

Dutch Sign Language Mixed Reality App

A Proof-of-Concept Dutch Sign Language (NGT: Nederlandse Gebarentaal / SLN: Sign Language of the Netherlands) learning system to teach hearing-impaired (hard of hearing and deaf) young adults the finger alphabet, consisting of a Meta Quest Mixed Reality application.

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Context of use: Education

Technology Impact Cycle Tool

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Impact on society

What impact is expected from your technology?

What is exactly the problem? Is it really a problem? Are you sure?

Currently, you can learn Dutch Sign Language both free and paid via apps and (online and / or study) courses or from a hearing-impaired friend or family member, of course.

However, (online and / or study) courses are not immersive and are difficult to convey and understand, since someone who already knows sign language needs to teach someone who cannot hear (well) how to use sign language. In addition, apps are not interactive and might go too fast. Moreover, when a friend or family member teaches you it, you are heavily reliant on their availability and teaching skills.

Are you sure that this technology is solving the RIGHT problem?

Yes, it aims to tackle the problem of hearing-impaired people having no motivation to learn it, even though it would improve their lives drastically.

How is this technology going to solve the problem?

Making learning sign language more accessible, as you can learn it whenever (you do not have to leave your home) and for how long you want, you only have to purchase it once, it is very immersive and there is no language barrier when learning it.

I interviewed some experts already and I am planning to take interviews and surveys with more experts and people who are hearing-impaired themselves. I already conducted the literature study. Later, I want to execute user tests too.

What negative effects do you expect from this technology?

They could become averse or addicted to VR headsets. Also, since there is no human interaction, they could start to dislike the product. I accept these negative effects, since they can happen to the alternatives as well.

In what way is this technology contributing to a world you want to live in?

A world which is more inclusive to and informed about deaf and hard of hearing people and their language and in which hard of hearing and deaf people can communicate much better with their loved ones. I have experienced the latter problem firsthand with a family member and do not wish this upon anybody else. On top of that, I find it not excusable that, even since Dutch Sign Language got recognized in 2021, there is barely any attention to it within society.

I have yet to read into the ethical guidelines.

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Now that you have thought hard about the impact of this technology on society (by filling out the questions above), what improvements would you like to make to the technology? List them below.

Studying the ethical, accessibility etc. guidelines and incorporate those best practices into my project.

Furthermore, I have to think about how to motivate people to start and keep using my solution and how to actually apply it in real life.

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Hateful and criminal actors

What can bad actors do with your technology?

This category is only partial filled.

In which way can the technology be used to break the law or avoid the consequences of breaking the law?

Given the fact that the solution makes use of the Meta Quest headset by Meta, which has recently been exposed for illegally viewing videos of the cameras in the headset, it is possible that the technology violates the privacy of the user.

Can fakers, thieves or scammers abuse the technology?

This question has not been answered yet.

Can the technology be used against certain (ethnic) groups or (social) classes?

This question has not been answered yet.

In which way can bad actors use this technology to pit certain groups against each other? These groups can be, but are not constrained to, ethnic, social, political or religious groups.

This question has not been answered yet.

How could bad actors use this technology to subvert or attack the truth?

This question has not been answered yet.

Now that you have thought hard about how bad actors can impact this technology, what improvements would you like to make? List them below.

This question has not been answered yet.

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Privacy

Are you considering the privacy & personal data of the users of your technology?

This category is only partial filled.

Does the technology register personal data? If yes, what personal data?

Yes, name, contact information, interests, location history and more.

Do you think the technology invades the privacy of the stakeholders? If yes, in what way?

This question has not been answered yet.

Is the technology is compliant with prevailing privacy and data protection law? Can you indicate why?

This question has not been answered yet.

Does the technology mitigate privacy and data protection risks/ concerns (privacy by design)? Please indicate how.

This question has not been answered yet.

In which way can you imagine a future impact of the collection of personal data?

This question has not been answered yet.

Now that you have thought hard about privacy and data protection, what improvements would you like to make? List them below.

This question has not been answered yet.

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Human values

How does the technology affect your human values?

This category is only partial filled.

How is the identity of the (intended) users affected by the technology?

It makes communication much more accessible and thus expands the users' opportunities. It does replace the role of a human, though.

How does the technology influence the users' autonomy?

This question has not been answered yet.

What is the effect of the technology on the health and/or well-being of users?

This question has not been answered yet.

Now that you have thought hard about the impact of your technology on human values, what improvements would you like to make to the technology? List them below.

This question has not been answered yet.

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Stakeholders

Have you considered all stakeholders?

This category is only partial filled.

Who are the main users/targetgroups/stakeholders for this technology? Think about the intended context by answering these questions.

Name of the stakeholder

Young hard of hearing and deaf people

How is this stakeholder affected?

-

Did you consult the stakeholder?

No

Are you going to take this stakeholder into account?

No

Name of the stakeholder

Loved ones of young hard of hearing and deaf people

How is this stakeholder affected?

-

Did you consult the stakeholder?

No

Are you going to take this stakeholder into account?

No

Did you consider all stakeholders, even the ones that might not be a user or target group, but still might be of interest?

-

Now that you have thought hard about all stakeholders, what improvements would you like to make? List them below.

This question has not been answered yet.

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Data

Is data in your technology properly used?

This category is only partial filled.

Are you familiar with the fundamental shortcomings and pitfalls of data and do you take this sufficiently into account in the technology?

N/A

How does the technology organize continuous improvement when it comes to the use of data?

This question has not been answered yet.

How will the technology keep the insights that it identifies with data sustainable over time?

This question has not been answered yet.

In what way do you consider the fact that data is collected from the users?

This question has not been answered yet.

Now that you have thought hard about the impact of data on this technology, what improvements would you like to make? List them below.

This question has not been answered yet.

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Inclusivity

Is your technology fair for everyone?

This category is only partial filled.

Will everyone have access to the technology?

This question has not been answered yet.

Does this technology have a built-in bias?

Yes, it assumes all deaf and hard of hearing people are able to see and are flexible in their hands, which is not the case. Additionally, it assumes that everyone's memory works the same, in spite of the fact that society is neurodiverse. Also, it assumes that the user wants to learn Dutch Sign Language without a dialect, although speaking a dialect might be more convenient, and that everyone can afford a Meta Quest headset, even though the poor keep getting poorer.

Does this technology make automatic decisions and how do you account for them?

This question has not been answered yet.

Is everyone benefitting from the technology or only a a small group?

Do you see this as a problem? Why/why not?

This question has not been answered yet.

Does the team that creates the technology represent the diversity of our society?

This question has not been answered yet.

Now that you have thought hard about the inclusivity of the technology, what improvements would you like to make? List them below.

This question has not been answered yet.

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Transparency

Are you transparent about how your technology works?

This category is only partial filled.

Is it explained to the users/stakeholders how the technology works and how the business model works?

Yes, there will be an onboarding and there will be explanations during the learning process.

There is no business model for this project.

If the technology makes an (algorithmic) decision, is it explained to the users/stakeholders how the decision was reached?

This question has not been answered yet.

Is it possible to file a complaint or ask questions/get answers about this technology?

This question has not been answered yet.

Is the technology (company) clear about possible negative consequences or shortcomings of the technology?

This question has not been answered yet.

Now that you have thought hard about the transparency of this technology, what improvements would you like to make? List them below.

This question has not been answered yet.

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Sustainability

Is your technology environmentally sustainable?

This category is only partial filled.

In what way is the direct and indirect energy use of this technology taken into account?

The user can change the settings on their headset, e.g. the brightness, to limit the app's energy consumption. For the app specifically, I still need to think about it.

Do you think alternative materials could have been considered in the technology?

This question has not been answered yet.

Do you think the lifespan of the technology is realistic?

This question has not been answered yet.

What is the hidden impact of the technology in the whole chain?

This question has not been answered yet.

Now that you have thought hard about the sustainability of this technology, what improvements would you like to make? List them below.

This question has not been answered yet.

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Future

Did you consider future impact?

This category is only partial filled.

What could possibly happen with this technology in the future?

Society would get more sign language friendly and understand and get more empathy for hearing-impaired people.

Sketch a or some future scenario (s) (20-50 years up front) regarding the technology with the help of storytelling. Start with at least one utopian scenario.

This question has not been answered yet.

Sketch a or some future scenario (s) (20-50 years up front) regarding the technology with the help of storytelling. Start with at least one dystopian scenario.

This question has not been answered yet.

Would you like to live in one of this scenario's? Why? Why not?

This question has not been answered yet.

What happens if the technology (which you have thought of as ethically well-considered) is bought or taken over by another party?

This question has not been answered yet.

Impact Improvement: Now that you have thought hard about the future impact of the technology, what improvements would you like to make? List them below.

This question has not been answered yet.