing a value from one (totally disagree) to five (totally agree)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scales			
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.	Odd items	Even items	SUS score	Grades
N.														
user 1	5	3	5	1	4	1	3	1	3	2	15	17	80	B
user 2	1	5	1	1	1	5	3	5	1	3	2	6	20	F
user 3	5	3	4	4	4	4	4	4	4	3	16	7	57,5	D
													52,5	D

Table 77: HbbTV screen reader SUS Results Online

The overall SUS score is almost 52.50, which is considered 'Poor' looking at SUS score scale. The corresponding grade scale of SUS is hence D

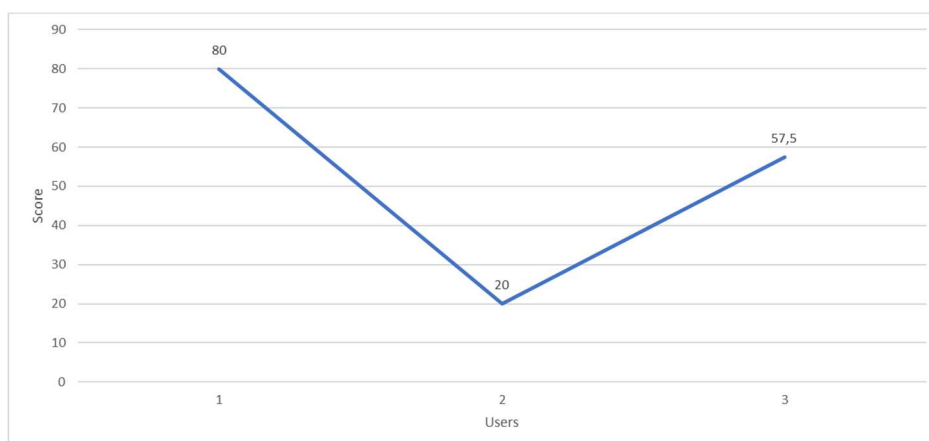


Figure 113: chart graph of SUS scores (HbbTV screen reader, online)

One participant voted very low claiming against the audiodescription, which is not related to the screen reader service, if we remove that participant, the results are OK according SUS scale. However, the panel is not significant to reach conclusions.

4.16.3. NPS results

Next table reports the scores given by each participant, as well as the score justification:

			Individual Scores
Response	Number	Percentage	Comment
1	5	29,41%	in my family there are no blind people, my parents no longer live, but I could recommend it to some friends
2	5	29,41%	I have no way to turn it off. Put as you put it is always on. I don't have any kind of disability and it is very annoying as in the movies the description of the scenes are awkward.
3	7	41,18%	
Total	17	100%	

Table 78: NPS individual scores and comments (HbbTV screen reader, online)

Thus, the NPS obtained:

Net Promoter Score Calculation		
	Number	Percentage
Promoters	0	0%
Neutrals	1	33%
Detractors	2	67%
Total	3	100%
NPS		-66,7

Table 79: NPS score calculation (HbbTV screen reader, online)

Most respondents were detractors and none of them was a promoter. Therefore, the results show -66.7 and means that it is poor and 'Needs improvement' in the grade scale of NPS.

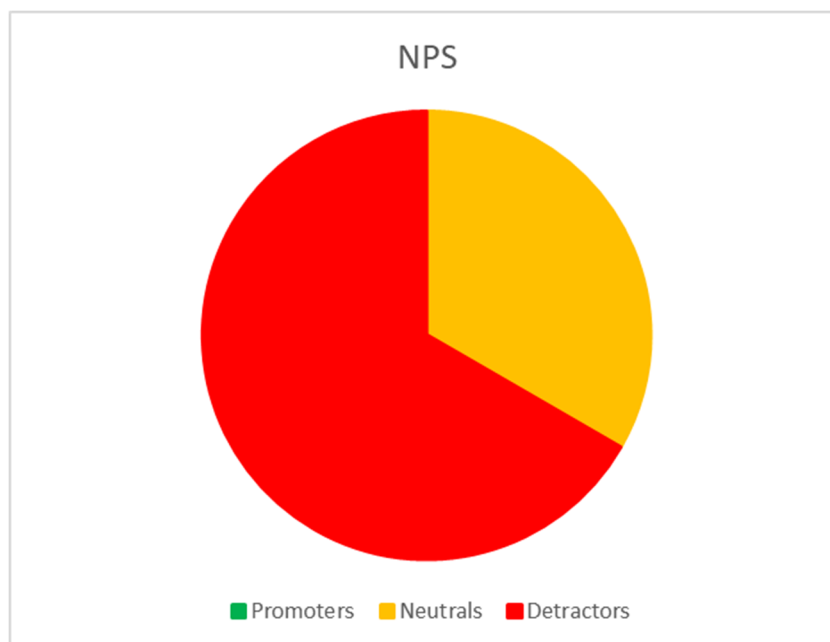


Figure 114: Chart of NPS data (HbbTV screen reader, online)

4.16.4. Qualitative comments made

All the participants recruited thought that researching, and the development of this service should continue.

CONTINUE RESEARCH	Response	%
YES	3	100%
NO	0	0%
NO RESPONSE	0	0%
Total	3	100%

Table 80: Continue with the research (HbbTV screen reader, online)

They also made the following comments:

N	COMMENT
1	They must continue with the research

Table 81: Main qualitative comments (HbbTV screen reader, online)

4.16.5. Quantitative information

From the data gathered during the pilot, from mid-February until end of April, the service has registered 255 unique visitors. In total, they have accessed more than 1.000 times and exploring 4.200 different pages.

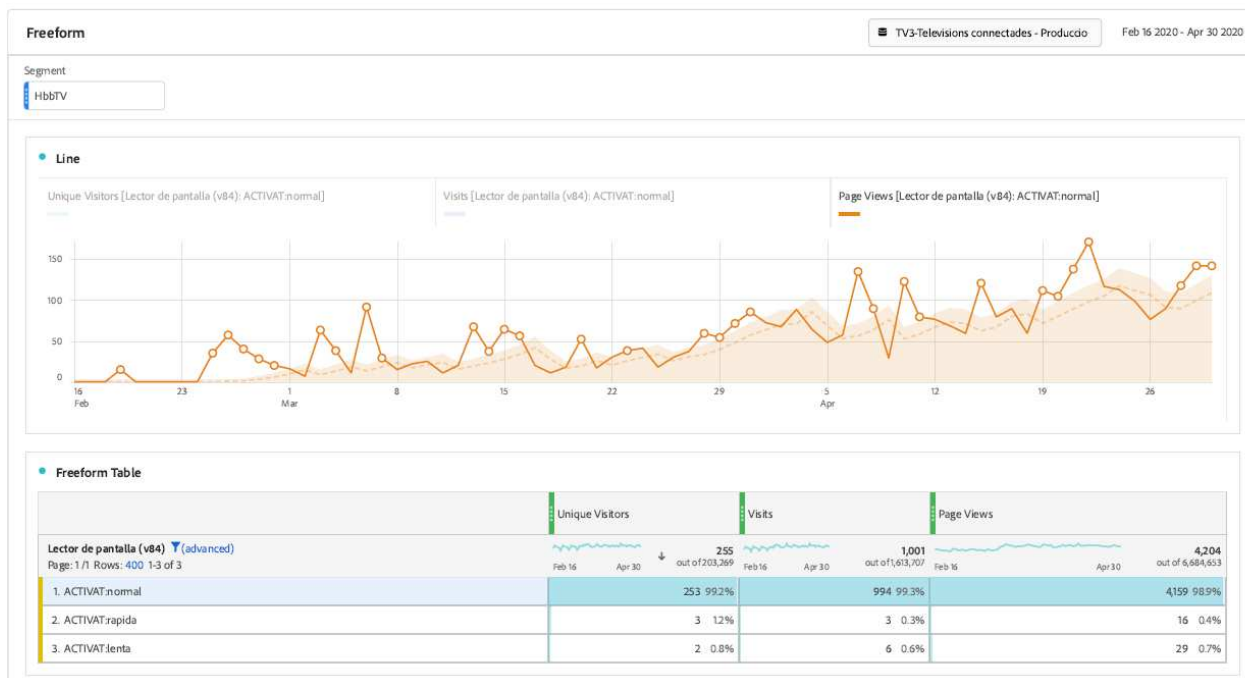


Figure 115: Screen Reader consumption data

Regarding the screen reader speed settings, the regular speed is the preferred option, what means that the previous tests helped to find a good speed for a proper understanding.

4.16.6. Test conclusions

From technical point of view, the HbbTV screen reader pilot was a success. All worked fine and we have not found any major issue. The EasyTV speech platform is hosting the service and the cache system had a good performance, registering near 600 audio requests on peaky days. During a month, around 6000 audios are requested, and 84% are cached, and the rest are newly generated and stored for a year.

The online questionnaires participation was very low and was difficult to engage users to participate. Nonetheless, despite the service was not promoted publicly, it has had registered users that consume content regularly and is increasing after pilot. Therefore, everyday more people are finding the content they want in a more autonomous way. During the intermediate tests, this service recorded the best project results (80.5 SUS and 80 NPS), after conducting face-to-face interview. The obtained results (52.5 SUS and -66 NPS) are contradictory and perplexing, even when the final release is an improved version covering also the launcher system, with less bugs and a specific easy access for blind users by pressing ten times the green button to enable or disable the screen reader.

Also, from the quantitative information gathered, we can see the launch curve, in plenty discovery stage of a new service still far from reach a consolidation scenario. Clearly, the number of users is increasing, and CCMA, as a public service duty, is planning how to export that technological solution to other HTML based smartTV applications

4.16.7. Actions to be taken for service improvement

We learned during the process how to improve some points.

- Repeat the introduced text before do a search.
- The HbbTV screen reader service was present on those TV models where it was previously tested and accepted. It is required to refine this and try to widen as much as possible the number of potential receivers.
- Text-to-speech service can improve the acronyms interpretation
Better communication and promotion of the service can help to increase the number of users.

4.17. Device Interoperability Online

The general information about the tests is:

- Testing partner: UICI and FCNSE
- Service tested: Device Interoperability online
- Testing date: April - May 2020
- Venue: Online
- Number of participants: 11
- Language(s) involved: Spanish, and Italian
- Tasks performed by users to carry out the test: the online test has been demonstrated with a video showing the interaction and functionalities of the “Device Interoperability” service.
- Approximate test duration: 20 minutes.

The testing of the Device Interoperability service was done online in three different languages (Italian, Spanish and Catalan). The testers were shown a video that showcased the EasyTV companion applications that interoperated with a Philips hue smart light and hub. The video is created to be accessible; it contains audio description in the three languages of the test. The video starts by presenting to the user the process of connecting the application to a new Philips hub. Afterwards it is shown how the user can control the lights either by touching the buttons or by voice commands. It is shown how to turn the lights on or off, how to set the brightness and finally, how to enable the “auto dim” feature. With the “auto dim” feature the application will automatically dim the smart lights to the desired level when the user starts to watch a video.

The tests took place in April and May 2020. In total, 11 users participated and answered the questionnaire.

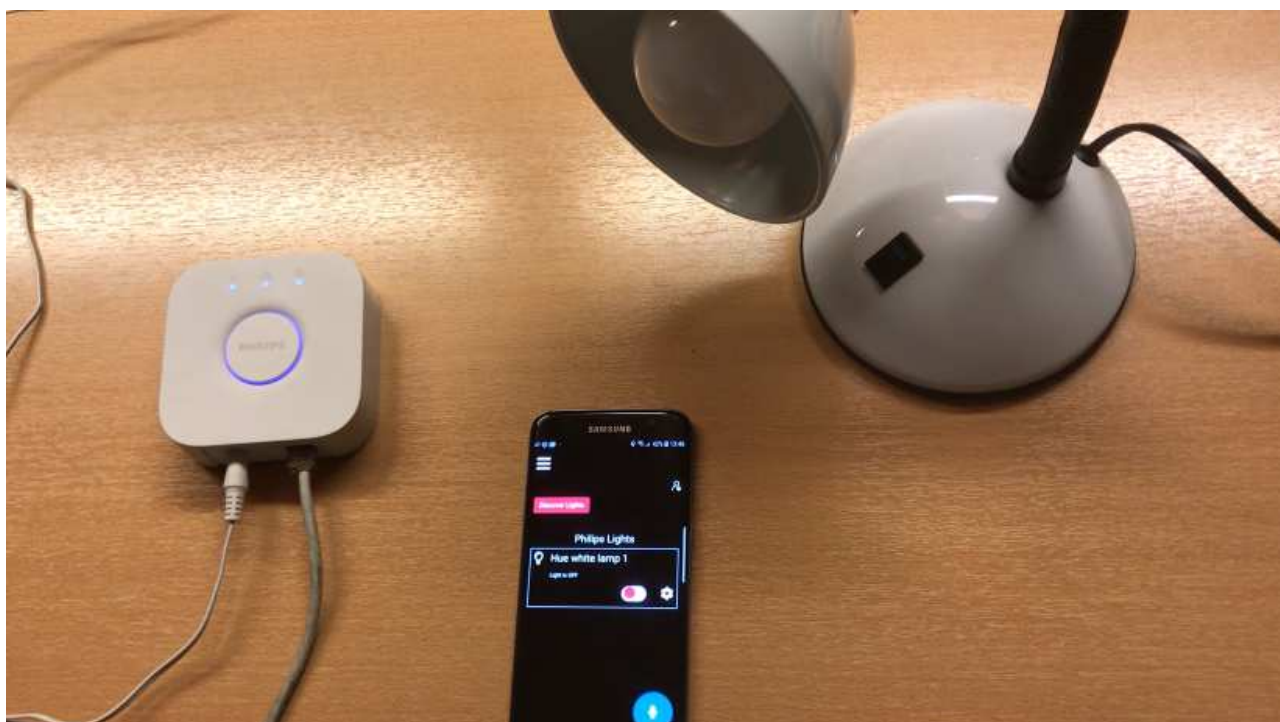


Figure 116 Device Interoperability, a frame from the online video showing the Philips hue smart light and the EasyTV application

4.17.1. Description of the informants' demographic profile

In this section, the demographic data collected during the tests is reported below.

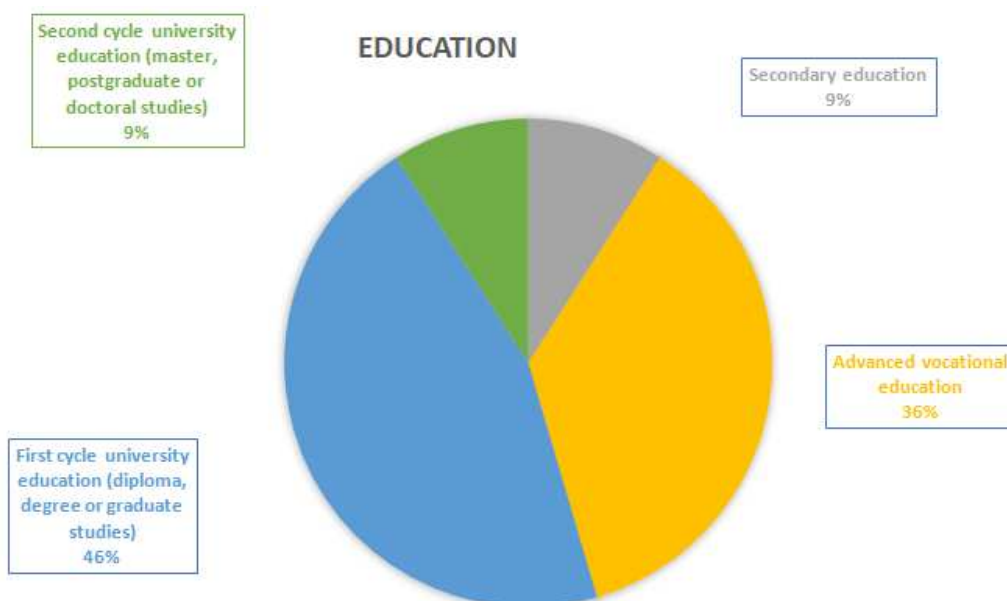


Figure 117 Device Interoperability Education Profiles

Most of the test users have completed either first cycle university education (5 people) or advanced vocational education (4 people). There were also 1 person with secondary education and 1 with

second cycle university education.

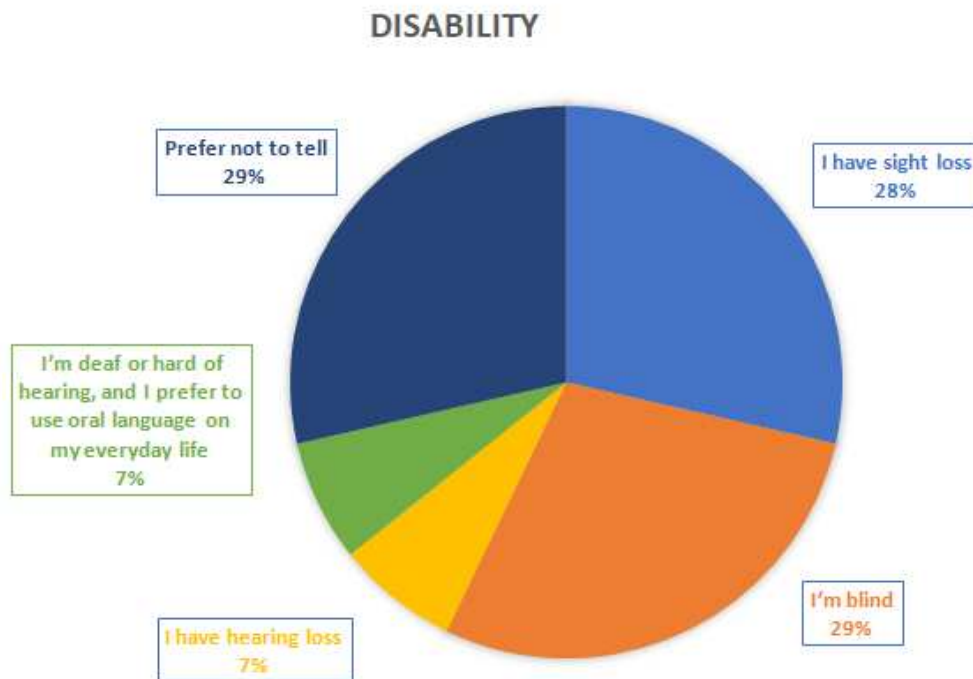


Figure 118 Device Interoperability Disability Profiles

Regarding the disabilities of the end-users, 4 reported they are blind, 4 reported they have sight loss, 1 reported they have hearing loss, 1 reported they are deaf or hard of hearing but prefer oral language and 4 prefer not to tell.

4.17.2. SUS results

Below are the results obtained regarding the SUS.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Scales			
	I think that I would like to use this feature frequently.	I found the feature unnecessarily complex.	I thought the feature was easy to use.	I think that I would need the support of a technical person to be able to use this feature.	I found the various functions in this feature were well integrated.	I thought there was too much inconsistency in this feature.	I would imagine that most people would learn to use this feature very quickly.	I found the feature very cumbersome to use.	I felt very confident using the feature.	I needed to learn a lot of things before I could get going with this feature.	Odd items	Even items	SUS score	Grade s
N.														
user 1	5	1	5	1	4	1	5	1	3	1	17	20	92.5	A
user 2	4	1	5	2	4	1	5	4	5	2	18	15	82.5	A
user 3	2	5	1	4	1	1	1	1	2	1	2	13	37.5	F
user 4	5	1	5	1	5	1	5	1	5	1	20	20	100	A
user 5	5	1	5	1	5	2	5	1	5	2	20	18	95	A
user 6	5	1	5	1	5	1	5	1	5	1	20	20	100	A
user 7	2	3	3	2	2	1	4	2	4	1	10	16	65	D
user 8	4	2	4	1	4	1	4	2	4	1	15	18	82.5	A
user 9	5	1	4	2	2	4	1	4	2	5	9	9	45	F
user 10	5	1	5	1	5	1	5	1	5	1	20	20	100	A
user 11	4	1	5	1	4	1	4	1	4	1	16	20	90	A
													80.9	B

Table 82 Device Interoperability SUS Results

The end SUS score is 80.9 which corresponds to grade “B” and is considered “good”.

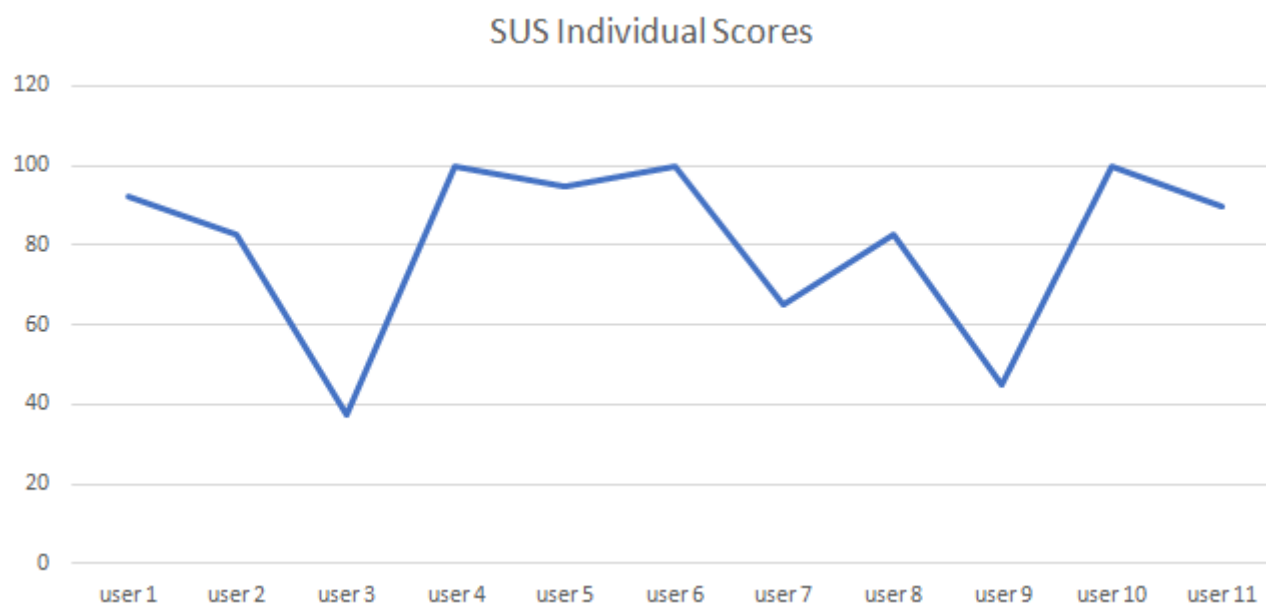


Figure 119 Device Interoperability SUS graph

4.17.3. NPS results

Below are the scores given by each participant as well as a comment justifying it.

Individual Scores			
Response	Scores	Percentage	Comment of the choice
1	10	11.24%	
2	9	10.11%	utile facile da usare
3	0	0.00%	
4	10	11.24%	
5	9	10.11%	
6	10	11.24%	
7	3	3.37%	nulla di nuovo. Sistemi analoghi già presenti e ben sviluppati sul mercato
8	9	10.11%	
9	9	10.11%	
10	10	11.24%	
11	10	11.24%	
Total	89	100%	

Table 83: Device Interoperability NPS Individual Scores

From the above results, the NPS table obtained is the bellow:

NPS CALCULATION	Number	%
Promoters	9	82%
Neutrals	0	0%
Detractors	2	18%
Total	11	100%
	NPS SCORE	63.6

Table 84: Device Interoperability NPS Calculation

The NPS score is 63.6 which falls into the “Excellent” NPS range (50-70)

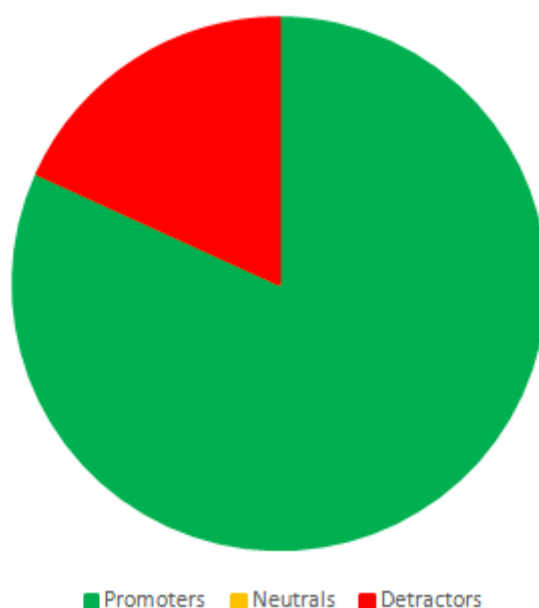


Figure 120 Device Interoperability NPS Classification

Most of the users (9 people) were promoters, there were also 2 detractors. There were no neutral users.

4.17.4. Qualitative comments made

To the question regarding if we should continue the research and development of this services. Ten people answered “yes”, and one person answered “no”. The users left the below comments:

N	COMMENT
1	It would be useful if the system were present on all televisions on the market.
2	Continue the project with agreements with the available TV Stations.

4.17.5. Test conclusions

Overall, the conclusion of the tests is positive. The users seemed to like the services and they see

the need the functionality that it covers. Also, they reported that we should continue researching and developing this service. There were also comments about integrating this service with TV stations.

Finally, the opinion to continue research in this service are widely approved.

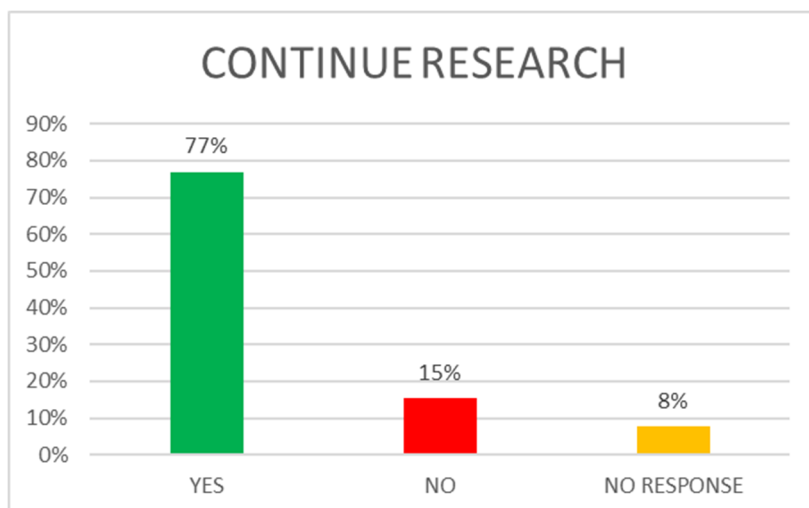


Figure 121: Device Interoperability - Results for keeping on working on the service

4.17.6. Actions to be taken for service improvement

Based on the conclusions of the tests, there are some actions we will take in order to improve the service. One of the actions is to add support for more devices and appliances in the end-user's home environment. Another action is to perform integrations with existing TV platforms for the functionalities of this service to be available to more users.

5. CONCLUSION

The EasyTV final tests were successfully carried out during March-May 2020. “Table 85: Summary of the final tests results” reports the scores obtained for each service tested. The positive results appear in green and the semi positive in orange, whereas the negative scores are written in red.

Partner	Service (test modality)	No. informants	SUS	NPS
CERTH	Capturing module (online)	15	43	-61.1
	Crowdsourcing platform (online)	15	50	-33.3
	Gesture recognition control (online)	6	87.92	66.7
	3D signing avatar (online)	28	-	-
UPM	Text detection (online)	15	73.3	13.3
	Face detection/magnification (online-visual impaired)	10	87.8	60
	Face detection/magnification (online-deaf and low deaf)	28	54.9	-32.1
	Face detection/magnification (online)	38	63.6	-7.9
	Custom magnification (online-visual impaired)	8	90.3	75
	Custom magnification (online-deaf and low deaf)	16	58.0	-56.3
	Custom magnification (online)	24	68.8	-12.5
	Character detection (online)	13	69.0	15.4
	Audio Subtitles (online)	16	80	37.5
	Audio Equalization (online)	15	41.3	-80
	Sound recognition (online)	15	67	-6.7
CCMA	Multilingual subtitles content generation (online)	9	77.77	22.22
	Multilingual subtitles content consumption (online)	5	59.44	44.44
	HbbTV Screen reader (online)	3	52.50	-66.70

MV	Speech platform (live)	16	89,2	68,8
	Speech platform (online)	91	77,9	34,1
ARX	Device Interoperability (online)	11	80.9	63.6

Table 85: Summary of the final tests results

The main conclusion that can be drawn from this table is that most services have been positively evaluated. Yet, there are also some services that need to be revised in order to meet user needs, since either the SUS or the NPS score (or both) have shown big room for improvement.

We have to say also that all the evaluations have been made online and so a more accurate information was difficult to give to the evaluators. Where the live test could be executed (see Speech Platform service), the possibility for the end user to test the application and touch with their hands the system, gave very good and positive feedbacks.

Regarding the Avatar service, where a different evaluation questionnaire has been adopted, we can say that it was demonstrated and evaluated by Greek and Spanish signers by means of two different demo videos. More specifically, the Greek signers viewed an avatar signing an entire sentence continuously, while the Spanish signers viewed an avatar performing a few isolated signs on a large video of weather forecast.

The Covid-19 situation deterred us from collecting data and developing avatar representations for all signs that appear in the video.

The results showed that the Greek users praised the accuracy of hand gestures and facial expressions and declared that they understood the signed content, while the majority of the Spanish users expressed concern on the usefulness of the 3D avatar. The opposite views of the Avatar service by the Greek and Spanish users can be attributed to the inability of the demo video presented to the Spanish users to convey the importance of the Avatar service for future use. More specifically, the signing of just few words from the avatar with large gaps between the signs baffled the Spanish users, who expected continuous avatar signing as they declared with their comments. However, comparing with the intermediate testing, the final testing of the Avatar service showed that there was a higher level of acceptance by the users due to the improvement in the accuracy of the extracted hand and body motions and facial expressions, although there is certainly room for large improvements until the Avatar service can be transformed to a final product. By extending the current work of CERTH in 3D hand pose estimation, the Avatar service can be significantly improved through more natural hand and body movements.

The following figure shows graphically the position of the various services in the SUS grade scale.

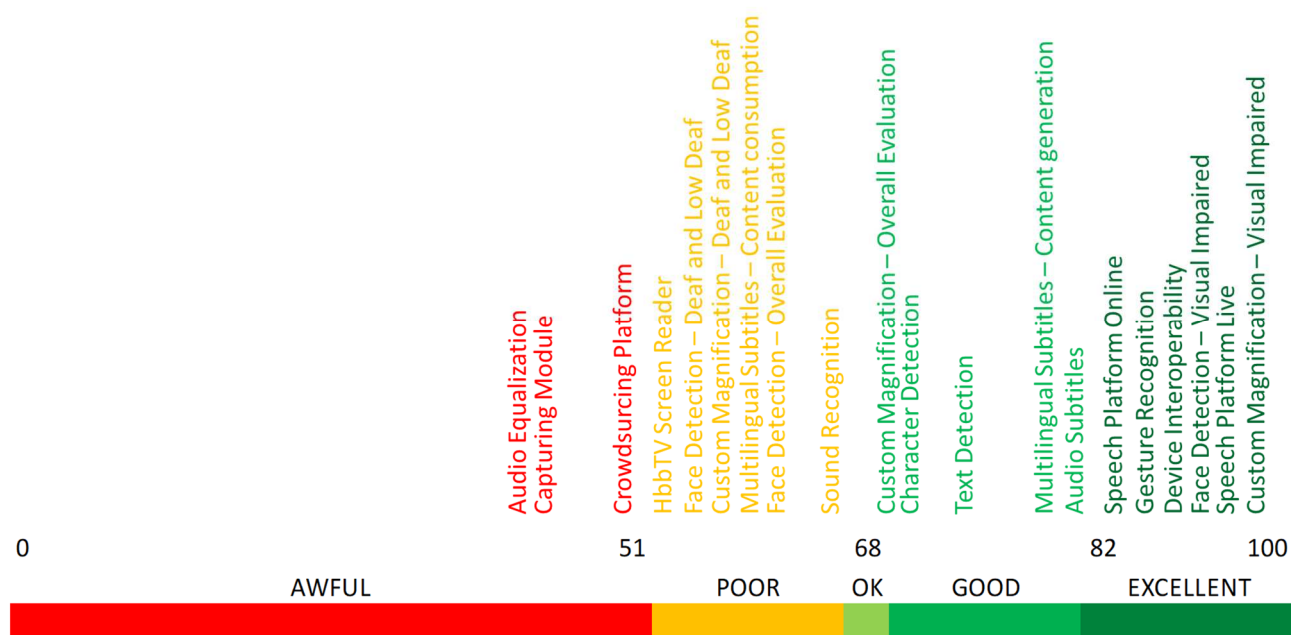


Figure 122: Position of the services tested in the SUS grade scale

The following figure shows graphically the position of the various services in the NPS grade scale.

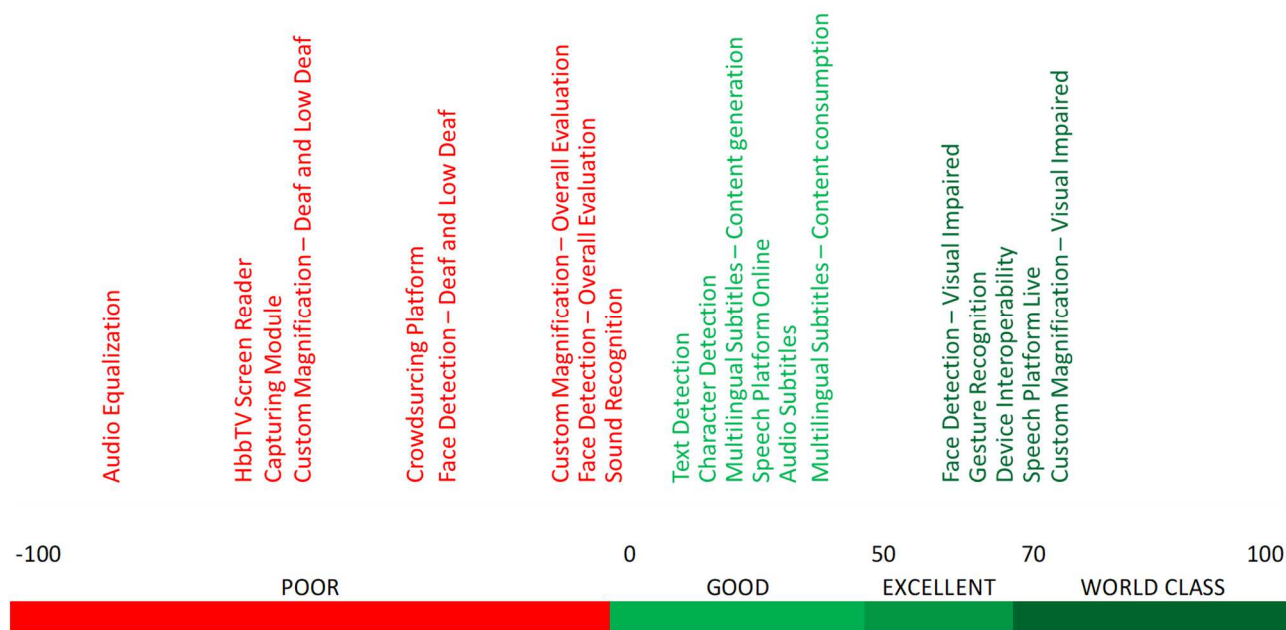


Figure 123: Position of the services tested in the NPS grade scale

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7. ANNEXES

7.1. Test information sheet and consent form in English

Easy TV is an H2020 EC funded project with grant agreement number 761999. EasyTV is led by Federico Álvarez, from the Universidad Politécnica de Madrid (Spain). The ethical adviser is Pilar Orero. You can contact Pilar Orero at pilar.orero@uab.cat and ask her for more information about the project and the project results.

EasyTV targets wider availability of interaction to accessible media and to provide equal access to audiovisual services for all users, especially for people with varying degrees of disabilities (focusing in visual and hearing impaired).

The test consists of two parts. First you will watch a very short video with the demo of a service or will be given some instructions to interact with the service. Then you will reply to a short questionnaire.

Now please read/watch/listen the consent form.

CONSENT FORM

Your participation in the tests is absolutely voluntary. The information you provide will be used in the project, but it will remain anonymous. You can discontinue your involvement in the study at any time without prior justification. This shall have no repercussions or negative consequences of any sort.

No personal information will be stored. The rest of data will be stored for 5 years after the project is completed, as the European legislation stipulates.

If you are willing to participate, please confirm the following statements by selecting the “yes” button at the end of this form. If you select “no” it means you do not give your consent.

- I have read and understood the information given for this research or have had the information read to me,
- I have had the opportunity to ask questions about the research.
- I consent to take part in the research sessions.

Do you give your consent to participate in this test?

- Yes
- No

7.2. Test information sheet and consent form in Spanish

EasyTV es un proyecto financiado por H2020 CE, cuyo número de subvención es 761999. EasyTV está dirigido por Federico Álvarez, de la Universidad Politécnica de Madrid. La asesora ética es Pilar Orero, con la que puede comunicarse en pilar.orero@uab.cat y pedirle más información sobre el proyecto y sus resultados.

La principal motivación de EasyTV es la necesidad de proporcionar un acceso igualitario a la televisión y a los servicios audiovisuales con el fin de garantizar que todos los usuarios, y especialmente las personas con diversidad funcional, las personas de la tercera edad y los usuarios con necesidades especiales, obtengan el máximo beneficio en cuanto a la oferta y la calidad de los contenidos y servicios multimedia.

El test consta de dos partes. En primer lugar, deberá mirar un vídeo corto con la demostración de un servicio o bien se le darán unas instrucciones para que interactúe con este. A continuación, deberá responder a un breve cuestionario.

Por favor, ahora lea/mire/escuche el consentimiento informado.

CONSENTIMIENTO

Su participación en la prueba es absolutamente voluntaria. La información que proporcione se utilizará en el proyecto, pero permanecerá anónima. Puede interrumpir su participación en cualquier momento sin justificación previa. Esto no tendrá repercusiones ni consecuencias negativas de ningún tipo.

No se almacenarán datos personales. El resto de información de conservará durante un período de cinco años tras la finalización del proyecto, tal y como ordena la legislación europea.

Si está dispuesto a participar, confirme las siguientes declaraciones seleccionando "sí" al final de este formulario. Si selecciona "no" significa que no da su consentimiento.

- He leído y comprendido la información proporcionada para este proyecto o me la han leído.
- He tenido la oportunidad de hacer preguntas sobre el proyecto.
- Doy mi consentimiento para participar en la prueba.

¿Da su consentimiento para participar en esta prueba?

- Sí
- No

7.3. Test information sheet and consent form in Catalan

EasyTV és un projecte finançat per H2020 CE, el número de subvenció del qual és 761999. EasyTV està dirigit per Federico Álvarez, de la Universitat Politècnica de Madrid. L'assessora ètica és Pilar Orero. Pot comunicar-se amb ella enviant-li un correu a pilar.orero@uab.cat per demanar-li més informació sobre el projecte i els seus resultats.

La principal motivació d'EasyTV és la necessitat de proporcionar un accés equitatiu a la televisió i als serveis audiovisuals per tal de garantir que tots els usuaris -i especialment les persones amb

diversitat funcional, les persones de la tercera edat i els usuaris amb necessitats especials- obtinguin el màxim benefici pel que fa a l'oferta i la qualitat dels continguts i serveis multimèdia.

La prova consta de dues parts. En primer lloc haurà de mirar un vídeo curt amb una demostració d'un servei o bé seguir les instruccions que se li oferiran perquè hi interactuï. A continuació, se li demanarà que contesti un breu qüestionari.

Si us plau, ara llegeixi/miri/escolti el consentiment informat.

Consentiment informat

La seva participació en la prova és absolutament voluntària. La informació que proporcioni s'utilitzarà en el projecte, però romandrà anònima. Pot interrompre la seva participació en qualsevol moment sense justificació prèvia. Això no tindrà repercussions ni conseqüències negatives de cap tipus. Si està disposat a participar-hi, confirmi les següents afirmacions seleccionant "sí" al final d'aquest formulari. Si selecciona "no" vol dir que no dona el seu consentiment.

No s'emmagatzemaran dades personals. La resta de dades es conservaran durant cinc anys un cop acabi el projecte, tal i com ordena la legislació europea.

- He llegit i comprès la informació proporcionada per aquest projecte o me l'han llegida.
- He tingut l'oportunitat de fer preguntes sobre el projecte.
- Dono el meu consentiment per participar en la prova.

Dona el seu consentiment per participar en aquesta prova?

- Si
- No

7.4. Test information sheet and consent form in Greek

Το EasyTV είναι ένα έργο χρηματοδοτούμενο από το πρόγραμμα H2020 της Ευρωπαϊκής Ένωσης με αριθμό συμφωνίας επιχορήγησης 761999. Το EasyTV συντονίζεται από τον Federico Álvarez ο οποίος είναι ακαδημαϊκό μέλος της Πολυτεχνικής Σχολής της Μαδρίτης (Ισπανία). Η σύμβουλος σε θέματα ηθικής του έργου είναι η Pilar Orero. Μπορείτε να επικοινωνήσετε με την Pilar Orero στο pilar.orero@uab.cat και να ρωτήσετε περισσότερες πληροφορίες για το έργο και τα αποτελέσματά του.

Το EasyTV στοχεύει στο να διευρύνει τη διαθεσιμότητα για συμμετοχή σε μέσα πρόσβασης και την παροχή ίσων δυνατοτήτων πρόσβασης σε οπτικο-ακουστικές υπηρεσίες σε όλους τους χρήστες, ειδικά σε ανθρώπους με διάφορους βαθμούς αναπηρίας (εστιάζοντας κυρίως σε άτομα με προβλήματα όρασης και ακοής).

Παρακαλώ διαβάστε/δείτε/ακούστε την φόρμα συγκατάθεσης.

ΦΟΡΜΑ ΣΥΓΚΑΤΑΘΕΣΗΣ

Η συμμετοχή σας στα δοκιμαστικά test είναι απόλυτα εθελοντική. Οι πληροφορίες που παρείχατε θα χρησιμοποιηθούν για τους σκοπούς του έργου, αλλά θα τηρηθεί ανωνυμία. Μπορείτε να διακόψετε τη συμμετοχή σας σε αυτή τη μελέτη οποιαδήποτε στιγμή θελήσετε χωρίς καμία αιτιολόγηση. Κάτι τέτοιο δεν έχει επιπτώσεις ή αρνητικές συνέπειες.

Αν θέλετε να συμμετάσχετε στις δοκιμές, παρακαλώ επιβεβαιώστε τα ακόλουθα με το να επιλέξετε "ναι" στο τέλος αυτής της φόρμας. Αν επιλέξετε "όχι" σημαίνει ότι δεν δίνετε τη συγκατάθεσή σας.

- Έχω διαβάσει και έχω κατανοήσει τις πληροφορίες που δίνονται σε αυτήν την έρευνα ή οι σχετικές πληροφορίες αναγνώστηκαν σε εμένα,
- Είχα τη δυνατότητα να κάνω ερωτήσεις σχετικά με την έρευνα.
- Συμφωνώ να συμμετάσχω στην ερευνητική διαδικασία.

Δίνεται η συγκατάθεσή σας για τη συμμετοχή σας στις δοκιμές;

- ☐ Ναι
☐ Όχι

7.5. Test information sheet and consent form in Italian

Easy TV è un progetto H2020 finanziato dalla UE con l'accordo di sovvenzione numero 761999. Alla guida del progetto EasyTV troviamo Federico Álvarez, della Universidad Politécnica de Madrid (Spagna), mentre il consigliere etico è Pilar Orero. È possibile contattare Pilar Orero a pilar.orero@uab.cat al fine di avere ulteriori informazioni sul progetto e sui risultati dello stesso.

EasyTV ha come obiettivo quello di ampliare la possibilità di interazione verso i media accessibili e di fornire un accesso equo ai servizi audiovisivi per tutti gli utenti, in particolare per le persone con diversi gradi di disabilità (con un particolare focus verso sordi e non vedenti).

Il test è strutturato in due parti. Prima verrà mostrato un breve video con la demo di un servizio o, in alternativa, verranno date istruzioni su come interagire con il servizio. Poi si dovrà rispondere ad un breve questionario.

Gentilmente leggete/ascoltate/osservate il modulo di consenso.

Modulo di consenso

La vostra partecipazione ai test è assolutamente volontaria. Le informazioni fornite verranno utilizzate nel progetto, ma rimarranno anonime. È possibile interrompere il vostro coinvolgimento nello studio in qualsiasi momento senza giustificazione preventiva. Ciò non avrà ripercussioni o conseguenze negative di alcun tipo.

Se siete disposti a partecipare, si prega di confermare le seguenti dichiarazioni, selezionando il pulsante "Sì" alla fine di questo modulo. Se si seleziona "No" significa che non si dà il consenso.

Ho letto e compreso, o mi hanno letto, le informazioni fornite per questa ricerca.

Ho avuto l'opportunità di porre domande sulla ricerca.

- Acconsento a partecipare alle sessioni di ricerca.

Acconsente a partecipare a questo test?

- Sí
- No

7.6. Test information sheet and consent form in Arabic

Easy TV 761999. الاوربية المساعدة رقم تحت CH 2020 طرف من ممول برنامج تفي ايزي

التي أريرو بيلار السيدة التقنية المسيرة و ,لمدرين التقنية العلمية بالجامعة أليز فيديريكو السيد بترأسها تفي ايزي هذا حول المعلومات من المزيد منها الطلب pilar.orero@uab.cat و الإلكتروني البريد عبر معها التواصل لك يمكن نتائجه و المشروع

نفس لضمان بصرية السمع الخدمات و التلفزة لمشاهدة الحظوظ نفس إعطاء هو تفي ايزي لمشروع الرئيسي الدافع بهاته أكثر يستفيدون حتى الخاصة الإحتياجات ذوي و السن كبار ,الخدمة المتعددي للأشخاص خاصة المستعملين لجميع الحق بصرية السمع الخدمات

يتلقى او الخدمة هذه على يحتوي لفيديو قصير مقطع مشاهدة يجب اولا .مقطعين على تحتوي هذه الأسئلة قائمة تلي التي الأسئلة عن الإجابة تجب بعدها و الخدمة هذه حول الكافية المعلومات

.الموافقة إسمع ,شاهد ,اقرأ الان فضلك من

الموافقة نموذج على للحصول هنا انقر

Modulo di consenso

اللغات متعددة ترجمات خدمة

.الموافقة

ستكون لكنها البرنامج هذا في تُستعمل سوف بها ستدلي التي المعلومات كل .تطوعية ستكون التجربة هذه في مشاركتك الهوية مجهولة

بأي سلبية عواقب اي لذلك تكون فلن تصريح اي إعطاء بدون شئت لحظة اي في الإجابة عن تتوقف ان تستطيع الاشكال من شكل

.الموافقة تعطي لا انك يعني فهذا "لا" إجابتك حالة في .النهاية في "نعم" اجب للمشاركة مستعدا كنت إذا

.المشروع هذا حول المعلومات جميع فهمت و قرأت لقد

.المشروع حول الأسئلة طرح فرصة لي أُتيحت لقد

.التجربة هذه في للمشاركة موافقتي أُعطي

التجربة؟ هذه في للمشاركة موافقتك تمنح هل

- نعم
- لا

7.7. Test information sheet and consent form in Greek SL (snapshots of clips)

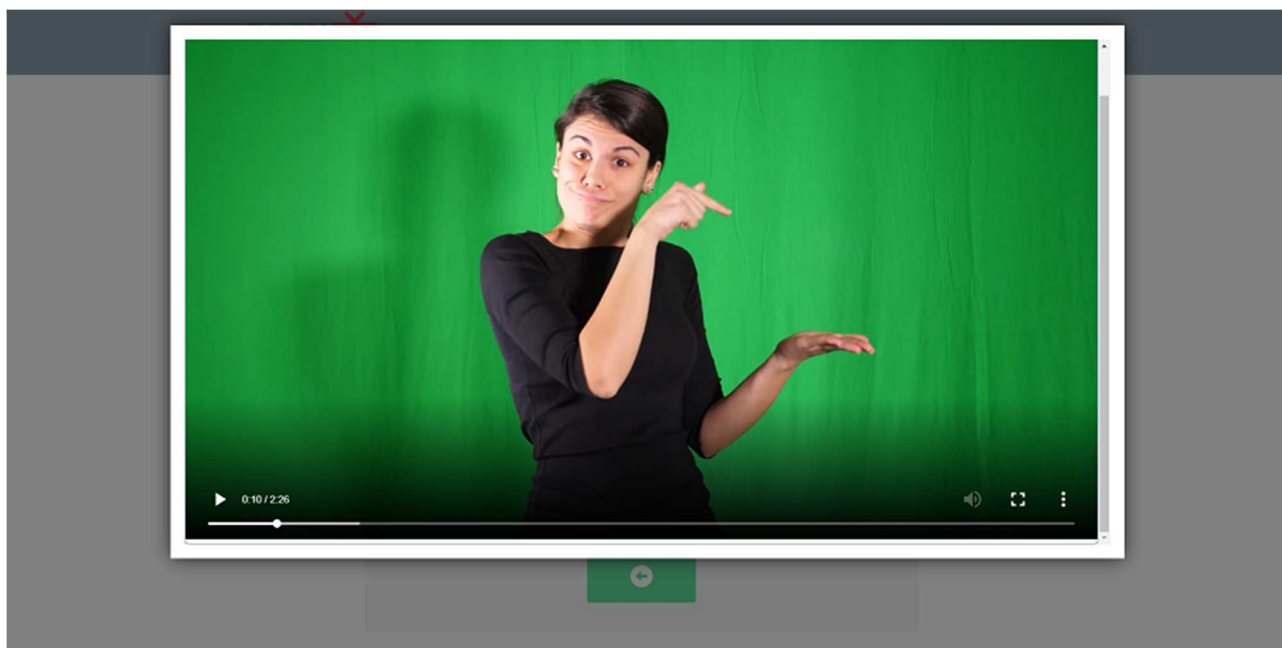


Figure 124: Information and consent form in Greek Sign Language (1)

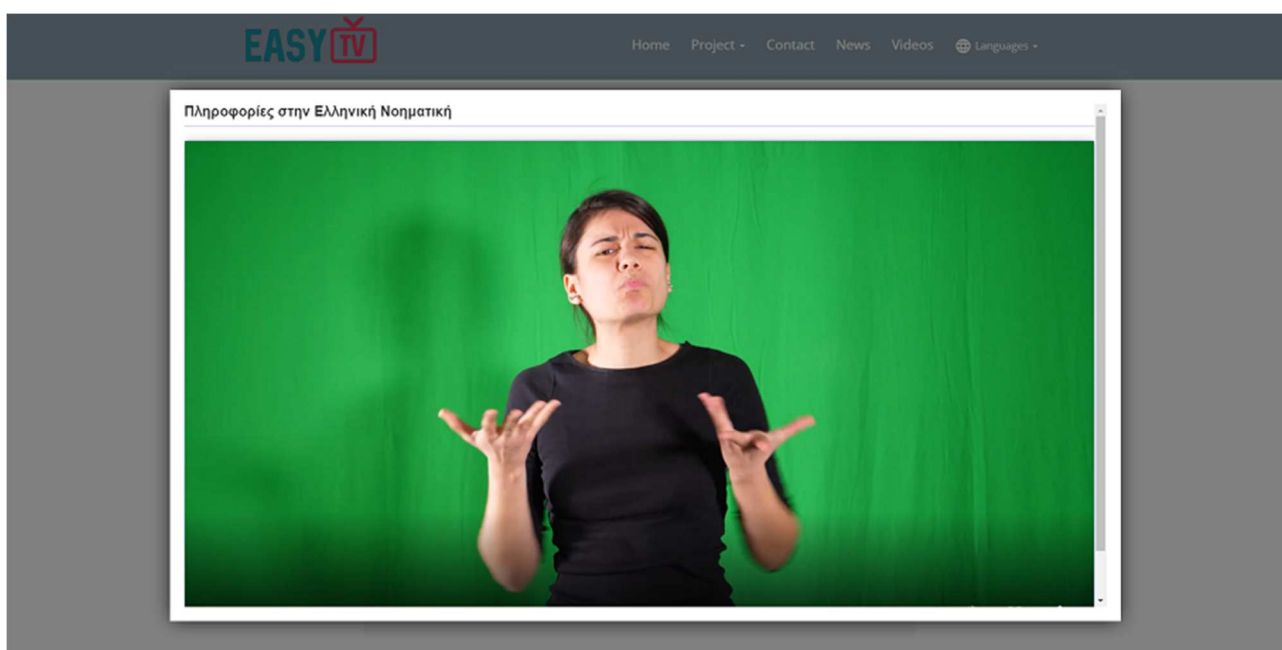


Figure 125: Information and consent form in Greek Sign Language (2)

7.8. Test information sheet and consent form in Spanish SL (snapshots of clips)

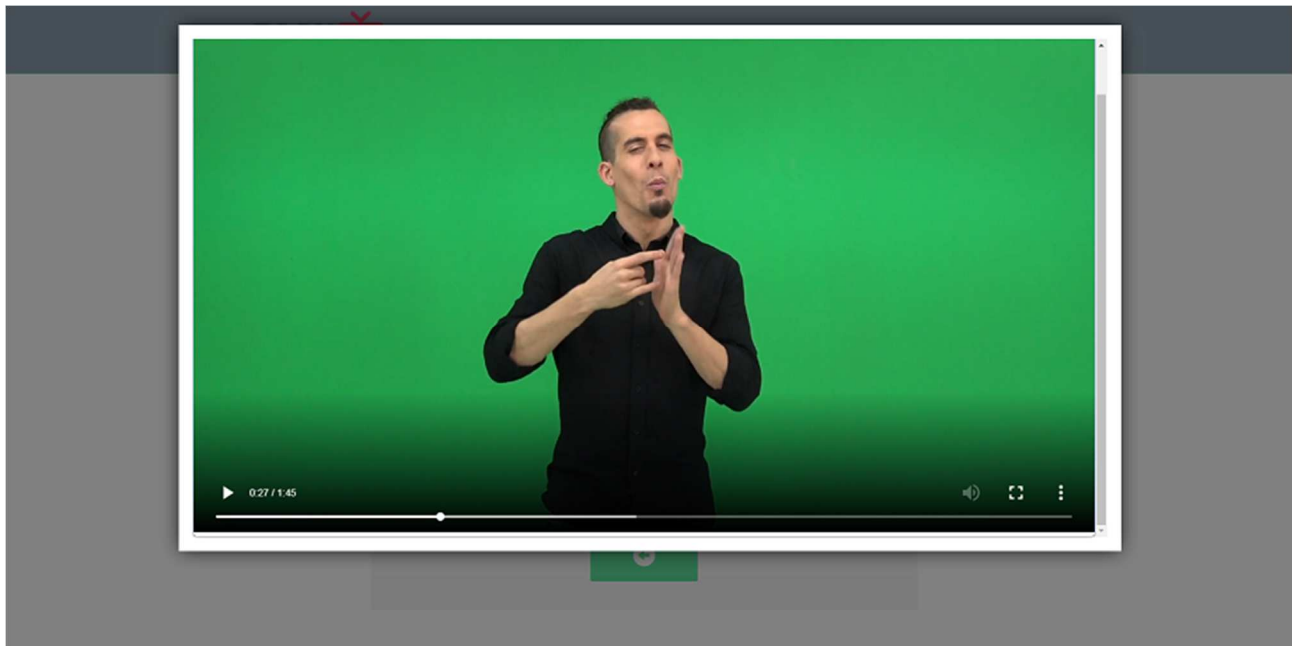


Figure 126: Information and consent form in Spanish Sign Language (1)

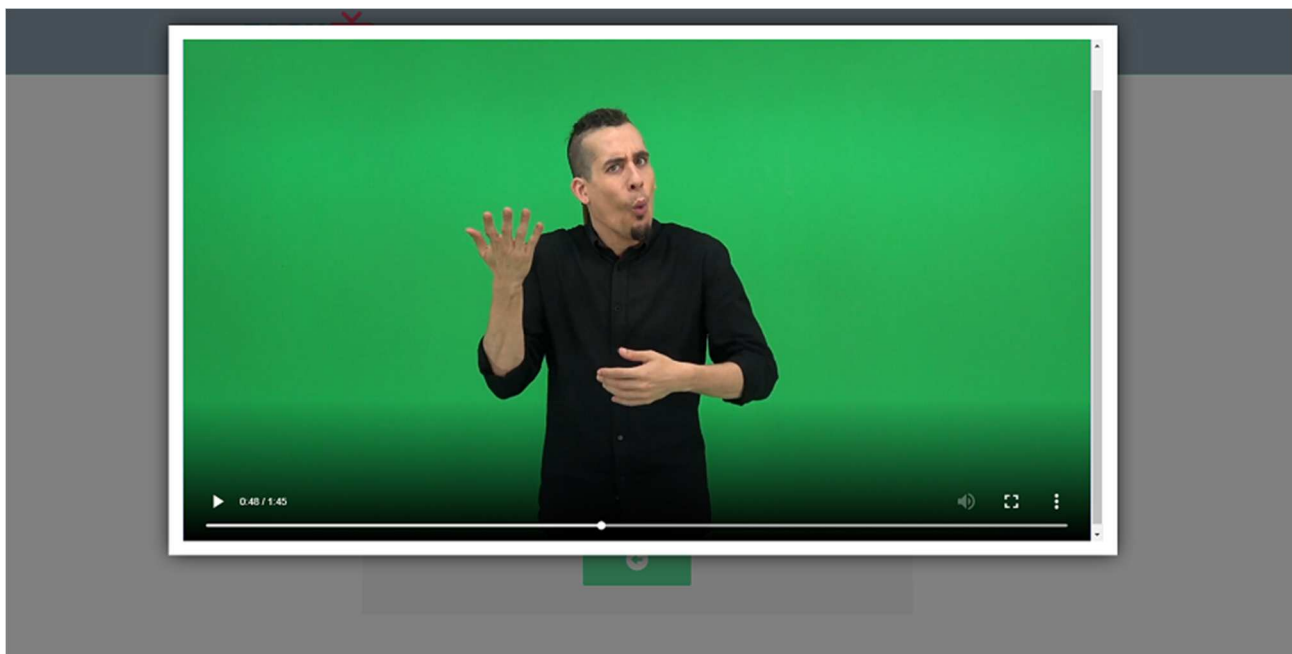


Figure 127: Information and consent form in Spanish Sign Language (2)

7.9. Questionnaire in English

1. Highest level of studies reached:*

- ☐ Lower than primary education
- ☐ Primary education

- ☐ Secondary education
- ☐ Advanced vocational education
- ☐ First cycle university education (diploma, degree or graduate studies)
- ☐ Second cycle university education (master, postgraduate or doctoral studies)
- ☐ Prefer not to tell

2. How would you define yourself? (more than one can be selected)*

- ☐ Sight loss
- ☐ Blind
- ☐ 65+
- ☐ Hearing loss
- ☐ I'm deaf or hard of hearing, and I prefer to use sign language on my everyday life
- ☐ I'm deaf or hard of hearing, and I prefer to use oral language on my everyday life
- ☐ Prefer not to tell
- ☐ Other (please, indicate):

3. I think that I would like to use this service frequently*

Strongly
disagree

Strongly agree

1	2	3	4	5
---	---	---	---	---

4. I found the service unnecessarily complex*

Strongly
disagree

Strongly agree

1	2	3	4	5
---	---	---	---	---

5. I thought the service was easy to use*

Strongly
disagree

Strongly agree

1	2	3	4	5
---	---	---	---	---

6. I think that I would need the support of a technical person to be able to use this service*

Strongly
disagree

Strongly agree

1	2	3	4	5
---	---	---	---	---

7. I found the various functions in this service were well integrated*

Strongly
disagree

Strongly agree

1	2	3	4	5
---	---	---	---	---

8. I thought there was too much inconsistency in this service*

Strongly
disagree

Strongly agree

1	2	3	4	5
---	---	---	---	---

9. I would imagine that most people would learn to use this service very quickly*

Strongly
disagree

Strongly agree

1	2	3	4	5
---	---	---	---	---

10. I found the service very cumbersome to use*

Strongly disagree				Strongly agree
1	2	3	4	5

11. I felt very confident using the service*

Strongly disagree				Strongly agree
1	2	3	4	5

12. I needed to learn a lot of things before I could get going with this service*

Strongly disagree				Strongly agree
1	2	3	4	5

13. Did you know or have you ever used this kind of service before? *

- ☐ Yes
☐ No

If so, which one?

14. How likely would recommend our service to a friend or colleague in a scale from 0 (very improbable) to 10 (I would definitely recommend it)? *

0.....10

15. What is the primary reason for this score?

16. Do you think we should continue researching and developing on this area of TV service? *

- ☐ Yes
☐ No
☐ Prefer not to tell

17. If you would like to suggest any new functionality or improvement, you can do it now.

18. Is there anything you would like to add?

The following questions is applied only for Multilingual subtitles service

19. Last question. Please, tell us what application you are giving us feedback from.

Choose one of the following options:

- ☐ Multilingual subtitles on the website
☐ Multilingual subtitles on HbbTV (live)
☐ Multilingual subtitles on HbbTV (on demand)

7.10. Questionnaire in Spanish

1. Nivel de estudios más alto conseguido*:

- ☐ Inferior a la educación primaria
☐ Educación primaria
☐ Educación secundaria
☐ Formación profesional (FP)
☐ Diplomatura, licenciatura o grado universitario
☐ Máster, posgrado o doctorado
☐ NS/NC

2. ¿Cómo se definiría? (puede seleccionar más de una respuesta)*

- ☐ Tengo pérdida de visión
- ☐ Ciego
- ☐ Soy mayor de 65
- ☐ Tengo pérdida de audición
- ☐ Soy sordo y prefiero usar la lengua de signos en mi vida diaria.
- ☐ Soy sordo y prefiero usar la lengua oral en mi vida diaria.
- ☐ NS/NC
- ☐ Otro (por favor, especifique):

3. Creo que me gustaría usar este sistema frecuentemente*.

Totalmente en
desacuerdo

Totalmente de
acuerdo

1	2	3	4	5
---	---	---	---	---

4. Me ha parecido innecesariamente complejo este sistema*.

Totalmente en
desacuerdo

Totalmente de
acuerdo

1	2	3	4	5
---	---	---	---	---

5. Este sistema me ha parecido fácil de usar*.

Totalmente en
desacuerdo

Totalmente de
acuerdo

1	2	3	4	5
---	---	---	---	---

6. Creo que necesitaría la ayuda de una persona con conocimientos técnicos para usar este sistema*.

Totalmente en
desacuerdo

Totalmente de
acuerdo

1	2	3	4	5
---	---	---	---	---

7. Me ha parecido que las distintas funciones de este sistema están bien integradas*.

Totalmente en
desacuerdo

Totalmente de
acuerdo

1	2	3	4	5
---	---	---	---	---

8. Creo que este sistema es demasiado inconsistente*.

Totalmente en
desacuerdo

Totalmente de
acuerdo

1	2	3	4	5
---	---	---	---	---

9. Imagino que la mayoría de la gente aprendería a usar este sistema de forma muy rápida*.

Totalmente en
desacuerdo

Totalmente de
acuerdo

1	2	3	4	5
---	---	---	---	---

10. El sistema me ha parecido engorroso*.

Totalmente en
desacuerdo

Totalmente de
acuerdo

1	2	3	4	5
---	---	---	---	---

11. Tenía muy claro cómo usar este sistema todo el rato*.

Totalmente en
desacuerdo

Totalmente de
acuerdo

1	2	3	4	5
---	---	---	---	---

12. Tuve que adquirir muchos conocimientos antes de poder usar este sistema*.

Totalmente en
desacuerdo

Totalmente de
acuerdo

1	2	3	4	5
---	---	---	---	---

13. ¿Conocía o había usado este tipo de servicio anteriormente?*

En caso afirmativo, ¿cuál?

14. ¿Cuán probable es que recomiende nuestro servicio a un familiar o amigo? Califique su respuesta en una escala de 0 a 10, donde 0 es «Muy improbable» y 10 es «Seguro que lo recomendaría»*.

15. ¿Cuál es la razón principal para la puntuación que ha dado en la pregunta anterior?

16. ¿Cree que deberíamos seguir investigando y desarrollando este tipo de servicios para la televisión?*

- ☐ Sí
- ☐ No
- ☐ NS/NC

17. Si desea sugerir que añadamos alguna nueva característica al servicio o que lo mejoremos de alguna manera, puede hacerlo ahora.

18. ¿Le gustaría hacer constar alguna otra cuestión?

The following questions is applied only for Multilingual subtitles service

19. Por favor, díganos de qué aplicación nos está dando sus comentarios.

Puede elegir una respuesta:

- ☐ Subtítulos multilingües en el sitio web
- ☐ Subtítulos multilingües en HbbTV (en vivo)
- ☐ Subtítulos multilingües en HbbTV (bajo demanda)

7.11. Questionnaire in Catalan

1. Nivell més alt d'estudis assolit:

- ☐ Inferior a l'educació primària
- ☐ Educació primària
- ☐ Educació secundària

- ☐ Formació professional (FP)
- ☐ Diplomatura, llicenciatura o grau universitari
- ☐ Màster, postgrau o doctorat
- ☐ NS/NC

2. Com es definiria? (Es pot seleccionar més d'una resposta)

- ☐ Tinc pèrdua de visió
- ☐ Cec
- ☐ 65+
- ☐ Tinc pèrdua d'audició
- ☐ Soc sord i prefereixo fer servir la llengua de signes en la meua vida diària
- ☐ Soc sord i prefereixo fer servir la llengua oral en la meua vida diària
- ☐ NS/NC
- ☐ Altres (si us plau, especifiqueu):

3. Crec que m'agradaria fer servir aquest sistema sovint.

Totalment en
desacord

Totalment
d'acord

1	2	3	4	5
---	---	---	---	---

4. Aquest sistema m'ha semblat innecessàriament complex.

Totalment en
desacord

Totalment
d'acord

1	2	3	4	5
---	---	---	---	---

5. El sistema m'ha semblat fàcil de fer servir.

Totalment en
desacord

Totalment
d'acord

1	2	3	4	5
---	---	---	---	---

6. Crec que necessitaria l'ajuda d'una persona amb coneixements tècnics per fer servir aquest sistema.

Totalment en
desacord

Totalment
d'acord

1	2	3	4	5
---	---	---	---	---

7. M'ha semblat que les diverses funcions d'aquest sistema estaven ben integrades.

Totalment en
desacord

Totalment
d'acord

1	2	3	4	5
---	---	---	---	---

8. Crec que el sistema és massa inconsistent.

Totalment en
desacord

Totalment
d'acord

1	2	3	4	5
---	---	---	---	---

9. Imagino que la majoria de gent aprendria a fer servir aquest sistema ràpidament.

Totalment en
desacord

Totalment
d'acord

1	2	3	4	5
---	---	---	---	---

10. L'ús del sistema m'ha semblat molt molest.

Totalment en
desacord

Totalment
d'acord

1	2	3	4	5
---	---	---	---	---

11. Tenia molt clar com fer servir el sistema en tot moment.

Totalment en
desacord

Totalment
d'acord

1	2	3	4	5
---	---	---	---	---

12. Vaig haver d'aprendre moltes coses noves abans de poder fer servir aquest sistema.

Totalment en
desacord

Totalment
d'acord

1	2	3	4	5
---	---	---	---	---

13. Coneixia o haver fet servir aquest tipus de servei abans?

- ☐ Sí
☐ No

En cas afirmatiu, quin?

14. Quina probabilitat hi ha que recomani el nostre servei a un familiar o amic? Doni la seva resposta en una escala del 0 al 10, en la qual 0 és "molt improbable" i 10 és "de ben segur que el recomanaria".

1.....10

15. Quin és el principal motiu de la puntuació que ha atorgat a la pregunta anterior?

16. Creu que hauríem de continuar investigant i desenvolupant aquest tipus de serveis per a la televisió?

- ☐ Sí
☐ No
☐ NS/NC

17. Si vol suggerir que afegim alguna nova característica al servei o que hi fem cap millora, ho pot fer ara.

18. Hi ha res més que vulgui fer constar?

7.12. Questionnaire in Greek

1. Επίπεδο σπουδών:*

- ☐ Χαμηλότερο της πρωτοβάθμιας εκπαίδευσης

- ☐ Πρωτοβάθμια εκπαίδευση
- ☐ Δευτεροβάθμια εκπαίδευση
- ☐ Προχωρημένη επαγγελματική εκπαίδευση
- ☐ Τριτοβάθμια εκπαίδευση (πτυχίο)
- ☐ Τριτοβάθμια εκπαίδευση (μεταπτυχιακές/διδακτορικές σπουδές)
- ☐ Επιθυμώ να μην απαντήσω

2. Με ποιόν τρόπο θα περιγράφατε τον εαυτό σας? (μπορείτε να επιλέξετε περισσότερα του ενός)*

- ☐ Απώλεια όρασης
- ☐ Τυφλός
- ☐ 65+
- ☐ Απώλεια ακοής
- ☐ Είμαι κουφός ή βαρήκοος, και προτιμώ να χρησιμοποιώ Νοηματική Γλώσσα καθημερινά.
- ☐ Είμαι κουφός ή βαρήκοος, και προτιμώ να χρησιμοποιώ προφορική γλώσσα καθημερινά.
- ☐ Επιθυμώ να μην απαντήσω
- ☐ Άλλο (παρακαλώ αναφέρετε):

3. Νομίζω ότι θα ήθελα να χρησιμοποιώ αυτήν την υπηρεσία συχνά*

Διαφωνώ
απολύτως

Συμφωνώ
απολύτως

1	2	3	4	5
---	---	---	---	---

4. Θεωρώ ότι η υπηρεσία είναι πολύπλοκη χωρίς λόγο *

Διαφωνώ
απολύτως

Συμφωνώ
απολύτως

1	2	3	4	5
---	---	---	---	---

5. Θεωρώ ότι η υπηρεσία είναι εύκολη στη χρήση*

Διαφωνώ
απολύτως

Συμφωνώ
απολύτως

1	2	3	4	5
---	---	---	---	---

6. Πιστεύω ότι για να χρησιμοποιηθεί η υπηρεσία θα χρειαστεί τεχνική υποστήριξη από ειδικό*

Διαφωνώ
απολύτως

Συμφωνώ
απολύτως

1	2	3	4	5
---	---	---	---	---

7. Παρατήρησα ότι οι διάφορες λειτουργίες της υπηρεσίας έχουν ενσωματωθεί σωστά*

Διαφωνώ
απολύτως

Συμφωνώ
απολύτως

1	2	3	4	5
---	---	---	---	---

8. Θεωρώ ότι αυτή η υπηρεσία περιείχε πολλές ασυνέπειες*

Διαφωνώ
απολύτως

Συμφωνώ
απολύτως

1	2	3	4	5
---	---	---	---	---

9. Πιστεύω ότι οι περισσότεροι άνθρωποι θα μπορέσουν να χρησιμοποιήσουν την υπηρεσία πολύ εύκολα*

Διαφωνώ
απολύτως

Συμφωνώ
απολύτως

1	2	3	4	5
---	---	---	---	---

10. Βρήκα την υπηρεσία πολύ δύσκολη στη χρήση*

Διαφωνώ
απολύτως

Συμφωνώ
απολύτως

1	2	3	4	5
---	---	---	---	---

11. Νιώθω μεγάλη άνεση στο να χρησιμοποιώ αυτήν την υπηρεσία*

Διαφωνώ
απολύτως

Συμφωνώ
απολύτως

1	2	3	4	5
---	---	---	---	---

12. Έπρεπε να μάθω πολλά προκειμένου να χρησιμοποιήσω την υπηρεσία*

Διαφωνώ
απολύτως

Συμφωνώ
απολύτως

1	2	3	4	5
---	---	---	---	---

13. Ξέρατε από πριν ή είχατε χρησιμοποιήσει τέτοιου είδους υπηρεσίες προηγουμένως; *

- ☐ Ναι
☐ Όχι

Αν ναι, ποιά?

14. Πόσο πιθανό είναι να προτείνετε την υπηρεσία αυτή σε κάποιο φίλο ή συνάδελφο στην κλίμακα από 0 (καθόλου πιθανό) μέχρι 10 (σίγουρα θα την πρότεινα); *

0.....10

15. Ποιός ήταν ο κύριος λόγος που βάλατε αυτήν την βαθμολογία;

16. Πιστεύετε ότι πρέπει να συνεχιστεί η έρευνα και η ανάπτυξη λογισμικού σε αυτόν τον τομέα υπηρεσιών TV; *

- ☐ Ναι
☐ Όχι
☐ Επιθυμώ να μην απαντήσω

17. Αν θέλετε να προτείνετε μια νέα λειτουργία ή τη βελτίωση μιας ήδη υπάρχουσας, μπορείτε να το κάνετε τώρα.

18. Υπάρχει κάτι που θα θέλατε να προσθέσετε;

7.13. Questionnaire in Italian

1. Qual'è il tuo più alto grado di studio:

- ☐ Più basso della scuola primaria
- ☐ Scuola Primaria
- ☐ Scuola Secondaria
- ☐ Istruzione superiore (formazione professionale, diploma, ecc.)
- ☐ Università primo ciclo (laurea breve, altro)
- ☐ Università secondo ciclo (laurea, master, dottorato)
- ☐ Preferisco non rispondere

2. Come definiresti te stesso? (puoi selezionare più di una opzione)

- ☐ Ipovedente
- ☐ Non vedente
- ☐ Over 65
- ☐ Sordo
- ☐ Con problemi di udito e preferisco usare la lingua dei segni nella mia vita quotidiana
- ☐ Sordo o con problemi di udito e preferisco usare la lingua orale nella mia vita quotidiana
- ☐ Preferisco non rispondere
- ☐ Altro (specifica):

3. Penso che userò spesso questo sistema. *

Totalmente disaccordo				Totalmente d'accordo
1	2	3	4	5

4. Trovo questo sistema inutilmente complesso. *

Totalmente disaccordo				Totalmente d'accordo
1	2	3	4	5

5. Penso che il sistema sia facile da usare. *

Totalmente disaccordo				Totalmente d'accordo
1	2	3	4	5

6. Penso che avrei bisogno dell'aiuto di una persona con conoscenze tecniche per utilizzare questo sistema. *

Totalmente disaccordo				Totalmente d'accordo
1	2	3	4	5

7. Le funzioni di questo sistema sono ben integrate. *

Totalmente disaccordo				Totalmente d'accordo
1	2	3	4	5

8. Penso che il sistema sia molto incoerente. *

Totalmente disaccordo				Totalmente d'accordo
1	2	3	4	5

9. Immagino che la maggior parte delle persone imparerebbe a usare questo sistema molto rapidamente. *

Totalmente disaccordo				Totalmente d'accordo
1	2	3	4	5

disaccordo				d'accordo
1	2	3	4	5

10. Trovo che il sistema sia scomodo da usare.*

Totalmente disaccordo	in			Totalmente d'accordo
1	2	3	4	5

11. Ho avuto la certezza di saper usare questo sistema.*

Totalmente disaccordo	in			Totalmente d'accordo
1	2	3	4	5

12. Ho dovuto imparare molte cose prima di poter usare questo sistema.*

Totalmente disaccordo	in			Totalmente d'accordo
1	2	3	4	5

13. conoscevi già o hai mai sentito parlare di questi servizi?

- ☐ Sì
☐ No

Se Sì, quali?

14. In una scala da 0 a 10, quanto raccomandaresti il nostro servizio ad un amico o collega. 0 (molto improbabile) 10 (lo raccomanderei sicuramente)?

0.....10

15. Qual'è il principale motivo di questo voto?

16. Pensi che dovremmo continuare a fare ricerca e sviluppare in quest'area di contenuti TV per ciechi e sordi?

- ☐ Sì
☐ No
☐ Preferisco non rispondere

17. Se desideri suggerire nuove funzionalità o miglioramenti, puoi farlo ora.

18. C'è qualcosa che vorresti aggiungere?

7.14. Questionnaire in Arabic

<https://easytvproject.eu/questionnaires/multilang-subt/questions-ar.html>

7.15. Questionnaire in Greek Sign Language (snapshots of clips)

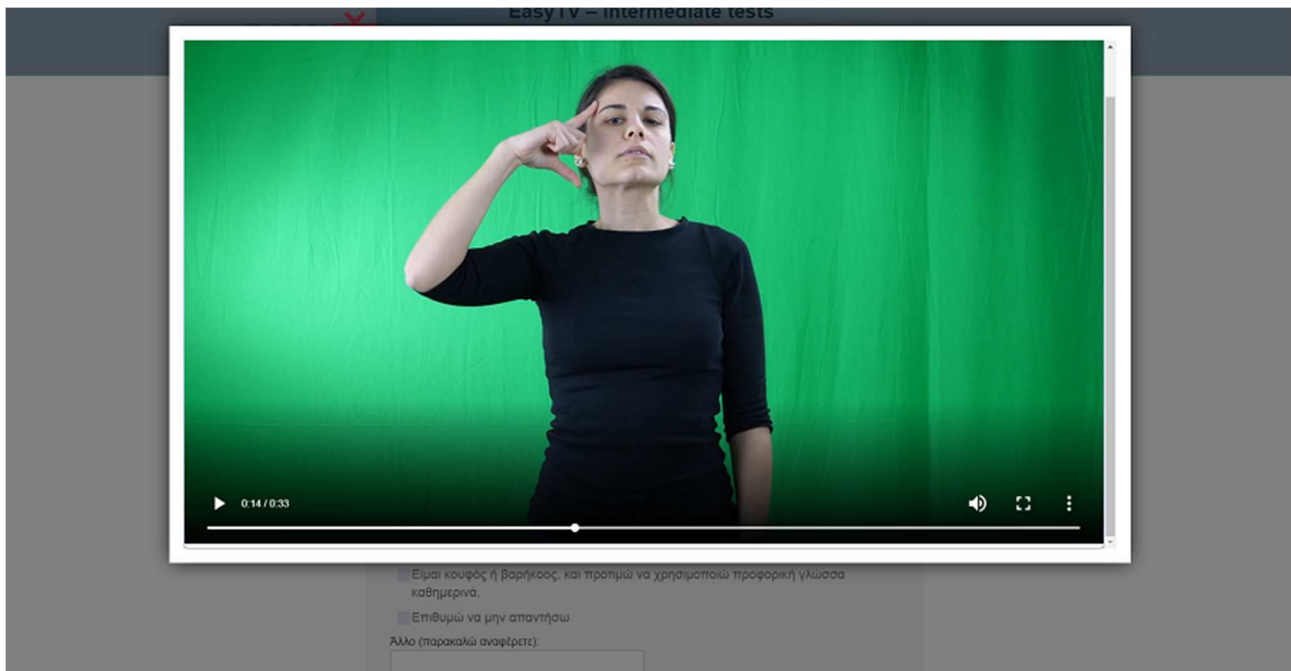


Figure 128: Questionnaire in Greek Sign Language (1)



Figure 129: Questionnaire in Greek Sign Language (2)

7.16. Questionnaire in Spanish Sign Language (snapshots of clips)

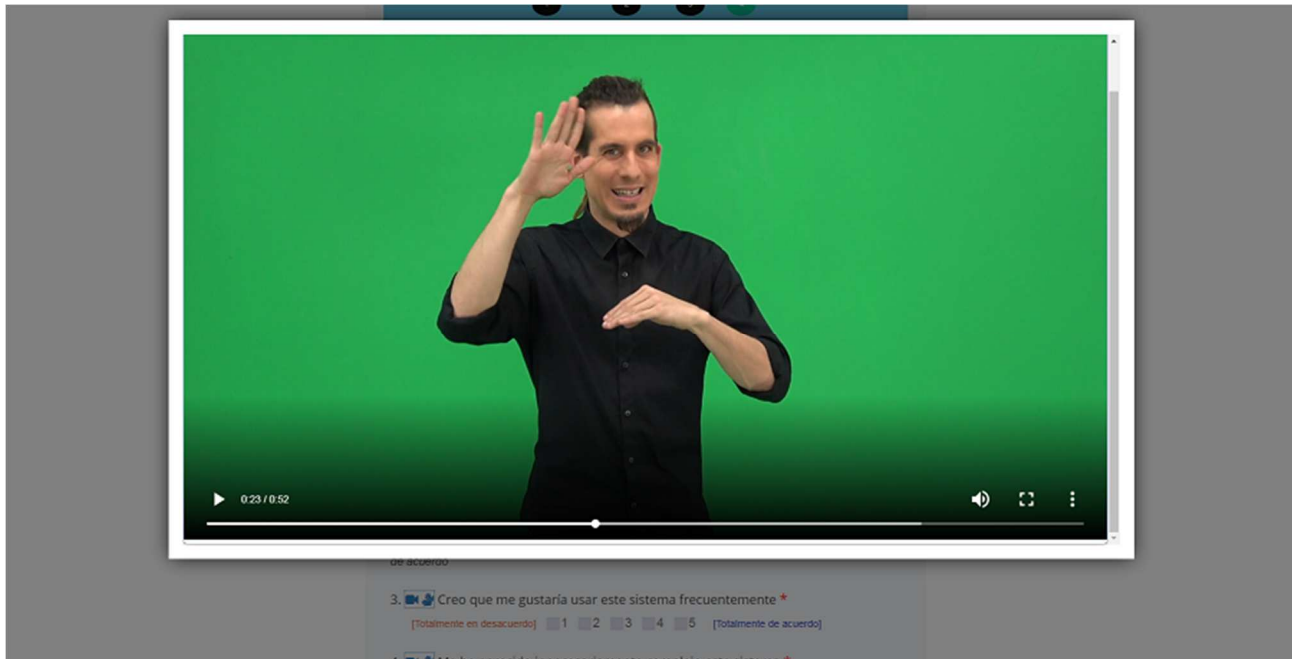


Figure 130: Questionnaire in Spanish Sign Language (1)

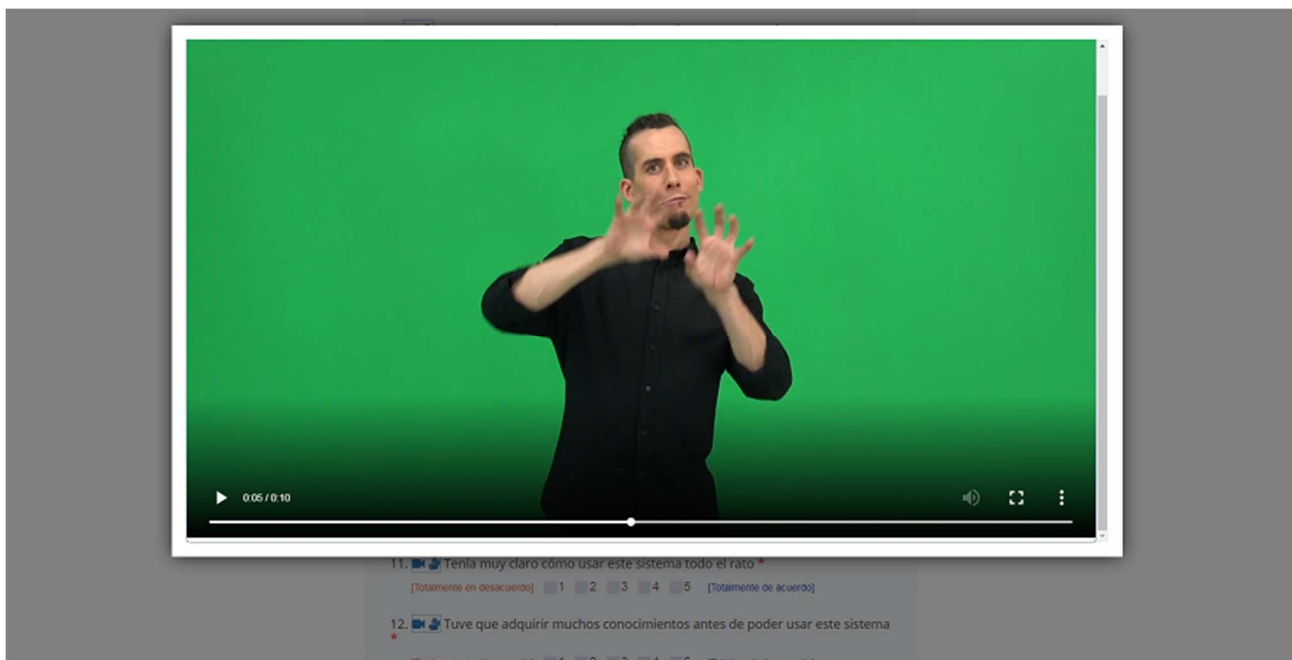


Figure 131: Questionnaire in Spanish Sign Language (2)

7.17. Avatar 3D - Questionnaire in Spanish

1. Nivel de estudios más alto conseguido*:

- ☐ Inferior a la educación primaria
- ☐ Educación primaria
- ☐ Educación secundaria
- ☐ Formación profesional (FP)
- ☐ Diplomatura, licenciatura o grado universitario
- ☐ Máster, posgrado o doctorado
- ☐ NS/NC

2. ¿Cómo se definiría? (puede seleccionar más de una respuesta)*

- ☐ Tengo pérdida de visión
- ☐ Ciego
- ☐ Soy mayor de 65
- ☐ Tengo pérdida de audición
- ☐ Soy sordo y prefiero usar la lengua de signos en mi vida diaria.
- ☐ Soy sordo y prefiero usar la lengua oral en mi vida diaria.
- ☐ NS/NC
- ☐ Otro (por favor, especifique):

SECCIÓN 1: Nivel de comprensión

Si estás haciendo el test en línea, puedes escribir tu respuesta o subir un vídeo en lengua de signos española, subirlo a una plataforma como Wetransfer o Youtube y pegar el enlace en el cuadro. Si lo estás haciendo de modo presencial, puedes escribir aquí tu respuesta o pedir a un interprete que la anote por ti.

Por favor, juzgue los siguientes ítems de acuerdo con las afirmaciones siguientes en una escala de 1 (muy en desacuerdo) a 7 (muy de acuerdo).

SECCIÓN 2: Calidad de la implementación técnica de la traducción

- Entendí el contenido.
- Las expresiones faciales del AVATAR eran visibles.
- El movimiento de las manos del AVATAR era visible.
- Las manos y las expresiones faciales iban sincronizadas.
- El movimiento de las manos del AVATAR era preciso.
- En general, el movimiento del AVATAR era natural (parecido al humano), independientemente de la comprensión.
- La velocidad del AVATAR era comprensible.

SECCIÓN 3: Calidad del aspecto del AVATAR

- El AVATAR me ha parecido realista.
- Me ha gustado el tipo de ropa que llevaba el AVATAR.
- La iluminación ambiente era muy buena y los detalles del AVATAR eran claros.
- El aspecto del AVATAR es importante para mí.
- Creo que el tono de la piel del signante virtual debería contrastar con el color de su ropa (tal como se ha mostrado).
- Creo que la ropa del signante virtual debería contrastar con el fondo (tal como se ha mostrado).
- Me ha gustado el aspecto general del signante virtual.

SECCIÓN 4: Opiniones para la mejora

Por ejemplo, la selección del sexo, la ropa o el fondo.(opcional)

Puede hacernos llegar su opinión de dos formas:

1- Escribir el comentario en el siguiente cuadro.

2- Grabar un video en lengua de signos, subirlo a alguna plataforma como Youtube, Vimeo, Wetransfer, etc. y pegar el enlace en el siguiente cuadro.

7.18. Avatar 3D - Questionnaire in Greek

1. Επίπεδο σπουδών:*

- ☐ Χαμηλότερο της πρωτοβάθμιας εκπαίδευσης
- ☐ Πρωτοβάθμια εκπαίδευση
- ☐ Δευτεροβάθμια εκπαίδευση
- ☐ Προχωρημένη επαγγελματική εκπαίδευση
- ☐ Τριτοβάθμια εκπαίδευση (πτυχίο)
- ☐ Τριτοβάθμια εκπαίδευση (μεταπτυχιακές/διδακτορικές σπουδές)
- ☐ Επιθυμώ να μην απαντήσω

2. Με ποιόν τρόπο θα περιγράφατε τον εαυτό σας? (μπορείτε να επιλέξετε περισσότερα του ενός)*

- ☐ Απώλεια όρασης
- ☐ Τυφλός
- ☐ 65+
- ☐ Απώλεια ακοής
- ☐ Είμαι κουφός ή βαρήκοος, και προτιμώ να χρησιμοποιώ Νοηματική Γλώσσα καθημερινά.
- ☐ Είμαι κουφός ή βαρήκοος, και προτιμώ να χρησιμοποιώ προφορική γλώσσα καθημερινά.
- ☐ Επιθυμώ να μην απαντήσω
- ☐ Άλλο (παρακαλώ αναφέρετε):

Ενότητα 1: Επίπεδο κατανόησης

Μπορείτε να γράψετε την απάντησή σας εδώ ή να ζητήσετε από έναν διερμηνέα να το γράψει για εσάς.

Παρακαλώ απαντήστε στις ακόλουθες ερωτήσεις σύμφωνα με την κλίμακα από 1 (διαφωνώ απόλυτα) έως 7 (συμφωνώ απόλυτα).

Ενότητα 2: Ποιότητα της τεχνικής εφαρμογής της μετάφρασης

- Κατάλαβα το περιεχόμενο.
- Οι εκφράσεις του προσώπου του AVATAR ήταν ορατές.
- Η κίνηση των χεριών του AVATAR ήταν ορατή.
- Τα χέρια και οι εκφράσεις του προσώπου ήταν συγχρονισμένες.
- Η κίνηση των χεριών του AVATAR ήταν ακριβής.
- Γενικά, η κίνηση του AVATAR ήταν φυσική (ανθρώπινη) ανεξάρτητα από την κατανόηση.
- Η ταχύτητα του AVATAR ήταν κατανοητή.

Ενότητα 3: Ποιότητα της εμφάνισης του AVATAR

- Το AVATAR μου φάνηκε ρεαλιστικό.
- Μου άρεσε ο τύπος των ρούχων που φορούσε το AVATAR.
- Ο φωτισμός περιβάλλοντος ήταν πολύ καλός και οι λεπτομέρειες του AVATAR ήταν σαφείς.

- Η πτυχή του AVATAR είναι σημαντική για μένα.
- Νομίζω ότι ο τόνος του δέρματος του εικονικού νοηματιστή πρέπει να έρχεται σε αντίθεση με το χρώμα των ρούχων του (όπως φαίνεται).
- Νομίζω ότι τα ρούχα του εικονικού νοηματιστή πρέπει να έρχονται σε αντίθεση με το φόντο (όπως φαίνεται).
- Μου άρεσε η γενική εμφάνιση του εικονικού νοηματιστή.

Ενότητα 4: Συζήτηση για βελτιώσεις

Προτάσεις, για παράδειγμα: η επιλογή φύλου, ενδυμάτων ή ιστορικού.(προαιρετική)

Παρακαλώ γράψτε το σχόλιο στο παρακάτω πλαίσιο.

7.19. Test raw data

All the raw data gathered during the tests and processed to calculate the scores and all the results for the final tests are available in the project website at the following URL:

https://easytvproject.eu/questionnaires/final_results_rawdata.zip

7.20. Template for tests report

1. General information about the test
 - Testing partner:
 - Service tested:
 - Testing date:
 - Venue:
 - Number of informants:
 - Language(s) involved:
 - Tasks performed by users to carry out the test
 - Approximate test duration:
2. Description of the informants' demographic profile:
3. SUS results:
4. NPS results:
5. Qualitative comments made
6. Test conclusions
7. Actions to be taken for service improvement.

7.21. New ethics certificate

EasyTV

Informació requerida per la CEEAH de la UAB

Num. CEEAH: 4036R

Data: 14-03-2019

1. Títol del procediment de recerca

EasyTV

2. Breu descripció del projecte

The goal of the H2020 funded project EasyTV (Easing the access of Europeans with disabilities to converging media and content) is to foster wider availability of accessible media offerings to everybody and to provide equal access to audio-visual services for all users, especially for persons with various degrees of disabilities (focused to visual, hearing and mobility impaired). The project aims at developing media improved access services and making distribution of novel accessibility features with enhanced multimedia visual and sound experience more cost-efficient and yet more flexible to use, and also easier to use. EasyTV aims to innovate and kick-start the breakthrough of breaking the language barrier for all by developing technologies which can enhance the interaction and perform sign translations towards an inclusive media interaction. The heart of EasyTV is an improved personalization of the content experiencing and interaction, towards a hyper-personalized experience to all. The project will test access services using different methodologies and through different tasks and pilots.

Àrea del procediment d'experimentació amb humans

Ciències Socials i Polítiques

3. Dades de l'investigador responsable

Nom i cognoms	Pilar Orero Clavero
NIF	19836927W
Departament / Centre	Dept. Traducció
Telèfon	(+34)935813360
Adreça electrònica	Pilar.Orero@uab.cat
Es doctor/a? (recordeu que la comissió només avalua projecte de recerca dirigits per doctors/es)	Si

4. Objectius del procediment d'experimentació amb humans

Descriure els principals objectius que es pretenen assolir amb la realització d'aquest procediment d'experimentació

The aim of the user tests carried out in EasyTV is to obtain quantitative and qualitative data about the user experience in relation to the interaction and consumption of access services such as subtitling, audio description, audio subtitling and sign language. The accessibility will be done through different technology such as: voice commands, personalised remote control, automatised translation services such as sign language, and other developments that will take place during the life of the project.

The information gathered from users will be used to determine the optimal parameters for user experience and to provide feed-back to project partners in order to customize and adapt existing technologies, and prepare new developments.

Users will include populations with no impairments but also vulnerable populations such as persons with disabilities (persons with hearing impairments or deaf, blind and low sighted people, persons with reading disabilities), and the elderly more specifically, non-dependant old people because it is considered that after 65 most people have a loss

EasyTV

in their sensorial abilities. Special care will be taken to cater for their needs, providing assistance when necessary. Special care will be taken to cater for their needs, providing assistance when necessary.

Veure Annex 3 (application/pdf - 84.98046875 kB)

5. Metodologia del procediment d'experimentació

Descriure breument la metodologia emprada justificant les dades, mostres biològiques i o respostes conductuals obtingudes de les persones sota experimentació

The general procedure for user testing will be to present users with a content (for instance, films, clips, audio files, software, hardware, etc.) and gather user responses to a number of variables. Users can also be asked to comment on different scenarios or perform certain actions (like activating access services through the remote by voice commands), depending on the specific test.

Different qualitative and quantitative techniques will be taken into account (for instance, questionnaires, focus groups or interviews). If needed, objective data may also be gathered through eye-tracking or electrophysiological tools. Even though the eye-tracking we have now is not invasive, and there is no difference between looking at a screen with/without eye-tracking, at all times we shall take care of the end user confort, and they will be able to leave the test if they feel the slight discomfort. Given the fact that some of the testers will be people with sensorial disabilities or the elderly, special care will be taken to cater for their needs, providing assistance when necessary.

Alternative means of communication will be provided if needed, both for the data gathering tools and for information sheet and consent forms. For instance, for blind and visually impaired persons an oral information sheet and consent form can be administered orally if this is better suited for end user needs (see sample consent sheet- oral version). Other adaptations can be made if necessary to suit end user needs. For instance, translations into the language of the participants will also be provided if needed.

End users will be recruited through official channels, for instance sending information to associations and institutions related to persons with disabilities. Two end user associations are partners in the project the CNSLE in Spain and the UICI in Italy. They will also secure end user participation.

It is expected that tests will take place in Italy, Greece, and Spain, and for that reason translation of questionnaires will be made.

If the test session is to be recorded, users will be requested to sign an additional for giving permission to this aim.

Tests will be mostly developed in the project partner premises (research rooms, etc.) but other spaces will be considered (for instance, end user association premises) if this guarantees a better comfort and access for participants.

Veure Annex 4 (application/pdf - 85.189453125 kB)

6. Informació a les persones participants

Supòsit	Si	No	
S'annexa un full d'informació del projecte de recerca que inclou de forma entenedora els objectius de la investigació, els investigadors/res responsables i la forma d'obtenir fàcilment més informació?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Annex 1
S'annexa un full de consentiment informat signat per l'investigador/a i la persona en qüestió on queda clarament expressat que la participació és voluntària, que disposa de la informació suficient i que es podrà retirar en qualsevol moment sense donar explicacions i sense que això tingui cap mena de conseqüència?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Annex 2

EasyTV

7. Compensació

Supòsit	Si	No
Està previst algun tipus de compensació per la participació en el projecte?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<i>Si la resposta es Si, explicar i justificar-ne les característiques, la quantia (si és econòmic) i l'adequació amb el risc i/o molèstia ocasionats al subjecte participant</i> The project will pay a compensation to people attending the testing for covering their transportation. The user will get the compensation regardless of whether they complete the test or not. The only criteria for getting the compensation is that they attend the test.		

8. Gestió i emmagatzematge de les dades obtingudes

Supòsit	Si	No
Està prevista l'anonimització de les dades obtingudes? Recordeu que s'entén per anonimització la desvinculació permanent i irreversible entre les dades i la identitat del subjecte de recerca	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<i>Si la resposta es Si, explicar les activitats realitzades</i> Data from participants will be stored with a code in order to keep personal information anonymous. This code, which will be generated randomly, will not make it possible to relate the participant's data with the information provided by the participant. The name of the participant will only be available on the consent forms, which will be kept locked in room MRA/126 at Universitat Autònoma de Barcelona.		
Està previst l'emmagatzematge de les dades amb mesures de seguretat?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<i>Si la resposta es Si, donar detalls del procediment de seguretat</i> All data will be anonymous.		

9. Feedback

Supòsit	Si	No
Està prevista alguna forma de feedback a les persones participant un cop finalitzat el projecte?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<i>Si la resposta es Si, quina?</i> Participants will be informed that they can ask for information about the project results in case they are interested.		

10. Registre dades

Supòsit	Si	No
Les dades obtingudes es troben en un registre aprovat per l'Autoritat Catalana de Protecció de Dades?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Si la resposta es Si, indicar codi del registre:</i>		

Nom i cognoms Lloc i data

Signatura



MARIA PILAR
ORERO
CLAVERO - DNI
19836927W

Digitally signed by
MARIA PILAR ORERO
CLAVERO - DNI
19836927W
Date: 2019.04.03
15:59:53 +02'00'

EasyTV

Annex (1)

INFORMATION SHEET

Project: EasyTV (*Easing the access of Europeans with disabilities to converging media and content*)

Main researcher: Federico Álvarez (UPM)

Ethical adviser: Pilar Orero

The aim of the tests is to get feed-back on the interaction between end users and access services and its technology. This will allow us to identify the needs and expectations of diverse audiences and research how the quality of experience, the quality of the service, and personalisation can be improved.

During the test, which can take various forms (experiment with questionnaire, focus groups, interviews, etc.), you will be asked to provide some demographic data. Then, you will be asked to watch an input, perform a task or give your opinion on various aspects. If needed, objective data will be recorded during the session. The researcher will give you more details of the specific test assigned to you and the data collection methods. Please ask as many questions as needed to clarify the procedure.

The project will pay a compensation to people attending the testing for covering their transportation. The user will get the compensation regardless of whether they complete the test or not. The only criteria for getting the compensation is that they attend the test.

If your specific test can cause you any type of discomfort, the researcher will explain it thoroughly and you can stop at any time without prior justification.

Now please read the consent form.

EasyTV

Annex (2)

INFORMATION SHEET

Project: EasyTV (*Easing the access of Europeans with disabilities to converging media and content*)

Main researcher: Federico Álvarez (UPM)

Ethical adviser: Pilar Orero

The aim of the tests is to get feed-back on the interaction between end users and access services and its technology. This will allow us to identify the needs and expectations of diverse audiences and research how the quality of experience, the quality of the service, and personalisation can be improved.

During the test, which can take various forms (experiment with questionnaire, focus groups, interviews, etc.), you will be asked to provide some demographic data. Then, you will be asked to watch an input, perform a task or give your opinion on various aspects. If needed, objective data will be recorded during the session. The researcher will give you more details of the specific test assigned to you and the data collection methods. Please ask as many questions as needed to clarify the procedure.

If your specific test can cause you any type of discomfort, the researcher will explain it thoroughly and you can stop at any time without prior justification.

Now please read the consent form.

CONSENT FORM (written version)

Project: EasyTV (*Easing the access of Europeans with disabilities to converging media and content*)

Your participation in the tests is absolutely voluntary.

You can discontinue your involvement in the study at any time without prior justification. This shall have no repercussions or negative consequences of any sort.

The information you provide will be used in the project but it will remain anonymous.

Easy TV is a European project led by Federico Álvarez, from the Universidad Politécnica de Madrid (Spain). The ethical adviser responsible of ethical procedures in this H2020 EC funded project is Pilar Orero. You can contact Pilar Orero at pilar.orero@uab.cat and ask her for more information about the project and the project results.

In the case that some physiological or eye-tracking apparatus are used to gather data, you will not experience any discomfort, since the apparatus used are the latest generation and are not invasive. Tests will be mostly developed in the project partner premises (research rooms, etc.) but other spaces will be considered (for instance, end user association premises) if this guarantees a better comfort and access for participants.

If the session is recorded, you will be asked to sign an additional consent form to this aim.

The researcher administering the test is ((NAME and SURNAME)).

If you are willing to participate, please confirm the following statements by signing at the end of this document.

- I have read and understood the information given for this research or have had the information read to me,
- I have had the opportunity to ask questions about the research.
- I consent to take part in the research sessions.
- (if applicable) I consent to being recorded in audio/video/(...) form.

Name of the participant	Date	Signature
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Name of the researcher	Date	Signature
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Name of the ethical adviser	Date	Signature
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CONSENT FORM (alternative oral version, to be recorded)

Project: EasyTV (*Easing the access of Europeans with disabilities to converging media and content*)

Your participation in the tests is absolutely voluntary.

You can discontinue your involvement in the study at any time without prior justification. This shall have no repercussions or negative consequences of any sort.

The information you provide will be used in the project but it will remain anonymous.

If the session is recorded, you must sign an additional consent form to this aim.

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The researcher administering the test is ((NAME and SURNAME)).

If you are willing to participate, please reply at the end of each question:

- Have you been read the information about the project and have you understood it?
Please reply yes or no. (oral reply)
- Have you had the opportunity to ask questions about the research? Please reply yes or no. (oral reply)
- Do you consent to take part in the research sessions? Please reply yes or no. (oral reply)
- (if applicable) Do you consent to being recorded in audio/video/(...) format? Please reply yes or no. (oral reply)

Please indicate your name: (oral reply)

Please indicate the date: (oral reply)

Please indicate the researcher's name: (oral reply)

Please indicate the ethical adviser's name: (oral reply)

EasyTV

Annex (3)

CONSENT FORM (written version)

Project: EasyTV (*Easing the access of Europeans with disabilities to converging media and content*)

Your participation in the tests is absolutely voluntary.

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The information you provide will be used in the project but it will remain anonymous.

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If the session is recorded, you will be asked to sign an additional consent form to this aim.

The project will pay you a compensation for attending the tests for covering your transportation regardless of whether you complete the test or not. The only criteria for getting the compensation is that you attend the test.

The researcher administering the test is ((NAME and SURNAME)).

If you are willing to participate, please confirm the following statements by signing at the end of this document.

- I have read and understood the information given for this research or have had the information read to me,
- I have had the opportunity to ask questions about the research.
- I consent to take part in the research sessions.
- (if applicable) I consent to being recorded in audio/video/(...) **form**.

Name of the participant	Date	Signature
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Name of the researcher	Date	Signature
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Name of the ethical adviser	Date	Signature
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CONSENT FORM (alternative oral version, to be recorded)

Project: EasyTV (*Easing the access of Europeans with disabilities to converging media and content*)

Your participation in the tests is absolutely voluntary.

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The researcher administering the test is ((NAME and SURNAME)).

If you are willing to participate, please reply at the end of each question:

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Please reply yes or no. (oral reply)
- Have you had the opportunity to ask questions about the research? Please reply yes or no. (oral reply)
- Do you consent to take part in the research sessions? Please reply yes or no. (oral reply)
- (if applicable) Do you consent to being recorded in audio/video/(...) format? Please reply yes or no. (oral reply)

Please indicate your name: (oral reply)

Please indicate the date: (oral reply)

Please indicate the researcher's name: (oral reply)

Please indicate the ethical adviser's name: (oral reply)

EasyTV

Annex (4)

CONSENT FORM (written version)

Project: EasyTV (*Easing the access of Europeans with disabilities to converging media and content*)

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If the session is recorded, you will be asked to sign an additional consent form to this aim.

The researcher administering the test is ((NAME and SURNAME)).

If you are willing to participate, please confirm the following statements by signing at the end of this document.

- I have read and understood the information given for this research or have had the information read to me,
- I have had the opportunity to ask questions about the research.
- I consent to take part in the research sessions.
- (if applicable) I consent to being recorded in audio/video/(...) form.

Name of the participant	Date	Signature
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Name of the researcher	Date	Signature
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Name of the ethical adviser	Date	Signature
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CONSENT FORM (alternative oral version, to be recorded)

Project: EasyTV (*Easing the access of Europeans with disabilities to converging media and content*)

Your participation in the tests is absolutely voluntary.

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- Have you been read the information about the project and have you understood it?
Please reply yes or no. (oral reply)
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- Do you consent to take part in the research sessions? Please reply yes or no. (oral reply)
- (if applicable) Do you consent to being recorded in audio/video/(...) format? Please reply yes or no. (oral reply)

Please indicate your name: (oral reply)

Please indicate the date: (oral reply)

Please indicate the researcher's name: (oral reply)

Please indicate the ethical adviser's name: (oral reply)