praise

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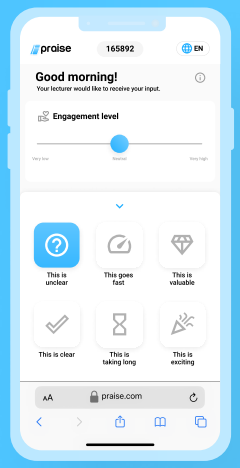
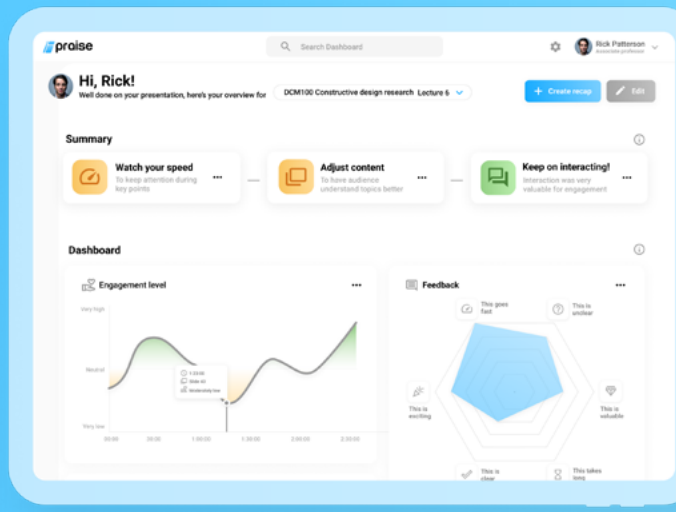
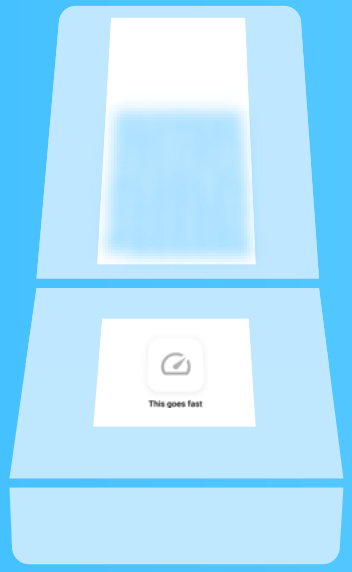
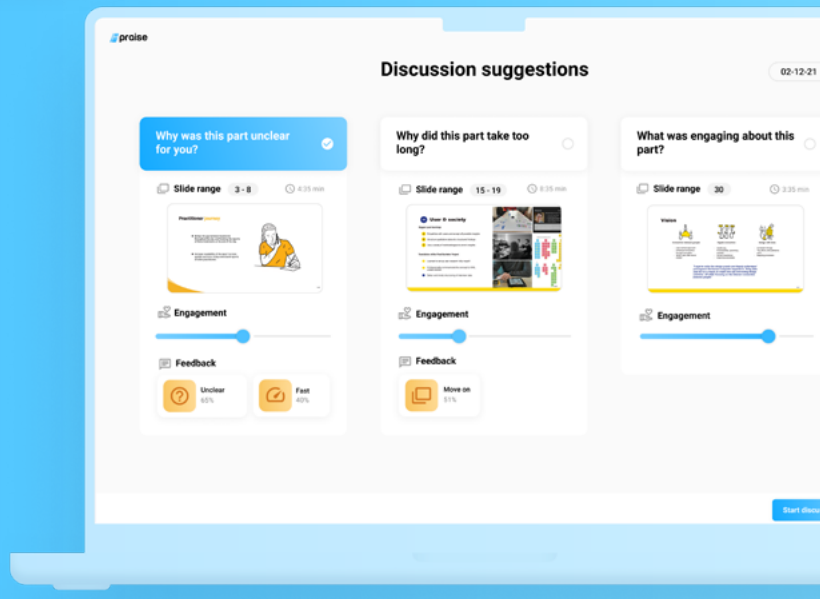






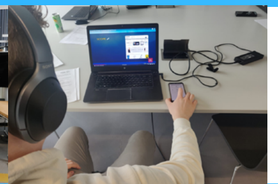
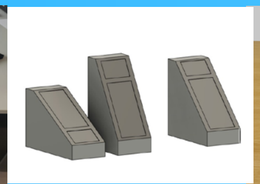


Executive design summary

PRAISE is a collection of devices and interfaces that facilitate communication between presenters and their audience with the purpose of generating feedback. The system contains several components that support this purpose; An audience interface that allows listeners to express their engagement level and immediate feedback points, a presenter device that expresses the engagement level and feedback to the presenter, a discussion interface that facilitates a conversation between presenters and their audience, and a reflective dashboard that contains quick and easily accessible feedback generated by the data gathered during the presentation. To support a larger group of users, the system has modularity when it comes to the presenter device and reflective dashboard, and is also suitable for online use.

Through these components the system assists audiences with communicating their feedback and experience to the presenter in an anonymous, non-intrusive and non-confrontational way. It then assists the presenter by using AI to process this information and connect it to speech data in order to identify moments of improvement or highlights within the presentation that gained a noteworthy response from the audience, communicating them in an easily accessible way while also giving insight into the data that was used to identify these moments.

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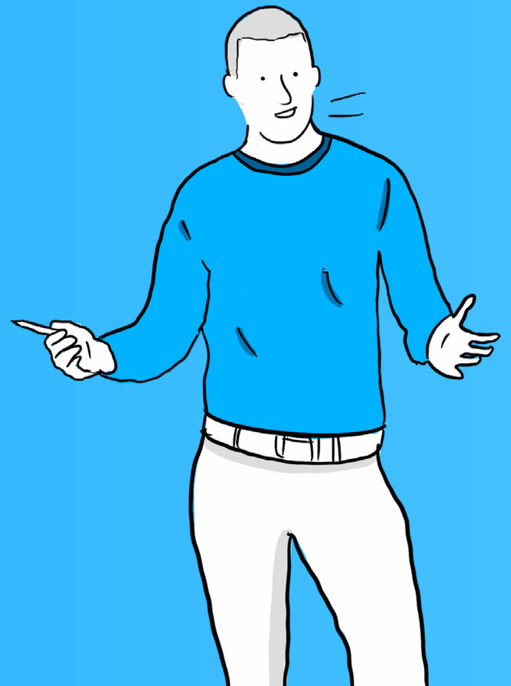
Introduction

This report outlines the vision, design process and result of the M1.1 design project of Gino Althof, Niek van Berk, Zhanhong Su and Jelle Wijers. The project was done under the supervision and coaching of J. Huang and D. Kim as part of the ARTIFICE squad at the ID department of Eindhoven University of Technology, and spans one semester of roughly 17 weeks.



Design space & vision

The objectives of this design project were defined through a combination of personal interests and squad topics. The wide application domain of artificial intelligence and the functionalities that this supports allowed us to explore themes of identity, communication and the role of AI. Exploring these topics led us through a path of design for attention, discipline, and ultimately engagement.

Our design space ended up being about the way we can use information and AI to improve the quality of a presentation (or set of subsequent presentations) in order to increase the engagement of audience members. The goal is to help presenters gain feedback from the audience, using methods for processing and delivering that feedback to the presenter in a clear and timely way.

Within this design space themes came up throughout the process that proved important and provided a throughline, as well as inspiring our vision of the design.

Anonymity

The anonymity of audience members allows them to provide feedback without the risk of 'backlash' or judgement. If a system is not sufficiently anonymous it may reduce the likelihood of audience members engaging with it.

Confrontationality

Information communicated to the presenter needs to be neutrally or positively-toned, non-confrontational and non-obtrusive. This encompasses the frequency and timing of feedback as well as expressing it in a tone that doesn't feel accusatory, overly critical, or mean-spirited. Ensuring balance of positive and negative feedback is also important here.

Control

The system should not create a conflict of control; audiences should feel like their feedback is being considered and incorporated without pressuring the presenter to feel like they need to answer the audience's every desire. A design that gives the audience too much power may lead to a presenter being thrown off or pressured, while a design that gives the presenter too much leniency might lead to feedback not being considered at all.

Experience

The system should be usable for presenters of different experience levels, and should allow them to engage with the system in a way that is compatible with their needs and skill.

Specificity

Feedback should be specific to the audience. One crowd might have different needs than another, and AI provides an opportunity for feedback that reflects the needs of that audience. Generally applicable 'presenting tips' that apply to every audience aren't a design challenge, and don't need to be answered using AI.

Methodology & process

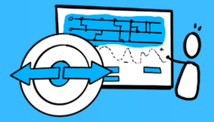
To explore different design opportunities within the field of AI we looked at application areas that were of interest to us as designers, as well as interesting topics within AI that were worth exploring such as identity, assertivity, purpose. We even looked at personal goals or hindrances people may experience where AI could provide assistance. Through a combination of both physical and digital topic mapping we identified some challenges or opportunities to design around, which we further explored through sketching, reading and further mapping.

Iteration 1

Brainstorm & exploration

Exploration areas & bodystorming

Exploratory interviews



Scoping & journey

Conceptualisation

Iteration 2

Midterm evaluation

User tests (2x)

Insight mapping

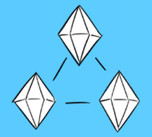
Needs, requirements & design challenges

3rd iteration on next page

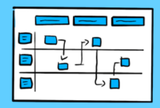
Iteration 3

Iteration on prototype

Prototyping & realisation

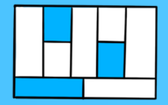


Design values



Concept & AI scenario

Future work



Business strategy

Related work

Related research

This section describes which components factor into the engagement of a listener, as well as which aspects and components influence the behaviour of both a speaker and listener. The following studies relate most strongly to our design process and proved the most informative overall, as they connect to our themes and design decisions, They provide a grounded framing to our design vision and assist in understanding the important design aspects.

Attention and Engagement

As part of a study on engagement by Attfield, Kazai, Lalmas and Piwowarski (2011) an analysis of papers was performed in order to identify characteristics of engagement. These characteristics span emotional engagement, cognitive engagement, and behavioural engagement.

Aspects of engagement include; focusing attention and the exclusion of other things, a positive/affective experience, sensory appeal, willingness to repeat, novelty/unfamiliarity, control richness/variety, trust/reputation, and user incentives. In order to properly evaluate how engaged a listener is with a presentation we need to consider how our design affects these components (such as focused attention). Aspects such as user incentives, willingness to repeat, trust/reputation and control richness are also important to our design itself as we want users to feel incentivized to use the system and provide feedback.

Speaker and listener behaviours

We can learn about involvement, control richness and user incentives from a study by Bavelas, Coates and Johnson (2000) which addresses the role of the listener during storytelling and the distinction between monologue and dialogue. Allowing listeners to co-narrate helps illustrate a story and has an effect on the narrator's performance. While this study covers a more one-on-one or dialogue-based setting, we believe that its concept of co-narration and involvement could extend to other settings that involve speakers and listeners.

Feedback confrontation

Chollet et al. (2015) trained an interactive learning framework that registers a speaker's audiovisual behaviour and provided immediate feedback on it in three scenarios; no feedback, direct visual feedback (colour gauges), and nonverbal feedback of a virtual audience (body language, nodding etc.). It finds that virtual audiences have the advantage that their behaviour can be manipulated in a way that is appropriate for customising training. It also finds that the fear of negative evaluation lowered in front of a virtual audience compared to a human audience. The former connects to our considerations of different experience levels, and both of these findings are relevant to our point of confrontation.

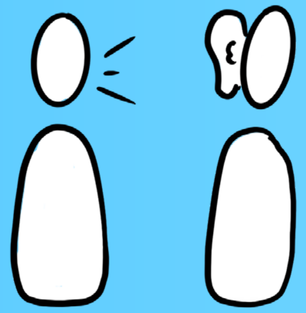
A survey conducted as part of the study by Bergstrom, Harris and Karahalios (2011) shows that students are less comfortable expressing dissatisfaction and ambivalence in a classroom environment compared to satisfaction and enthusiasm. The discomfort students have when expressing negatively toned feedback suggests that the point of confrontation may extend to the audience as well, and that anonymity might be a solution to this side of the confrontation issue.

Related Designs

In order to inspire our process and final design, it is important to place it into the context of existing work and see which components of them we can apply or recognize in our own process.

Curtis, Jones and Campbell (2015) carry out a study that explores the audience's interpretation of good speaking techniques through audience-rated speaker qualities, as well as video analysis done to extrapolate the level of engagement. Through this it extrapolates a likert-scale engagement level, and connects this against the audio-visual features of the presentation video. Through this it was able to predict the specific engagement level of an audience with roughly 70% accuracy. This study's achievement implies the potential of a system's ability to comprehend and learn audience-specific needs/factors of engagement and connect them to speaker's qualities. This supports the importance and plausibility of our point of specificity.

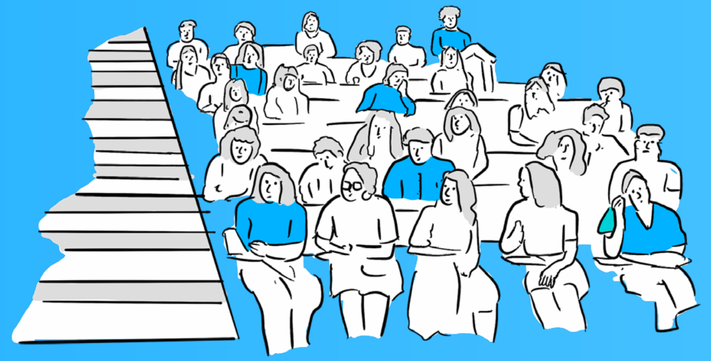
Bergstrom, Harris and Karahalios (2011) establish that anonymous ways to provide feedback and initiate dialogue reduce evaluation anxiety, and evaluate this through the FSM (Fragmented Social Mirror) which uses iconography to allow students to provide feedback in an expressive yet anonymous way. In settings of roughly 100 students, it found that anonymity increased discussion and feedback opportunities and engagement, but open text fields during a class session also allowed for disruptive behaviour and attempts at humorous or distracting comments. It suggests the benefit of mechanisms that prevent this type of interaction. Its implementation and findings are relevant to our topic of anonymity, as well as conflicts of control.



The design process

The design process covers several iterations and the design practises leading up to them. We consider to have three major iterations (the ones presented at the midterm demoday, user testing, and final demoday) with several smaller adjustments throughout covering the ideas generated from the initial ideation stage as well as the state of the concept at pre-demoday.

The process includes primarily ideation and conceptualization surrounding the period of iteration 1, evaluation and user testing around the period of iteration 2, and realisation and value scenarios leading up to our final iteration.

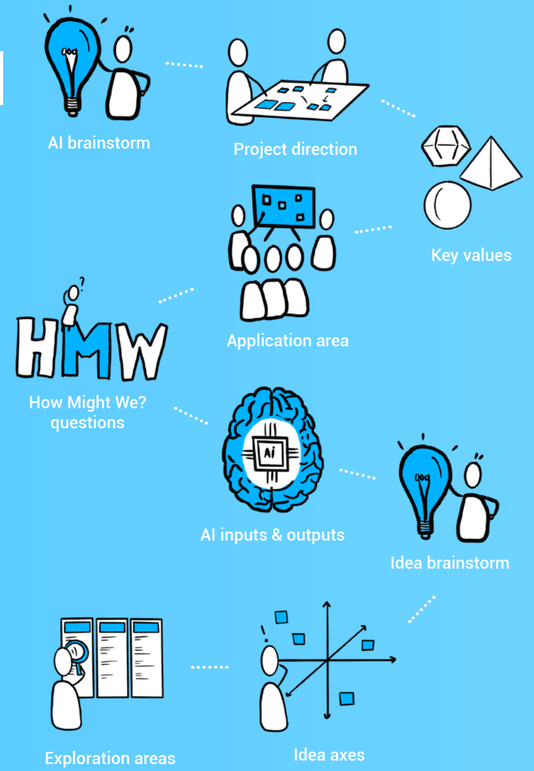


Iteration 1

Brainstorm & Idea Generation

The project was kickstarted through means of a brainstorming session held to come up with a project direction which would benefit from the introduction of Artificial Intelligence.

Exploration process



Creating discipline

By writing down project directions a large variety of possibilities came forward. The most notable direction that was brought into the discussion was creating discipline through means of AI. We felt it created interesting design challenges regarding control and assertivity of AI. From there a variety of questions were created to specify this project direction and user we would design for (Figure 1). As a result, several key values about discipline were listed. These values include; habits, distraction/attention, focus and control.

Figure 1: Brainstorm for AI project Direction

Presentations & engagement

Through discussion several application areas to improve distraction and attention were listed. The biggest interest was shown within the application area of presentations where the values mentioned before appeared highly applicable. Next to this, the overarching goal of improving the engagement level of meeting/audience members was set as most important. To start ideating a large amount of 'How Might We?' questions were created (Figure 2). The 'How Might We?' questions were then used to ideate on ideas to improve engagement level within meetings/presentations using AI based technologies and interaction.

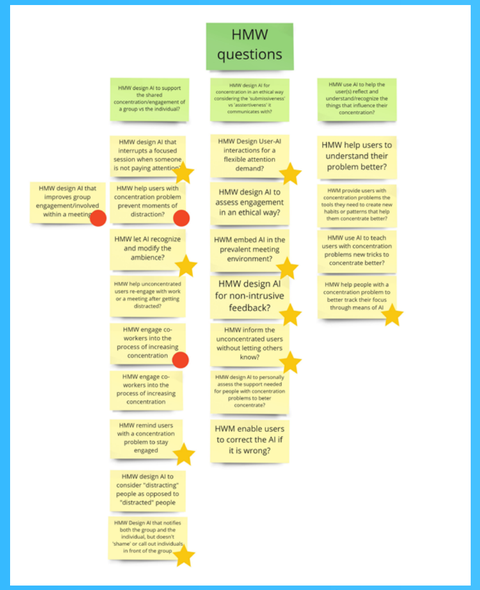


Figure 2: How Might We? questions for project direction

Based on the ideation different axes were created mapping the different (AI) interactions present in the ideation.

1. **Direct - Subtle**
   - Direct meaning taking the stage and taking attention within a presentation
   - Subtle meaning to be in the peripheral view, ambient, not taking away attention.
2. **Individual - Group-based**
   - Individual meaning only used by one person within a presentation, only individual interaction present.
   - Group-based meaning supporting a discussion or being used by multiple users at once.
3. **Immediate - Reflective**
   - Immediate meaning an interaction during the presentation to improve it immediately.
   - Reflective meaning a reflection on the presentation afterwards to improve it for next presentations.

Figure 3: Idea brainstorm

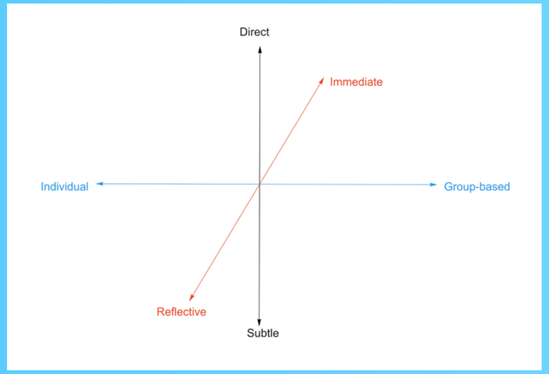


Figure 4: Idea Axes

The idea axes gave a good direction to ideate further on ideas with several types of features, and are reminiscent of some of the design themes that would later become important in the process.

Exploration areas

The (AI) prototyping workshop helped to define the presentation's setting and corresponding objects, skills and meanings (Appendix 03). As a result, the possible data inputs and outputs were ideated on to show possible opportunities for the use of AI within the presentation setting (Figure 5). It appeared many different types of data could be gathered and used by an algorithm to help the presenter present better or help audience members engage more during presentations.

Using the earlier ideation, the axes matrix, the Artificial Intelligence inputs/outputs and research about existing AI designs for presentations, possible exploration opportunities were defined within the prototyping workshop (Figure 6) (Appendix 04). As a result 4 explorations were chosen to tackle in the next part of the project to investigate possible presenter/audience interactions and find interesting opportunities for Artificial Intelligence to play a role in this project setting.

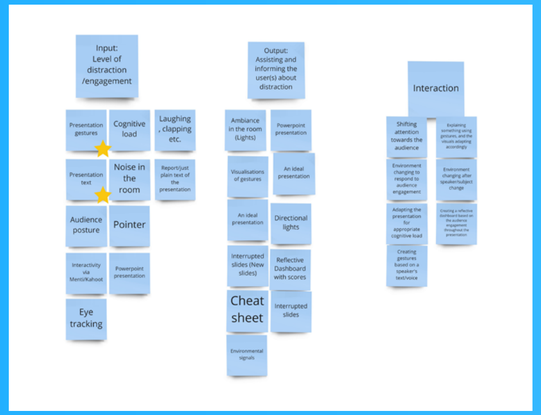


Figure 5: AI inputs & outputs

Explorations

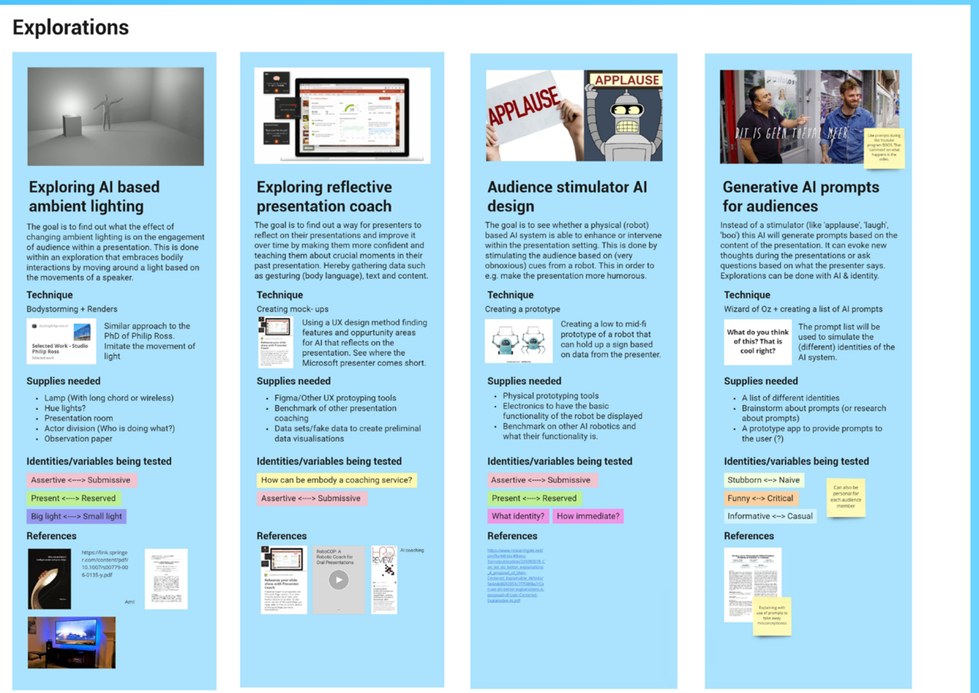


Figure 6: Exploration areas including explanation

Exploration-related research

Additional research was done that was relevant to the explored concepts, either the help evaluate them or inform them. They promoted new ideas surrounding gesturing, visual stimuli and audience engagement, and helped identify important components of gesturing or other visual stimuli.

To start, investigation into existing technologies or services regarding presenter skill was conducted. The 'Microsoft Presenter Coach' (Microsoft, n.d.) uses Artificial Intelligence to help presenters rehearse their presentations. 'RoboCOP' (Trinh, Asadi, Edge & Bickmore, 2017) is a robot that supports presenters using visual and textual feedback using conversational coaching. Research about ambient lighting showed that ambient lighting can improve attention and engagement (Sharma, Kumar & Bhardawaj, 2014).

Aripin, Noorezam & Rahman (2020) address the concept of 'kinesics' during oral presentation. Kinesics encompasses the gesturing, body movement, eye contact and facial expressions used by speakers to provide meaningful information to listeners. When used by English Second Language speakers, kinesics allows them to speak more confidently and alleviate their speaking anxiety, and the study suggests investigating the value of kinesics in other contexts that involve speakers and listeners. Understanding the importance of kinesics in part inspired us to design for gesturing.

A study by Alibali, Heath & Myers (2001) separates gesturing into two types of gestures; representational gestures and beat gestures. Representational gestures use handshape and motion to depict content related to the speech, while beat gestures are simple and rhythmic without the intent to depict content. In a setting where a speaker isn't visible for the audience, gesture production lowered when it came to representational gestures, but beat gestures didn't decrease. This means the role of beat gesturing may serve not just the audience, but also the speaker's own internal processes. Through this we can understand the reason why presenters gesture, and what values it may have outside of the representational usage.

Kaschak et al. (2005) investigates a proposal that sentences are understood by creating a perceptual 'simulation' of the described events. In a scenario where participants listened to sentences where motion in a particular direction was described (e.g. 'the cat climbs up the tree') responses to the sentence were faster if they were paired by stimuli depicting motion in the opposite direction rather than in the same direction. In contrast, earlier studies by Glenberg & Kaschak (2002) and Zwaan (2004) found that response is faster if the additional stimuli match the content of a sentence. This means definitive answers to how the connection between visual stimuli and language processing works aren't answered by these studies, but both imply the value of visual stimuli when it comes to language processing. This helps us understand the importance of visual stimuli and its opportunity for design.

Gestures, lighting & prompts

Based on the previous exploration areas and research, the decision was made to explore gestures, lighting and prompts during a presentation. These were chosen because gesturing influences the engagement of the audience, while the lights were chosen because they could provide different ways of creating visual stimuli during a presentation.

Bodystorming

Up until now, the concepts were drawn out or rendered to communicate our ideas, but it is hard to experience lighting changes when it is not possible to be there in real life. To understand the effects better on both the presenter and the audience, we bodystormed different methods of changing lights in a classroom. (Jaasma, Trotto & Hummels, 2014)

In the first explorations, the focus was on ambient light versus direct light. There was one presenter, one member with a light, and someone recording for analysis later on. In the first setup, a light was pointed towards the wall behind the presenter, so the light resembled a spot light. The light would follow the gestures of the presenter on the wall. Explorations were done with the size and focus of the beam (Figure 7). In the second setup the brightness of the existing lights were changed according to the presentation. With this, the lights would turn on above the audience when a question is asked, and become brighter on the presentation when the presenter is showing something specific there.

Figure 7: Screenshot from the bodystorm video

Some other ideas without lights were explored as well. The first concept that was explored was audience prompts. In this concept, the audience would receive prompts when they should laugh or ask questions (Figure 8.1). We were interested to see how an increased response would affect the confidence of a speaker, even if forced. The second concept was dynamically changing slides. The slides would move around objects based on what the presenter was talking about and gesturing (Figure 8.2). We imagined this could help the explanatory ability of gesturing.

After recording all these scenarios, we looked at them from a presenter and audience perspective, and reflected on them. The audience prompts were disliked as they felt too forced and removed the flow of the presentation. The adaptive slides were very interesting, but had the potential to become very chaotic. The same goes for the spotlight that followed the gestures. It was engaging for a moment, which would be great to get the attention back of the audience, but too chaotic to be present all the time. The ambient lighting produced the same response, only less chaotic. None of our experiences gave the impression they would work the whole presentation, but they all were interesting to use for certain moments in a presentation, to change it up a bit.

Figure 8: Screenshots from the bodystorm video

Exploratory interviews

After the exploration it became important to specify the concept further into a first version prototype. Interviews were held in groups, with several audience members and an expert presenter to investigate needs, pains, gains and activities (Lewandowski, 2016) (Figure 9).

The exploratory interview topic guide that also contains a consent form (Appendix 06, 07) comprises three different parts, including:

1. Questions about being an audience member
2. Questions about presenting
3. Showing the video of the bodystorming exercise done earlier

The questions mainly focused on a scenario where a presenter tries to engage their audience . Three students were interviewed as audience members. One lecturer was interviewed. Both the students and the lecturer were asked about their experience as both an audience member and a presenter.

The exploratory interviews made clear that both the students (S) and the lecturer (L) interviewed lay the responsibility for an interesting lecture (and thus a high level of engagement) with the lecturer: “A good presenter can make boring topics very interesting.” (S1) and “I lay the responsibility with myself. Maybe I didn’t tell the story interestingly.” (L1). This means the presenter is usually in control over the audience’s engagement. Though external factors like mobile phones may distract, such distraction is caused by boringness for the presentation: “Boringness makes me feel distracted.” (S2). Instead students referred to aspects that make a presentation good as being influential.

Another interesting finding was that the lecturer indicated to be less nervous and improvise more than the students. Additionally, the lecturer knows the audience’s status better than students: “Maybe from their gaze I know maybe 60-70 percent how distracted they are.” (L1). The students interviewed would generally like to focus on presenting rather than feeling if the audience is engaged: “As a student this would cause me more stress.”. This indicates different skill/experience levels that relate to the design theme of ‘experience’.

Lastly, the general consensus about the bodystorm video was that lighting and prompts reacting to gestures or the presentation were quite distracting. Being similar to the findings of our group. Additionally, what the movements meant and what they were for wasn’t clear: “[it] is very distracting. Both as audience and presenter.” This is because they grab quite a lot of (peripheral) attention and distract both audience and presenters, negatively influencing engagement levels.

Figure 9: Interview notes

Scoping & user journey

Following the exploratory interviews it became clear several key decisions about the project scope needed to be done before moving onto further conceptualization and iteration. This meant determining:

1. The user group
2. The type of presentation
3. Goal of the presentation

Thus, determining the setting and goal for the continuation of the project.

User group

As mentioned before, within the exploratory interviews it appeared the presenter has the main responsibility in making a lecture interesting. As could be seen from the interviews, external distractions only play a small role. As a result, the decision was made to design for presenters as the main user as they are what makes or breaks a presentation.

To specify the user group more, it was decided to focus on teaching settings. Within the exploratory interviews an interesting dynamic was found between presenters and students. Creating a teaching relationship where there is a clear need for improving presentations for both students as well as presenters.

(Context) Type of presentation

The type of presentation consequently became a physical lecture within a university setting. This meant having a room with students watching a presentation using slides while taking notes on a laptop or in a notebook. Additionally, interactivity with the audience is possible.

Lastly, the scale of the presentation needed to be decided as it was discussed that presenting for a bigger audience differs from presenting for a smaller audience (Garder & Martinko, 1988). From interviews we found that presenting for a larger audience makes it more difficult for presenters to keep an overview of engagement levels and to tailor the presentation to the needs of all students. Additionally, lectures are mostly given to larger groups of students. Hence the presentation scale was set to 30-100 people. Keeping a large, but fitting range for this setting.

Goal of the solution

At last, it became important to set the goal of the solution which could be used when conceptualising the system/service/product. Through discussion and by looking back at the earlier brainstorm the goal of the solution was set as follows:

"Assisting the presenter in developing skills to become more engaging as a speaker, maintain the attention of the audience and consider their specific needs"

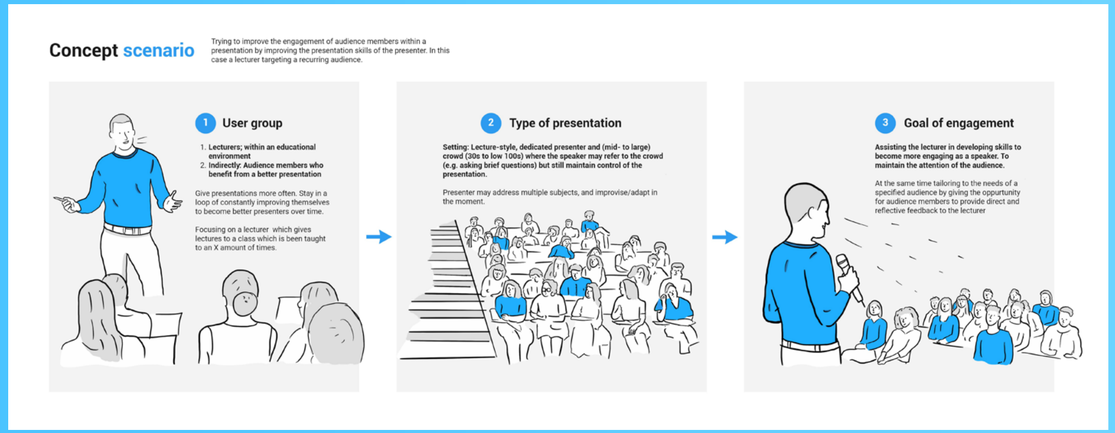


Figure 10: Concept scenario

Journey

Using the exploratory interviews and the defined scope a user journey (Figure 11) was created to show the presentation process and related pain points, gain points and emotions. This journey provided a better view of the setting and therefore could be used to create a fitting concept within a multi-facetted scenario.

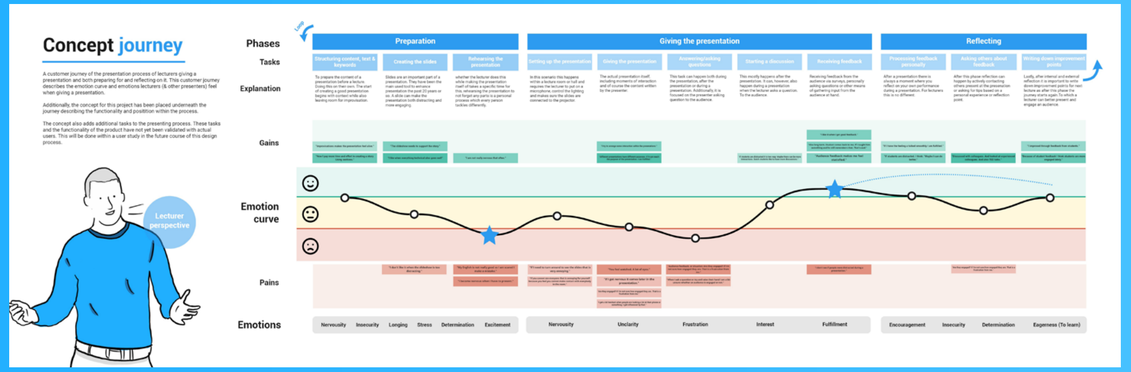


Figure 11: Lecturer journey

Ideation assessment & Conceptualization

After creating the journey using the scenario & preliminary insights, the ideas from the exploration were assessed. Using the journey several key moments within the process ('moments of truth') (Kai, 2010) were identified to which a new concept was created.

Assessing explorative concepts

Looking back at the initial exploration the explored concepts were all situated within the presentation phase of the journey. Trying to make the presentation better whilst the presentation was going. Additionally, the earlier concepts didn't take into account the audience as a user. The explored concepts therefore did not fit the current scenario. Considering the audience as a user in addition to the presenter ended up being part of our theme of control.

By mapping the 'moments of truth' (Figure 12) onto the journey it became clear the concept should play a role in the two other phases as well. The journey shows that preparation and reflection is an integral part of improving presentations (De Grez, Valcke & Roozen, 2009): "I improved through feedback from students." (L1). Additionally, the concept would intervene less with the actual presentation to minimise distraction and have more focus on presenting itself.

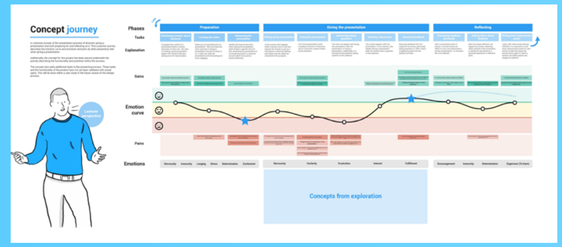


Figure 12: Journey for explorative ideas

Through discussion a new concept was created that consists of 3 parts spanning across the scenario:

1. Audience input device
2. Presenter device
3. Reflective interface

The audience device (Figure 13) is a turning knob with which audiences can indicate their preference. This form of input was chosen because it seemed non-intrusive/peripheral and low-effort, which we expected would lead to increased usage and a lower attention demand (Bakker & Niemantsverdriet, 2016). Inputs like facial recognition, body posture and eye movement were omitted because of their intrusive nature and their tracking limitations regarding different room sizes and audience size, and relative inaccuracy (Chang, Zhang,

Figure 13: Physical audience input device prototype

Chen & Liu, 2018).
The presenter device shows the audience engagement level during a presentation to the presenter only, indicating to presenters when engagement levels are lower. Simultaneously this device records the lecture to gather speech data. The presenter device (Figure 14) was realised using a simple non-touch screen and a white casing. It shows a face indicating three emotions: content, uninterested or completely unengaged (sleepy). These emotions indicate the level of engagement from audiences deducted from the audience device.

Lastly, a first iteration of the reflective interface was created within Adobe XD (Appendix 14). It was decided to show simple tips based on data points gathered by the audience & presenter device. The reflective interface uses the data from the presentation and turns it into a reflective tool to assess the presentation afterwards. In this way presenters can improve on their presentations while reflecting and preparing, learning from past lectures. Reflective information rather than 'in the moment' information reduces the overall obtrusiveness and confrontation. (Figure X).

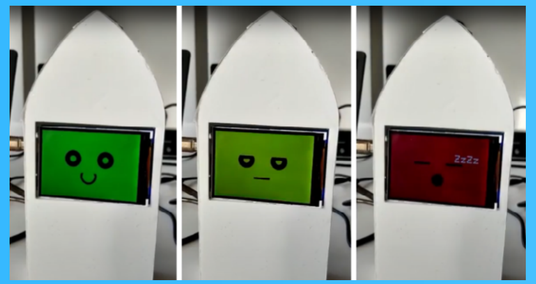


Figure 14: Presenter device and the three audience moods

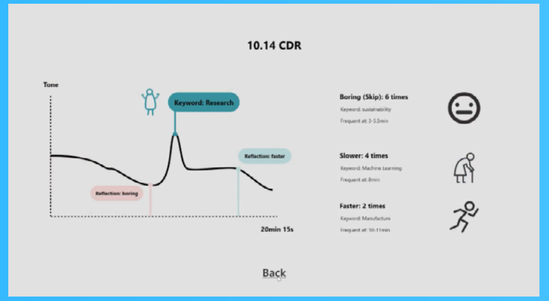


Figure 15: First iteration of the reflective interface for lecturers

The concept was mapped underneath the journey to show where in the process the parts of the system would play a role.

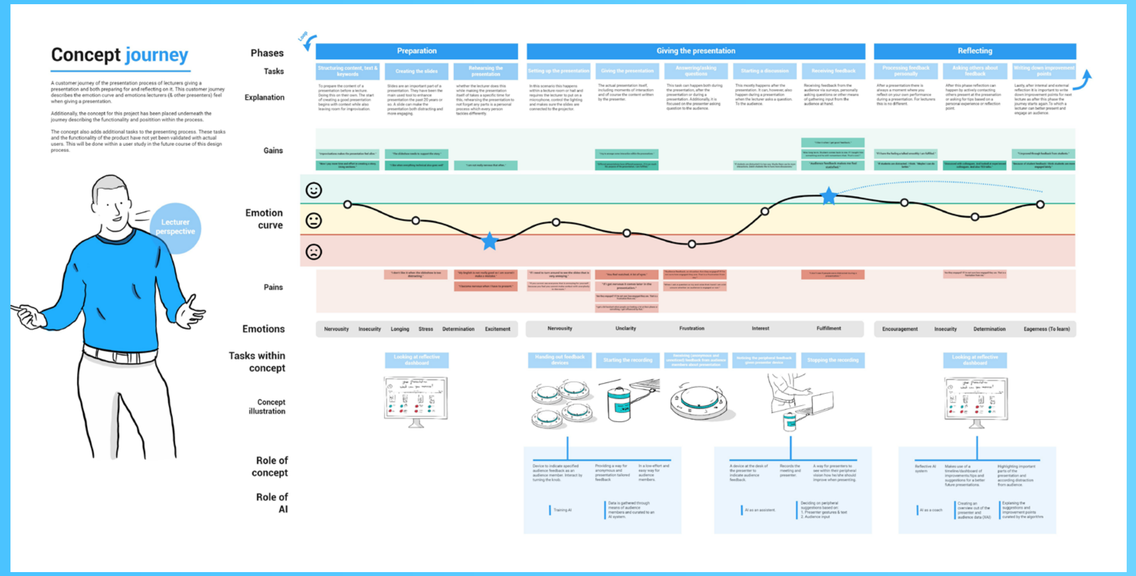


Figure 16: Lecturer journey with new concept mapped underneath

Artificial Intelligence within this concept takes the role to predict the audience input of students after a few lectures (Figure 17). The audience input data will in this concept be used as training data for the algorithm. As a result, the presenter device will be able to predict and represent engagement levels even if no audience is present based on the presenter's speech data (tone, pace, clarity etc.). Additionally, the algorithm will generate tips within the reflective interface for improving presentations based on the data from the audience. This creates specificity, as the feedback given is not just general but actually specific to the audience that a presenter is facing.

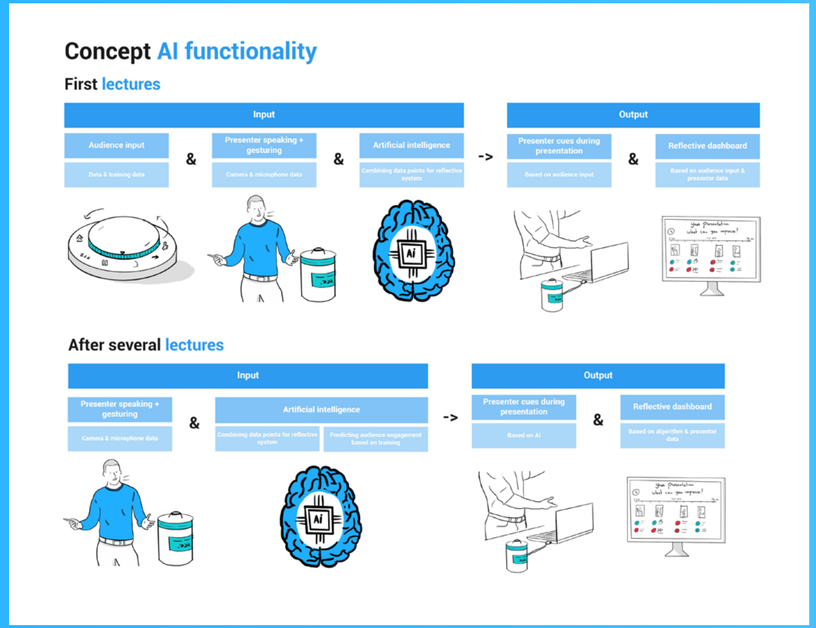


Figure 17: AI concept functionality

Figure 18: Midterm Demo Day setup

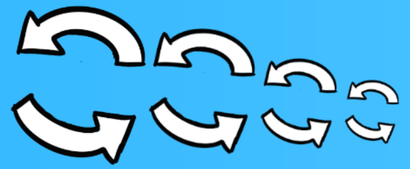
This concept was prototyped for the midterm demo-day using low-fi prototyping methods. Feedback was gathered by attendees which mainly consisted of our users: students & presenters (Figure 18).

This iteration was created to give a base overview of the different components of this system; a presenter device, an audience input mechanism, and a reflective interface. The realisations of them were simple and mostly designed in order to be an inquiry for feedback and opinion during midterm demo day.

Iteration 2

Concept iteration after midterm demo day

The second iteration covers the process from the midterm demo day to the start of user-testing. At this point we identified (and continued to identify) important themes and challenges that we need to cover with this design concept. Therefore, this iteration was created not necessarily to be the most optimal version of the system we could make at this point, but rather more like specific ‘evaluation prototypes’ that allowed us to inquire about users’ needs and opinions.



Midterm evaluation

After presenting our concept at the midterm demo day doubts came up regarding the implementability of the audience input device. In a setting that considers roughly a hundred audience members, giving each audience member one of these buttons might create substantial adoption hurdles.

In addition, the chosen colours and expressiveness in the presenter device made people feel it was too confrontational. A nervous speaker may be inclined to respond to it with an even increased anxiety, ultimately having adverse effects.

Different ways to express the feedback given by the audience to the presenter were also being discussed (regarding when, how and with which tone to do so). The iconography and language used in the input device were also points of exploration, as well as the data and information shown on the reflective interface.

Audience interface

We identified two ‘information points’ which an audience could give information about; What they want from the presenter or presentation (focus being on the presenter’s behaviour or skill or the content/ structure of the presentation), or how they are feeling about the presentation (focus being on their own experience). We separated these different points of information into ‘experiences’ and requests (Figure 19). We decided to further explore these in the upcoming user evaluation.

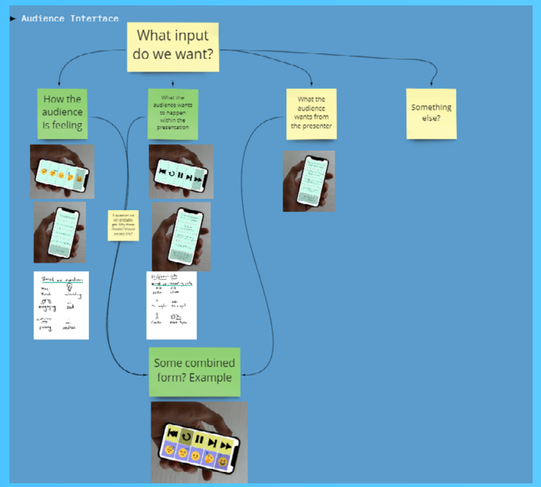


Figure 19: Audience interface exploration

Presenter device

The midterm prototype proved suboptimal when it came to the information richness/specificity and confrontationality. New mockups were created that attempted a more neutral or positive way of expressing information, and that explored different levels of complexity when it came to the information expressed. These concepts were mapped on axes of confrontation and complexity in order to get a rough idea of how the concepts compared to each other (Figure 20).

For the purpose of the upcoming evaluation the created presenter device would express ‘requests’ through iconography, and ‘emotions through colours. Through this system we hoped presenters during upcoming user tests could evaluate both the level of specificity as well the level of confrontation, and be able to comment on how they feel about the emotional state of the audience versus their more direct ‘feedback’.

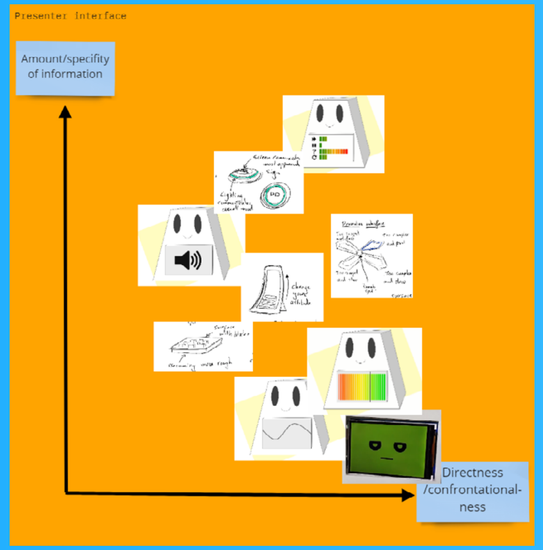


Figure 20: Presenter interface mapping & assessment

Reflective interface

The UX flow of the reflective interfaces was revised to be timeline-forward, so that feedback points could be more specific to moments within the presentation. The initial page was designed to present an overview of the timeline with specific moments of feedback. Detailed feedback and suggestions are moment-specific to help the presenters reflect on more precise points. By clicking the feedback points, corresponding sides and feedback analysis are shown.

There is also a summary part in the reflection interfaces. This part shows the pitch and speech rate across the entire presentation, as well as the specific points of feedback which can show extra information when clicked . An overview of all feedback is also presented.

User test preparation

The concept still had some uncertainties. To verify whether they were a problem or not, a user test was necessary. There were a couple of things that we wanted to verify:

- Does the audience not get distracted with this device?
- How often does the audience use the device?
- Can the audience express themselves through the options given?
- Does the presenter get distracted?
- Does the presenter do something with the information and what?
- Would the presenter get enough information?
- Would the presenter understand the reflective interface?
- Would the presenter do something with the reflective information?

Three prototypes were made to test these questions. The first one is an audience interface. This is a website with multiple button inputs. Three versions were made to test different input sets. The first set is based on emotions. The second set is based on requests. The third set combines the previous two. This prototype is connected to Data Foundry to store the inputs for later analysis. The different versions can be seen in Figure 21.

The second device is the presenter device. This device has an LED ring to visualise the general engagement level of the audience and a screen to show requests. The device can be seen in Figure 22. A first person video of a recorded presentation was linked to the video to convey the idea better.

The third prototype is a reflective interface (Figure 23). The interface was made in Adobe XD and can be clicked through like it is an actual application. The application contains different levels of information. The participant can use the interface to see specific information for the feedback or to see a summary of the presentation. A link to the application can be found in (Appendix 09).

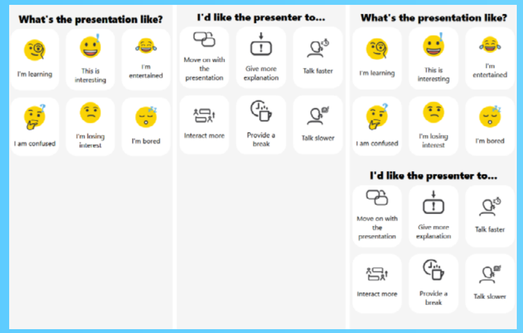
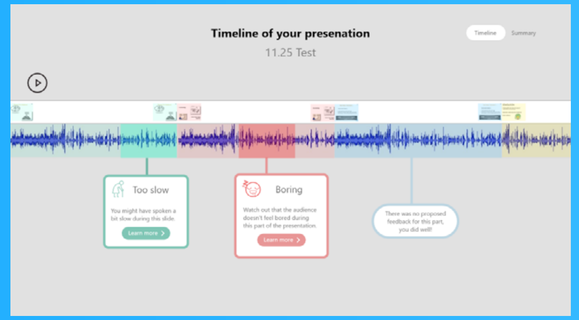
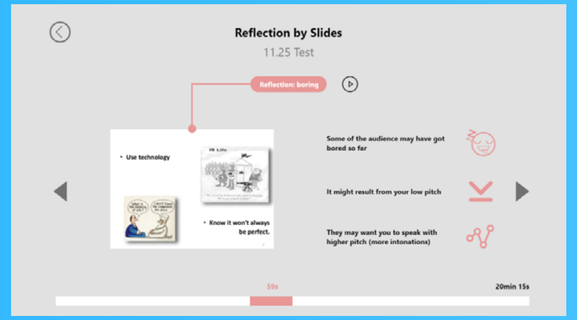


Figure 21: Audience interface user test prototype

Figure 22: Presenter device user test prototye





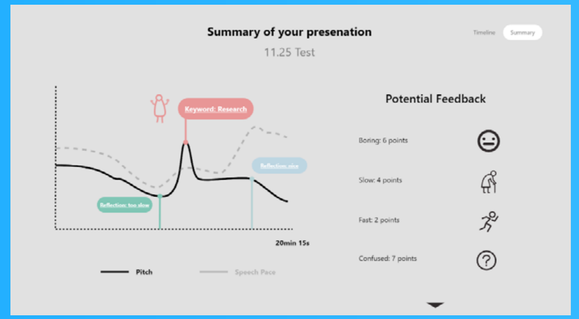


Figure 23: Reflective interface user test prototype

User test explanation

Two different user tests were conducted. One with audience members, and the other with presenters. 7 Students at TU/e participated in the Audience user test. For the presenter user test 4 student speakers with substantial presenting experience and one member of the teaching staff at TU/e participated.

Audience test (A)

Participants were given one of three input sets (emotions, requests and both).In this user test, the participants watched a small part of a video about UX design (Harvard i-lab, 2012). While watching the video, they had to fill in either their emotion, requests or both with the device. After the test an interview was held in which the participants explained their experience. A topic guide was made beforehand to structure the interview. The topic guide/interview setup can be found in Appendix 10, and the consent forms can be found in Appendix 10.

Presenter test (P)

The presenter user test consisted of two parts. In the first part the presenter device is shown and tested. In the second part the reflective interface is tested.

In the first test participants watched a video in which a presentation is given from a first person perspective. The presenter device is synced to this video, and displays information regarding engagement level and requests. In the video, different sides of the presenter were shown. For example, there were well-spoken parts and parts where the presenter spoke incoherently or too long. After this, an interview was held about the experience and to see what kind of information the participants would like to see on such a device. The complete interview setup can be found in Appendix 1-.

The second test was focused on the reflective interface. The participants were asked to think out loud while they explored the interface. They were not given any details about the interface aside from its purpose and general operation. After the participant felt like they had seen everything, an interview was held. In this interview, questions were asked about the experience of the prototype and what they think about the information provided in the prototype. The complete interview setup can be found in Appendix 10.

Figure X: Participant participating in the audience user test

Iteration 3

User study insights (Needs, requirements & challenges)

After conducting the user tests, the recordings were transcribed within Miro (Miro, 2022.). The transcriptions were divided between activities, needs, pains & gains (Lewandowski, 2016). The deduction of insights was done separately for each test as different users were targeted. After the insights, needs and requirements were deducted from the insight map (Appendix 11). These were then turned into design challenges to solve within a new iteration.

Needs & requirements

By closely examining the insight maps from both user tests several needs & requirements for both user groups were created (Figure 24) (Appendix 11). The most important needs & requirements are explained.

Phone-based interactions can be distracting for both parties:

- Audience member participants were concerned about the distraction of the device itself as "It was one extra thing to think about" (A7). As mentioned by audience participants it should be "something you see in a glance" (A1) and be low-effort to operate. Moreover, presenter participants felt like it was "really unnatural that the audience is not looking at me." (P1).

The purpose of the audience feedback must become clear for audiences. Additionally, audience feedback should not come across as too direct or rude but must still provide enough context.

- Indicating moods felt "insufficient and too personal" (A5) or even rude according to audience participants. Audience participants mentioned that: "The requests are more direct and I think the teacher can do something with them." (A3) and "The emojis are vague and I don't think the presenter would know what to do with them." (A4). Participants did feel quite unsure about what happens with their feedback: "If presenters see a point of feedback late it might derail the presentation a lot." (A7) and "I'd want to have confirmation that my 'message' was received and understood." (A4).

Too little context is gathered by the system to provide interesting feedback points:

- Two presenters strongly felt like the device gave too little context around situations: "So much context that the feedback is not taking into account. So it is difficult to really improve your presentation." (P1)

The presenter device should give quick and simple feedback, to not become distracting or even anxiety inducing:

- Participants felt like they needed to switch attention and weren't sure if they would be able to do this in a presentation: "The device is a bit distracting." (P3)

The reflective interface should give quick and easy to grasp information and it should focus on tips rather than analysis:

- The reflective interface was considered useful for presenters as it doesn't interfere with the presentation itself. Three presenter participants expressed a need for simplicity: "The reflective interface feels too elaborate to look at after every presentation." (P4).

During a presentation, feedback directly from the audience is much preferred over AI-based feedback. In the reflective interface, the application of AI is trusted more:

- Several presenter participants indicated that they didn't feel comfortable with real-time AI recommendations: "The role of AI during presentations might lead to trust issues, but not after the presentation within the reflection part" (P3). "I would rather estimate what the crowd is feeling seeing their faces." (P1).

Using the presenter device in an online setting is preferred:

- Presenter participants were more positive about the introduction of this device in an online situation where there is no face-to-face interaction: "For online environments this would make more sense." (P1).

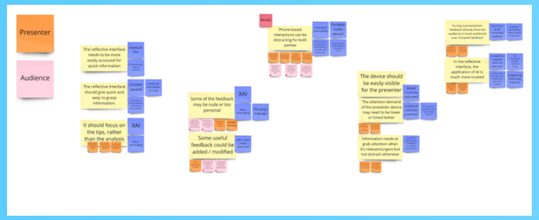


Figure 24: Needs & requirements overview in Miro

Design challenges

After creating the insight mapping 5 design challenges were established (Figure 25) (Appendix 26). These challenges are deducted from the needs and requirements found earlier and used to iterate on the current concept to tailor it to student and presenter needs.

1	How do we design a system that confirms for audience members feedback is actually used for presentations?
2	(How) do we accommodate the tonal/informational needs of both groups? (Which inputs should the system provide?)
3	How do we take the relation/power/control between audience and presenter into account?
4	How might we create a balance between giving context based input while keeping it low effort/not distracting/easy to indicate?
5	How do we incorporate or replace the phone-based interactions and their distracting nature?

Figure 25: Design challenges

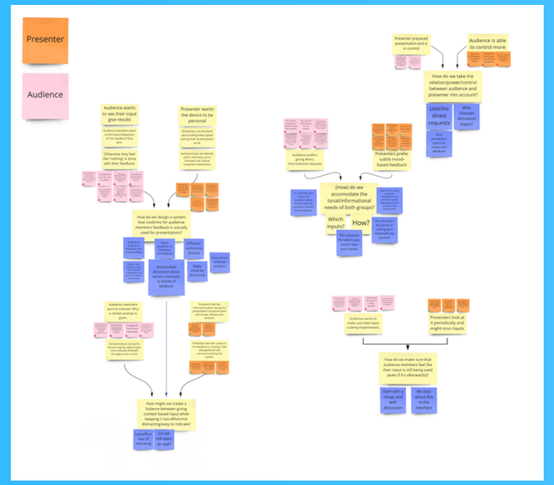


Figure 26: Design challenges in Miro

Iteration following Design challenges & needs/requirements

As part of finalising the design process, methods for solving the described design challenges were identified. The majority of them were addressed through some substantial design shifts that involved the inclusion of a discussion segment and the removal of the physical presenter device and its 'in the moment' feedback. Many of these decisions ended up reinforcing our themes of control, confrontation and specificity.

Audience feedback

To address the challenges regarding audience feedback and how/when it's shown to the presenter we explored whether the inclusion of a physical presenter device could possibly create too many expectations from the audience regarding immediate response to their feedback. Instead, we wanted to emphasise long-term improvements made by the presenter. Making room for a 'discussion' segment after presentations allowed presenters to show their willingness to reflect on the feedback given by audience members, reducing the audience's need to have their feedback be answered immediately (Figure 27). We felt this was an appropriate way to make the audience feel heard while also considering the presenter's control over a prepared presentation.

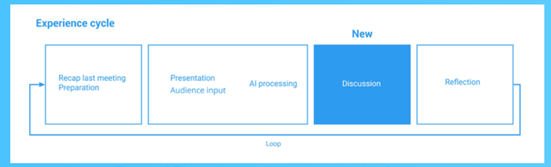


Figure 27: New experience cycle with Discussion part added

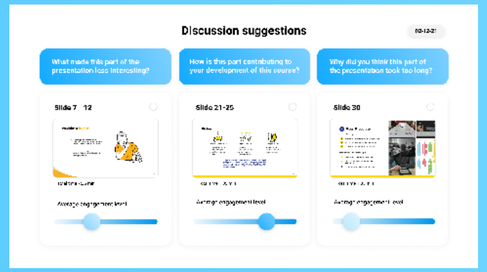


Figure 28: First iteration discussion suggestion interface

Audience members gravitated towards giving direct requests to the presenter because they felt the presenter would benefit most from that. The distinction between different 'emotional' types of engagement felt difficult to incorporate, and audiences were less inclined to use it. Presenters on the other hand expressed that the engagement levels were more accessible, usable and less disruptive. To accommodate this the 'emotion' input options were replaced by an 'engagement' scale that is more directly in line with the way the presenters liked to see engagement expressed.

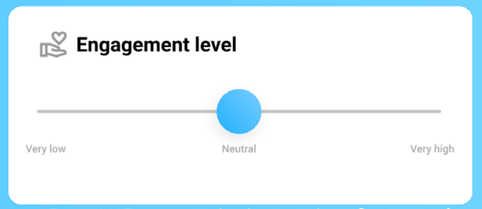
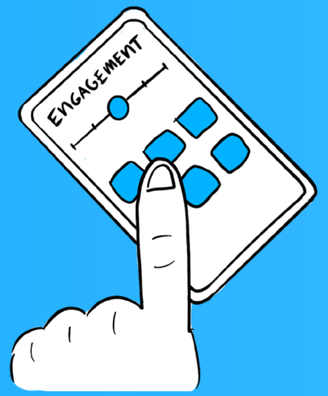


Figure 29: Engagement level input within reflective interface

To answer the challenge regarding phones-based interactions we had to reconsider alternative input methods. The usage of a unique personal input device was previously rejected due to creating a very high implementation hurdle, and we still stand behind this decision. This leaves little opportunity for alternatives, but we did look at different ways to input feedback on the phone that may be less reminiscent of behaviour people do when they are distracted by their phone. The potential for using the phone's gyroscope or orientation to input feedback was considered (e.g. putting it upside down means engaged, putting horizontal means 'move on'), but the loss of specificity went against one of our most important design themes, and the operation of it felt clunky and undesirable. Therefore we decided to stick with phone-screen based input but tried to design them to require less attention.



Pre-demoday feedback

At pre-demo day, the concept was at an intermediary stage of transition between the user test and the final concept. At this stage we explored the possibility of removing the presenter device entirely and focusing on the discussion instead. This would put more emphasis on detailed feedback with context rather than in-the-moment device-based feedback.

Iteration after pre-demoday

Based on the response at pre-demo day we re-evaluated some additional parts of the concept. We decided not to discard the presenter device and instead explore its potential for modularity, and looked at different ways to facilitate discussion.

Audience Input in discussion

Anonymity is a practical issue in the discussion part. Particularly for the lectures that are part of, for example, an elective. If the discussion is completely open and physical, the negative feedback becomes real-name and persona. This creates worries in the audience that they may be judged by the presenter in some way. We also know from related work that engagement increases with anonymity (Bergstrom, Harris and Karahalios, 2011).

In order to assure the anonymity of the audience members who raise opinions on the presentation. We extended the audience input during discussion from merely oral input during the presentations to text input on the audience device (Figure 30).

The AI can predict which speech features were important during the section of the presentation that is being discussed, and these features can be integrated as feedback suggestions to possibly reduce the load of the audience in the discussion.

After all the suggestions are gathered, keyword extraction can be applied to help pinpoint the general views that the audience has on certain parts of the presentation. The results can be presented in the reflection dashboard.

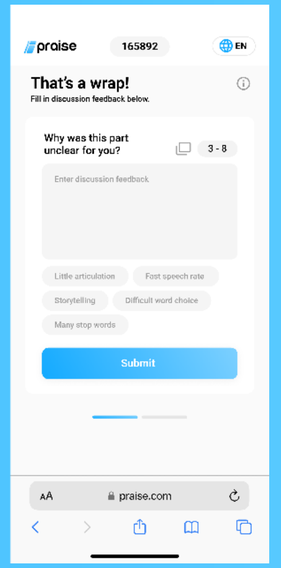


Figure 30: Discussion input via reflective interface

'Feedback' instead of 'requests'

The language used within the final prototype was changed significantly to tailor to the student and presenter needs deducted earlier. The styling of both the input app and reflective interface was altered to be visually consistent and provide clear feedback.

The language within the audience device was changed so it provides feedback instead of giving requests. Instead of stating "Talk faster" the new version of the input app states "This goes fast". This would be beneficial for both students and presenters as students would feel more confident in giving feedback as it feels less 'rude'. Presenters receive less 'pushy' feedback and may be more confident to receive real time feedback. Additionally, explanations such as " The presenter would like to receive your input." encourages audiences to give input but doesn't create the idea of a request based system.

Modular Settings for the Presenters

Just like audience members, presenters are not homogenous. Depending on their experience level, different presenters might want to see different kinds of information about the presentation. The presenters should have the chance to select what kind of information to receive. Therefore we let them choose beforehand whether to use the presenter device, and what to be presented on the device if used. for example choosing to include only the overall engagement level, or have together with the feedback.

The latter parts are the extension of this concept. The presenters are still free to choose which topics to be discussed, as well as how detailed the information demonstrated in the reflection interfaces could be.

Figure 31: Persona overview including modularity

Personas

To describe a scenario around the different forms of modularity within the system 3 presenter personas were created. The personas are created based on the skill level of the presenter : beginner, intermediate & expert. Each having different needs and requirements which are described in Figure 31.

The personas are divided across skill level as within the preliminary interviews and user tests it became clear more experienced presenters allowed more complex and intrusive interventions within their presentations as they feel more comfortable presenting. They often improvise more and leave room open for changing their presentations based on how the audience seems to feel. Beginner or intermediate presenters seem less inclined to do so.

Modularity in practice

Presenter device:
The presenter device was designed to be used with different levels of complexity. The presenter can make the decision to only show the LED matrix, only the feedback screen or both. The LED matrix serves another goal of providing more complexity if the presenter desires. For instance, the LED matrix for expert presenters may, instead of only showing engagement level, also show the heterogeneity of the audience. Meaning it can display how many audience members are engaged and to what extent. More about this can be found in the feature expansion section. The system is designed so the presenter device may not be used at all, for presenters who prefer not to be interrupted.

Discussion suggestions:
The discussion suggestions provided after each lecture are recommended, but optional to use as well. After a lecture the suggestions are reviewed by the presenter and selected if the presenter feels like discussing. As a result, the presenter may not choose to discuss at all and ultimately stays in control over the system as a whole.

Reflective interface:
The reflective interface includes different levels of complexity. Beginner presenters may only look at the general tips (Figure 32). Intermediate presenters may dig deeper to find out the reasoning behind the tip (Figure 33). Expert presenters may look at the provided graphs and time indications within the interface to find specific moments of disinterest or feedback (Figure 34). The dashboard is a detailed depiction of the data as well but is shown in an overview and optional to use.

To conclude, the system is made modular to tailor as much as possible to different types of presenters and differently skilled presenters . No presenter is the same and the system should not treat them as such. Introducing modularity solved a lot of issues mentioned in the earlier defined design challenges as well.

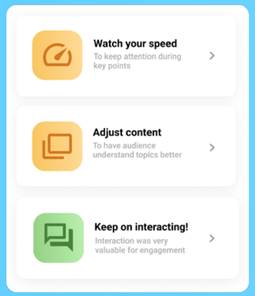


Figure 32: Reflective tips for the beginner persona

Figure 33: Reflective tips for the intermediate persona

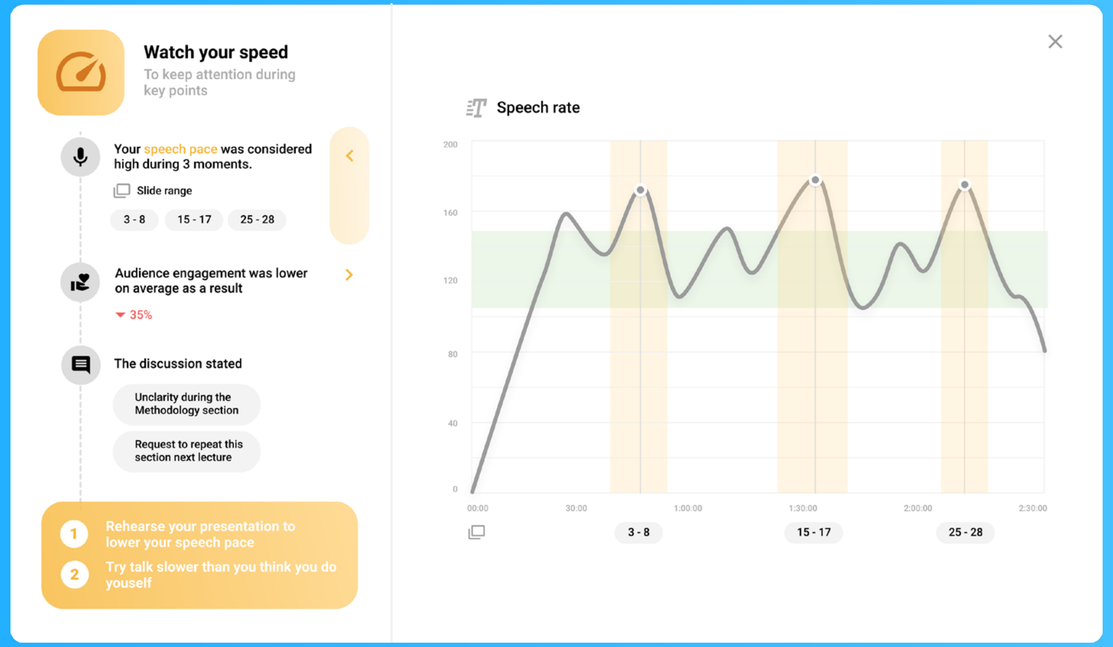


Figure 34: Reflective tips for the expert persona

Realisation

To demonstrate the concept, and to show that it is possible to realise the concept with current technology, the most important features of the design were realised. The audience device, presenter device and AI were realised.

Audience device

For the audience device, a website was chosen because of its scalability to big groups. The website is made in a framework called React (React – A JavaScript Library for Building User Interfaces, 2022), which is a javascript framework for interactive websites. The website has three pages. A login page, an input page and a discussion interface (Figure 35). The input page is connected to the presenter device via OOCSI (Funk et al., 2022). It is also connected to Data Foundry (Data Foundry, 2022) to store the inputs, which the AI can analyze. The discussion page shows identified variables which could have had the most influence on the engagement level (explained later in the AI part). The code and website can be found in Appendix 14.

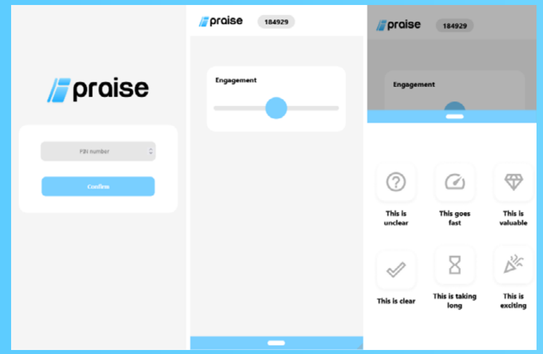


Figure 35: Audience input webpage working with OOCSI

Presenter device

The presenter device is designed in such a way that it can be used in multiple situations. As presentations differ a lot from each other the goal was to design a device that could be used while sitting down and standing up. Additionally, a separation between the engagement level LED's and the feedback screen was a requirement for the modularity. Different angles were considered to meet the criteria of diverse presentations (Figure 36).

Figure 36: 3D renders of the presenter device

The presenter device (Figure 37) contains a screen and a LED matrix. To make connectivity easy and fast, a Raspberry Pi was chosen as the main controller. The Pi is connected to an Arduino to control the LED matrix, since the matrix requires specific hardware to be controlled. The Raspberry Pi is connected with OOCSI and receives inputs from the audience members. That information is averaged and the engagement level is sent to the Arduino to display on the LED matrix.

The most used request is sent to the display of the Raspberry Pi. This display is a React Website again. The code and website can be found in Appendix 14.

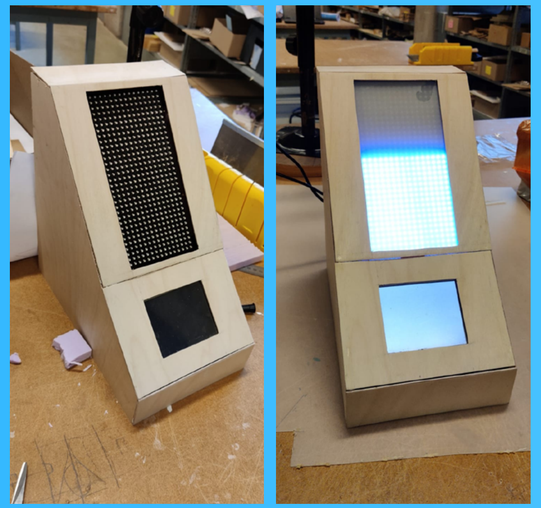


Figure 37: The presenter device prototyped

UX & UI design

Communication through tips & graphs (XAI)

The reflective interface is built up using cards with tips & tops. This is done for the cards to be easily overviewed by presenters when reflecting back on a lecture. The language that is used here uses a positive tone and always has the goal in mind to improve the presenters' presentation skills. The cards within the reflective interface can be folded out to reveal more explanation about the specific tip or top. The cards are always structured in the same manner so it becomes easier for the presenter to read them over time.

The cards and graphs eventually serve as a way to explain the decisions made by the algorithm when creating the tips and tops. In this way the system aims to become more understandable, relevant and trustworthy (Fiok, Farahani, Karwowski & Ahram, 2021)

1. Have a look at discussion suggestions what should change
2. Include pictures, videos or example cases to visualise examples
3. Ask your audience more often if they understand the subject

Figure 38: Language use for tips given within reflective interface

Consistent visual style (Colours)

All parts of the system are designed to have a consistent visual style. This in order to indicate that the product is a service that helps presenters present better.

A good example within the system is the colour blue. This colour is used mainly as a way to indicate the engagement level of audience members. Additionally, the LED lights on the physical device turn blue when engagement is higher. Additionally, the colours green and yellow within the reflective interface indicate 'tips' (Yellow) and 'tops' (Green).

UI

Furthermore, the system overall has a simple UI style to not distract from the content There is made use of icons accompanied by text to make sure the functionality of the buttons remains clear. A good example within the system is the colour blue. This colour is used mainly as a way to indicate the engagement level of audience members. Additionally, the LED lights on the physical device turn blue when engagement is higher. Additionally, the colours green and yellow within the reflective interface indicate 'tips' (Yellow) and 'tops' (Green).

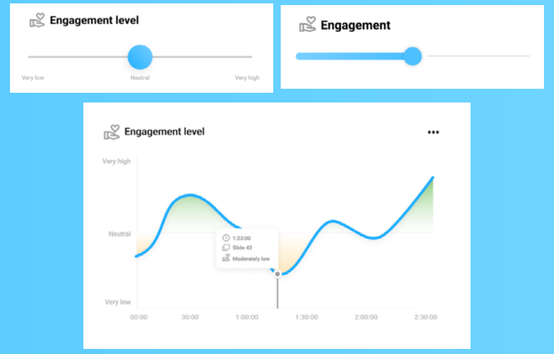


Figure 39: Color use for engagement level in UI design

AI realisation

Audience Input

The audience input consists of two parts: the engagement level and feedback. The engagement level was specified as five values ranging from not engaged to very engaged. The middle value is the initial intermediate value.

The prompt feedback has six options, consisting of “This is unclear” “This is clear” “This goes fast” “This is taking long” “This is valuable” “This is exciting”. These can be directly sent to the experienced presenters if requested and are also integrated in the AI outcome to help the presenters figure out what the audience feels in a specific moment.

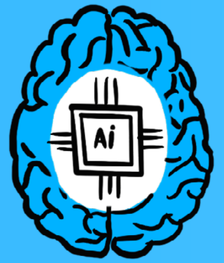
Presenters input

The presenters’ input is the speech during the presentation. To make a selection among the various speech features, it’s important to figure out what kinds of features are relevant to the audience’s engagement level, as well as the feasibility of accessing these features. An investigation that studied visual and acoustic features to identify those most commonly associated with good speaking techniques (Keith, C., Gareth J. F. J., Nick, C., 2015) showed the correlations of multimodal features with the audience engagement as a part of the results.

Among the inputs of the audio modality, the features related to intensity proved to be the most relevant ones (Keith, C., Gareth J. F. J., Nick, C., 2015). However, considering the fact that the investigation was done in a fake presentation setting where the audience watched videos and that our project focuses more on live and physical presentation settings, the intensity values are excluded because of the physical distances, such as the distance between the microphone and the presenter.

Pitch Range was selected among the frequency-related features due to its high relevance. Articulation Rate, which has a higher relevance than Speech Rate (Keith, C., Gareth J. F. J., Nick, C., 2015), was also selected as an important feature.

For the speech analysis tool, we used an external python library “my-voice-analysis” (Shakabks, 2021). It can measure multiple audio features of a given speech clip, from which we also selected two. The first is the number of Pauses and Filler Words, since Articulation Rate, compared to Speech Rate, has excluded the pauses of speech and is more relevant (Keith, C., Gareth J. F. J., Nick, C., 2015). The second is Speech Mode, including Reading, Showing No Emotion and Speaking Passionately (Shakabks, 2021). This feature was specifically included because even though it comprises the basic features like pitch and speech rate, it provides a holistic summary of the various speech features.



AI Working Pattern

The AI uses a basic algorithm called Decision Tree (GeeksforGeeks, 2021). Based on the audience input (engagement levels) and the speech data, the AI predicts which speech features are important to the engagement level by calculating the Gini coefficient (Tyagi, 2021). It uses this to give the audience pertinent choices in the discussion interface and give the presenters reasonable suggestions in the reflection part.

With the corresponding timestamps, the specific parts in a presentation can be linked to the prompt feedback, which are moredirect to the point. It can then be applied to the discussion and reflection parts.

Discussion topics

The discussion suggestions are chosen from a database of discussion topics provided by the system. The suggestions are based on the data from the presentation . The discussion topics are created so they may invoke a valuable discussion after the presentation, asking a critical question about the performance of the presenter to the students.

Code

The AI realization is written in python and includes several external libraries. Using the library sounddevice (Play and Record Sound with Python — Python-Sounddevice, 2019), the program records the speech with timescales of 60 seconds in a while loop controlled by presentation status (boolean). As the presentation ends, the program then goes through all the sound files and generates the datasets with the required AI features using my-voice-analysis. After that, the datasets are sent to the data foundry and are matched with the audience inputs through certain timestamps.

The program downloads the file from the data foundry and analyses the datasets. The speech features are defined as the features for learning while the engagement level is the target. With a learning model based on such, the program could rank the importance of the features and transmit the results to the discussion and reflection parts by means of OOCSI.

With widgets in Tkinter (originally embedded in python 3.9), the program can be controlled with a button by running the UI loop in another thread.

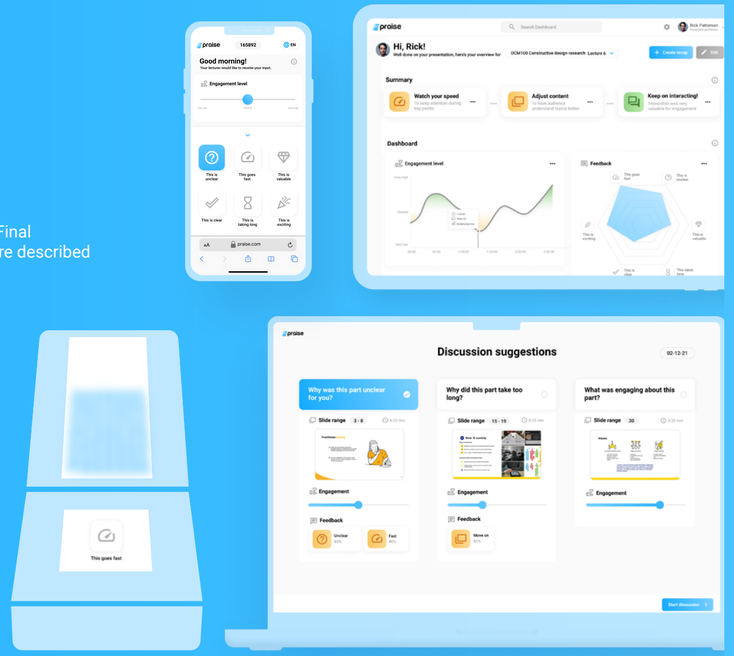
```
relevantFeatures = ["articulationRate", "F0Range", "fillerWords", "speechMode"]
feature = trainingData[relevantFeatures]
target = trainingData["engagementLevel"]

model = tree.DecisionTreeClassifier()
model = model.fit(feature, target)
# learning finished, rank the importances of the features
importances = model.feature_importances_
importanceDict = {"articulationRate": importances[0], "F0Range": importances[1], "fillerWords": importances[2],
                  "speechMode": importances[3]}
rankedDict = sorted(importanceDict.items(), key=lambda x: x[1], reverse=True)
print(importances)
```

Figure 40: Algorithm code

Final design

After realisation the final design was presented during the Final Demoday of the Artifice squad. The design and its values are described in the following section.



Design description

The final design named 'PRAISE' (presenter reflection, audience interaction, speaker engagement) involves a cycle of three main stages; presenting, discussing and reflecting. Over the course of these three stages presenters and their audience provide information that assists the presenter in improving their speaking skills. PRAISE is a system of interfaces that help gather, process and express this data.

1. During a presentation audience members are asked to use the 'praise' web app, an anonymous input tool that allows them to express their level of engagement in addition to a set of experience-based inputs that allow them to specify reasoning for why their engagement level is where it is. The web app is accessible through the link in appendix 14, the Figma prototype can be seen in Figure 41.

2. The information provided by the audience is specific to that moment in the presentation, and presenters can choose to access this information through the presenter device that shows the audience's level of engagement and (optionally) provides the specific feedback points that the audience inputs at that moment.

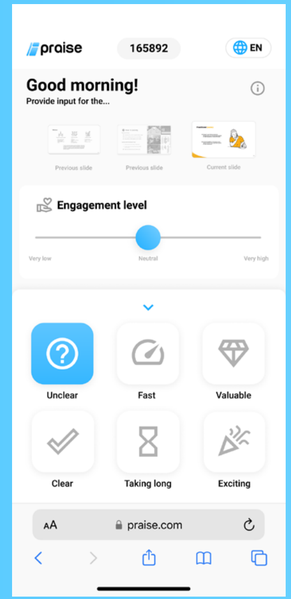


Figure 41: Audience webpage

Figure 42: Presenter device

3 At the end of a presentation, the system provides the opportunity for a brief discussion segment, where presenters and audience can engage more deeply with feedback. The AI identifies moments in the presentation where engagement stood out as being either especially high or especially low, and shows these to the presenter as potential discussion topics. It also connects these to the specific feedback points provided at that moment. A mockup of discussion suggestions can be seen in Figure 43.

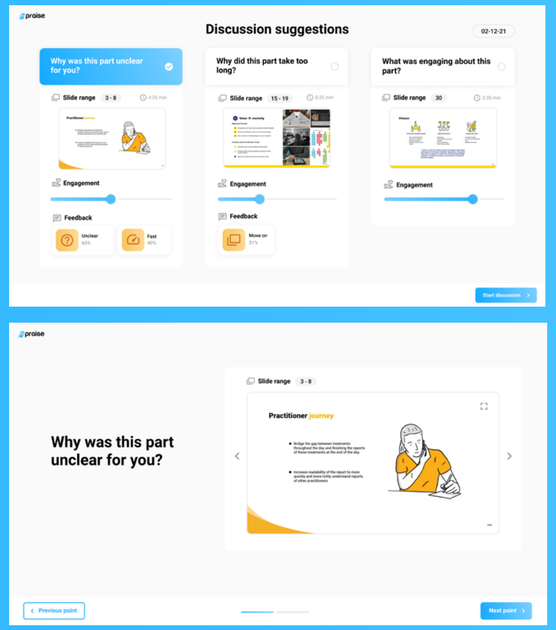


Figure 43: Discussion suggestion slides

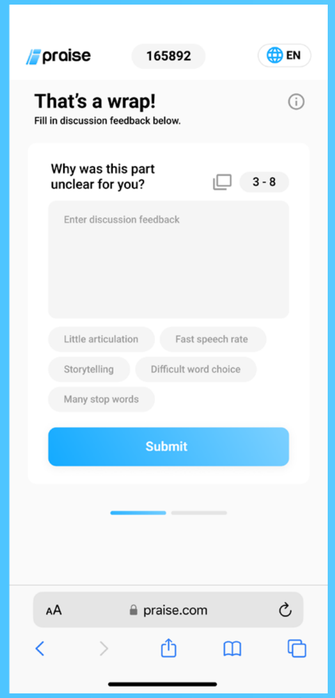


Figure 44: Audience discussion interface

4 When the presenter selects a discussion point to address, audiences are shown this discussion topic and can choose to involve themselves into the discussion in-person, or engage anonymously using the web-app. The web-app provides a text field where audiences can input additional feedback or reasoning, as well as highlighting potentially relevant aspects of the presenter's performance to that discussion point, such as speaking rhythm, content clarity or volume. The audience discussion interface can be seen in Figure 44.

5 Finally, the information gathered during presenting and discussion is processed by the system, and adjustment points are established by the AI that are shown to the presenter in a reflective interface. The data based on which the insight is created can be accessed by clicking through on a specific feedback point, or by checking the overall overview of the presentation These aspects of the reflective interface are visible in Figure 45 and the full interactive interface is available through the link in appendix 14.

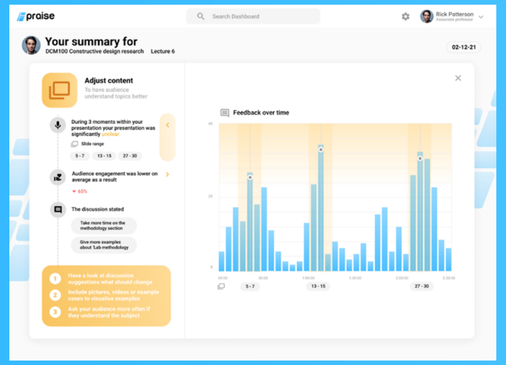


Figure 45: Reflective interface

Figure 46: Picture of the entire system

Concept in use

Figure 47: Concept in use (screenshots from video)

Figure 47: Concept in use (screenshots from video)

Concept flow

The concept flow in Figure X outlines the way different agents (Audience, Presenter and AI) play a role in the varying stages of the design's usage cycle. This covers the actions they take during certain stages of the process, as well as how they connect to each other through the relevant data.

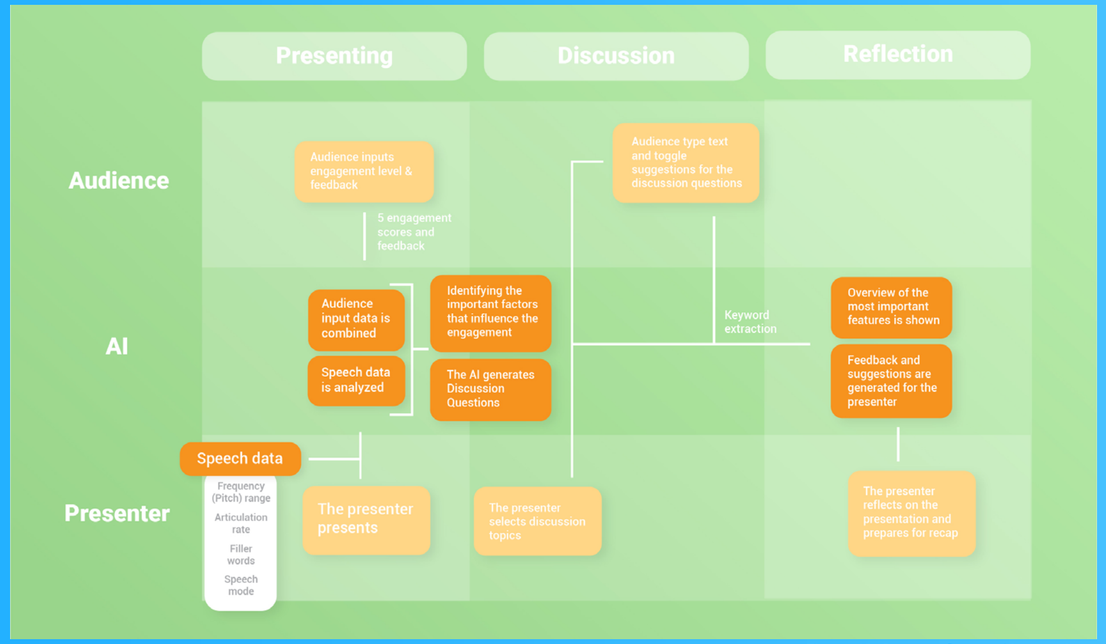


Figure 48: Concept flow and interactions

Concept values

At the beginning of the project an overview was created including 3 axes to cluster ideas generated and choose ideas based on discussion and research . The three axes go as follows:

1. Direct - Subtle
2. Individual - Group-based
3. Reflective - immediate

Mapping the current concept onto the axes shows how the final concept relates back to the design space of presentations. As the concept includes multiple parts they are separated and placed onto the axes (Figure 49).

1. Audience input (Direct, individual, immediate)
2. Presenter device (Direct and subtle, individual, immediate)
3. Discussion suggestions (Direct, Group-based, reflective)
4. Reflective interface (Direct, individual, reflective)

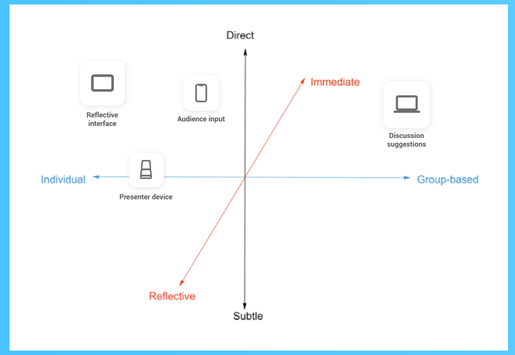


Figure 49: Concept mapped on axes

The different parts of the system all fall into different spectrums of the axes created earlier. Throughout the use of the whole system, there are tensions and shifts to how the system creates value. Altogether the parts touch upon all the values presented earlier. The parts in the system therefore strengthen each other and create a holistic system. The system is holistic as it is used across multiple phases within the presentation process. The parts as a whole strengthen the goal of improving presentations. One part alone may struggle to achieve this.

Design themes

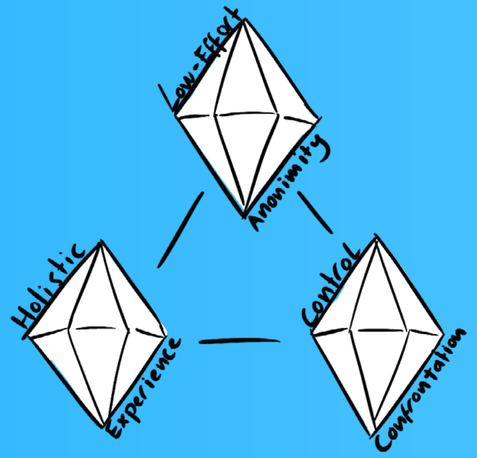
Besides the values presented within the axes diagram. Other important themes came to light when designing the PRAISE system. Which were presented in the design scope.

Experience & Confrontation
The system is modular. Three out of four parts within the system provide different functionality for users with different experience levels. The system is designed to improve the presenters' skills, and therefore also allows the presenter to consider which of the tools given are useful to them at their level. The user being able to choose their learning process is an important factor to actually make the system effective in use. (Choi et al., 2020).

Anonymity & Specificity
Throughout the entire usage scenario audiences are able to contribute in an anonymous way without limiting the type of feedback they can give. Because of this the usage hurdle lowers for audiences since they do not need to worry about any personal consequences. (Bergstrom, Harris & Karahalios, 2011). Having an audience that regularly gives personal feedback allows for recommendations that are specific to that very audience, and the design of the system reflects and highlights that specificity by calling back to the gathered data in the reflective dashboard.

Control & Effort
Presenters' ability to select discussion topics and choose which parts of the system to use gives them control over the way they use the system. This ensures it doesn't force itself into any moments or scenarios where the presenter may consider it overly obtrusive. On the other hand, audience members have control over which information they choose to share and due to their anonymity are under no obligation to engage with the system. To ensure that they still do engage with it and benefit from it themselves several aspects of the design were created in a way that helps communicate to the audience what their feedback is used for.

The system is overall designed to be low-effort in use for both audience members and presenters. The audience input device only requires minimal attention but still provides a way to give input. The presenter device communicates the input without a need for interaction. The discussion topics can be quickly chosen with one click. The reflective interface automatically creates tips and can be quickly overviewed (in about 5-10 minutes) after a lecture. Artificial intelligence helps to smartly automate the process and automatically create useful insights from data.



Future work

Future user research

For future iterations, new user research is required. These can be divided into audience and presenter research.

Audience
The user test explored which kind of inputs would be useful for audience members. Based on that, the inputs were changed for the final design. These new inputs should be verified again. Another point that was important for the audience members is that they feel their input is being used to help the presenter improve. To verify these criteria, a small presentation in which both the audience and presenter device is being used would be best.

Presenter
There are quite a bit of things that changed since the previous user test. During the previous user test, the presenter device had one way of working, but now it has multiple levels of information. These can be changed based on how confident the presenter is and how much the presenter would like to see live during a presentation. This is an important aspect to test.
Currently the design is based on three personas, a beginner, an intermediate and expert presenter. In the future, research should be done to find the percentage of each of these personas who would use our product. If 80% of the user fits in the beginner cluster, then the focus of the project should go towards those people, and later on include the other 20%.

One important aspect is the long term use of the device. Up until now the assumption was made that presenters and audience members would keep using the device, which both the audience and presenters confirmed in the previous user test. However, it was not tested, and for that reason it is interesting to do a pilot for one course, in which the whole setup is used for 8 weeks and see how both the audience and presenter think about it after that period.

Feature expansion

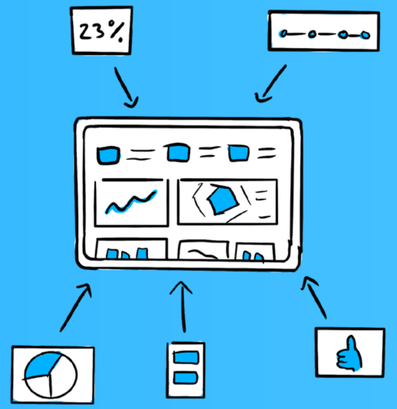
One of the key features of the current concept is its modularity. There are a couple of features that can be explored to improve that even more. The first one is related to the reflective interface. In the interface there is currently a preset of graphs drawn, in which speech rate, engagement and other variables are plotted over time. For more experienced users, it would be beneficial to set the X-axis and Y-axis to a variable themselves. That way, they can plot for example speech-rate against engagement level, and see the correlation themselves better.

A second feature that would help experienced presenters is to link the audience device with the students' university curriculum, anonymously. With that information, the audience can be clustered into groups and the presenter can look into why a certain group had lower engagement or a specific request. For example, when a presenter is talking about basic electronics and one group has a very low engagement, the presenter can see that they are all from electrical engineering, a group that probably may know this information already.

To expand the previous feature, the system can visualise this on the presenter device during the lecture as well. The device can group people based on different kinds of traits, such as study background, and show the engagement level per group. The presenter can then see what part of the audience is engaged, and which group is not and try to get their attention.

Currently the concept is focused on improving from a previous lecture, but it does not take into account the total growth the presenter has gone through. A feature that would help in this regard is to compare the previous presentation with presentations before that. The system could then indicate which pieces of advice it has given and what the presenter has done with those pieces of advice.

For further development, the audience input could also be made modular, which means depending on the content of the presentations, the presenters could decide which kinds of feedback are presented on the audience input interface.



Business strategy

It is arguably important for a design to be able to make a profit for the company. To explore what possible strategies are, a business model has been created, which can be found in figure X. The design, which is a service, could be purchased with a monthly subscription for an individual. The presenter device could be bought as an addon as a one time purchase. The most expensive costs in relation to the service itself, excluding the presenter device, are fixed charges, such as salary, and the depreciation of the server the service is hosted on, which go up with a very small amount when a new user joins. For that reason, it is possible to give group discounts. With group discounts, it becomes interesting to work together with universities and schools, since they have a lot of potential users. They could decide to purchase a subscription for all their employees. In the group purchase, it is then still possible to buy the presenter device, but there will not be a big discount on those, since the costs related to that product are directly related to the amount that are sold.

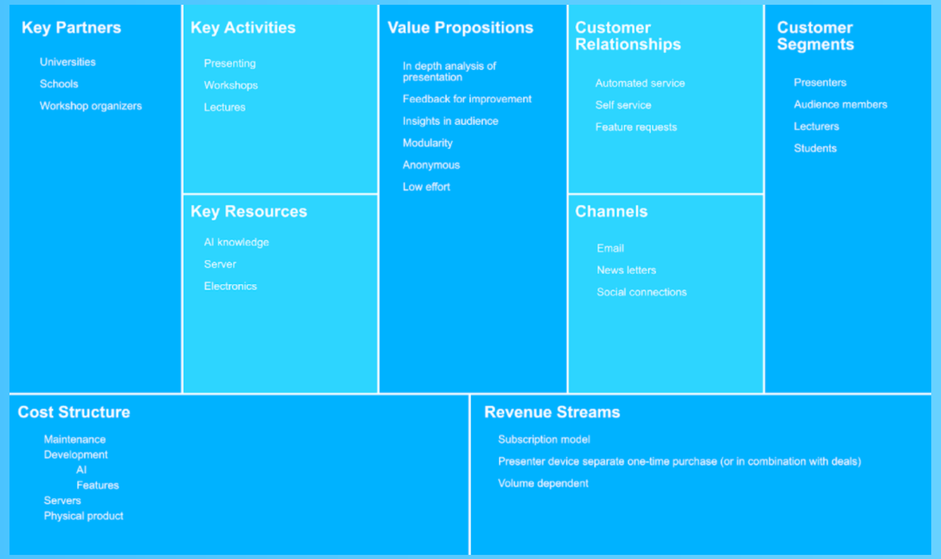


Figure X: Business model canvas

Discussion

Process dicussion (limitations)

All in all, the project went smoothly without any major hiccups. Everyone had something they wanted to learn and do, and everyone had an expertise area which helped the progress in the later stages a lot. However, there were some aspects in the project which influenced how we worked on the project. The first one is that AI is a very broad term and there are different opinions on what AI means. According to some, AI is a personal assistant, according to others, it is a system that can think completely for itself, and therefore more a future concept, while other people think AI is just machine learning. We struggled with this in the beginning of the project, because we were constantly wondering if what we were doing was AI or not. Next time, it would be smart to define what AI (or another subject that has multiple definitions) means according to us, and take that as our baseline.

The second thing we struggled with is that AI and machine learning is something we all have almost no knowledge in. That meant we had no clue what was possible and what is not. This resulted in us sometimes using the realisation of the concept as an argument for design decisions. That is not always something bad, because as a designer it is important to know if someone else is able to make it. However, because of our lacking knowledge in AI it was uncertain what actually was possible. Our individual reflections can be found in Appendix 10.

Concept evaluation

In the beginning, our focus was towards helping students pay attention during a lecture. With that in mind, we decided to make presentations better to help students to not get distracted. However, the presenters' presenting skills do not always influence whether a student is distracted or not. We should add personas for different kinds of audience members as well, because currently the audience has been generalised. In future iterations, it is important to research whether students that normally get distracted easily get less distracted, and if not, what kind of feedback they would need to give to presenters that could help them get less distracted.

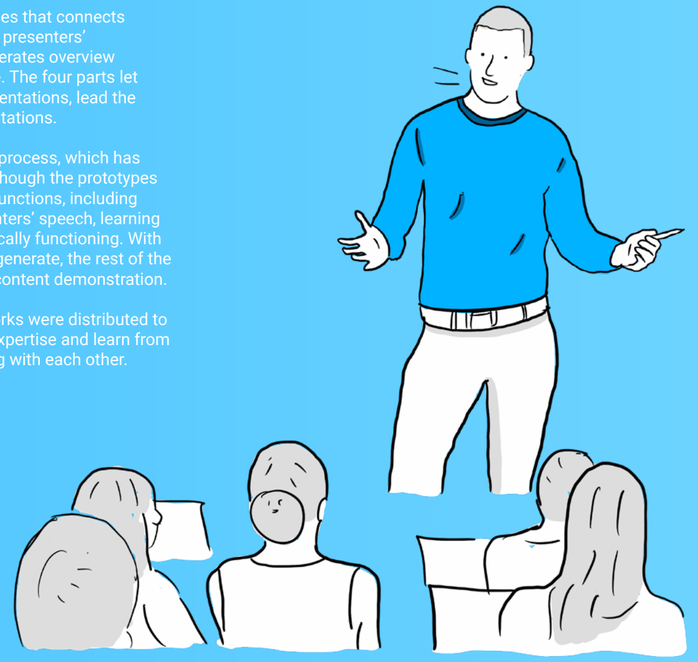
Modularity is important in the design, because then it can be used for different kinds of presenters. However, because of the modularity, there is a lot to see and change. This is not a problem for intermediate or experienced presenters, because they know what they would like to see, but a beginner presenter would have no idea what kind of information to reflect upon, and what kind of settings would be nice during the presentation. It can be quite overwhelming.

Conclusion

PRAISE is an integration of devices and interfaces that connects audience attitude towards the presentation and presenters' performance, pinpoints the key causes and generates overview and suggestions to help the presenters improve. The four parts let the presenters get the feedback during the presentations, lead the discussion and make reflection after the presentations.

The project has basically gone through a linear process, which has taken around one semester of 17 weeks. Even though the prototypes have not been completely realized, the core AI functions, including receiving data from audience's input and presenters' speech, learning from the data and generating analyses are basically functioning. With all the data that the prototypes can gather and generate, the rest of the realisation can be adjusted flexibly in terms of content demonstration.

The project was finished by group work. The works were distributed to all the members so that each could utilise his expertise and learn from accomplishing his own part and communicating with each other.



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Appendices

Appendix 00 - Contributions

Gino Althof

I worked on the realisation of the audience and presenter device for both the Demoday and usertest. I also made the setup of the AI, how it should work and how the data needs to be gathered and stored, but did not work on the realisation of it. I also made sure all the different prototypes would be able to communicate with each other, and that the modular aspect of the concept is also realised. The influence I had on the process itself is my technical knowledge, which helped to clarify certain aspects about what is possible and what may be possible in the future. My rapid prototyping abilities came in useful during the user test preparation, so that it could be done on time and the group still had time to iterate on the feedback. The renders that I made in the early phases also helped to explore lighting effects in a context which is hard to evaluate in real life.

Niek van den Berk

Within this project I worked on several parts extensively. First being part of the discussion during all meetings. Second, setting up user study preparations and most of the topic guides. As a result, I also conducted a 3 out of 4 preliminary interviews and conducted a fair amount of the interviews from the user study. In the first part of the project I also created the user journey and AI feature overview. The belonging illustrations were also created by me. In the second part of the project I took part in creating the needs & requirements and creating the design challenges. After this I took over the task of Zhanhong to create an iteration on the UX design of the audience interface, the reflective interface and later the discussion suggestions. I was the bridge between the technical part of the other team mates and the actual realisation into a UX design. Including the creation of the AI within the UX design and the XAI within the system. I also created the UI of the UX design and created the posters for the demo day. Including the persona overview and concept flow. Lastly, I made the visual design of the report, including all illustrations.

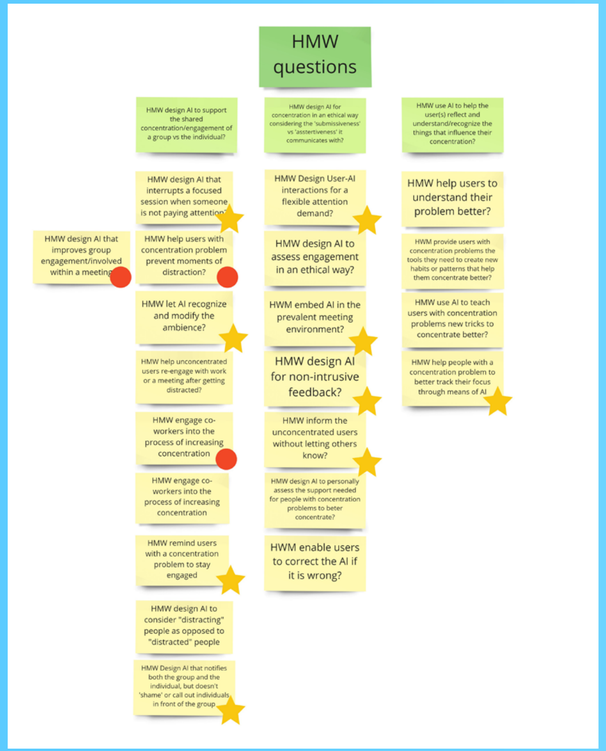
Jelle Wijers

Throughout the process and especially the ideation/conceptualisation and report-writing stage I dived into related work and existing benchmarks in order to frame the design in an appropriate academic context. I also helped keep perspective on recurring themes and topics that span the design process, attempting to gain a good overview of the connection between hard AI functionalities and their role in the concept and value to the users. While I didn't specifically commit to either the front-end or back-end part of the designs like other members of the group did, I feel like by being in a position that focused on the link between these two aspects I had a more general overview of the entire concept and process. I built the casing for the final presenter prototype, and programmed the presenter prototype used in the user-evaluation. I also scripted, storyboarded and edited the final video, and wrote a large amount of the pitches for presentations and demodays. I also conducted a small handful of the audience interviews. In addition to these more specific highlights I also believe I equally contributed to ideations and conceptualisations, the writing of the report, and other more shared or general aspects of the overall process.

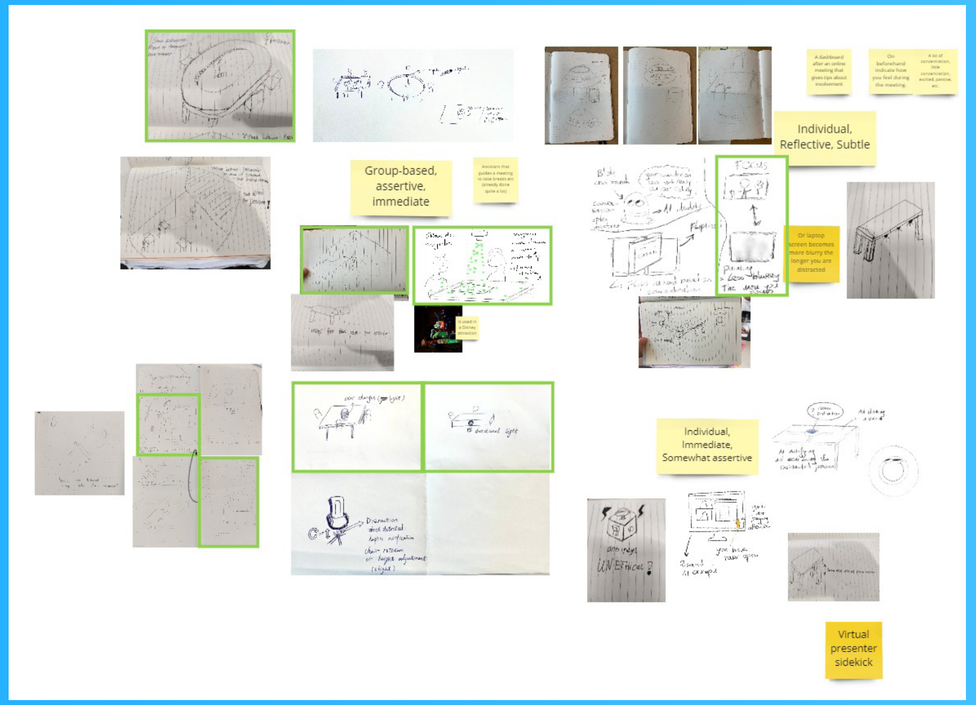
Zhanhong Su

I mainly worked on the technological parts of the project, especially around AI realisation. Generally I have gone through the entire process with teammates, starting from the brainstorming, bodystorming to user study. Before the user test I mainly work on designing the reflection interface (UI/UX) based on the iterated concept and corresponding information flow. However, this part of work was familiar to me but not something I was good at, and did not correspond with my anticipated development. After communicating within the team, I took over the AI part after the user test by designing the database, studying the algorithms that can be applied to our context, realising the core functions, and together with Gino, I built up the data connection between the audience device and the AI. Additionally, I participated in most parts of the process, including the concept exploration, paper research, transcribing and clustering feedback from user tests, as well as writing parts of the final report.

Appendix 01 - How Might We? questions

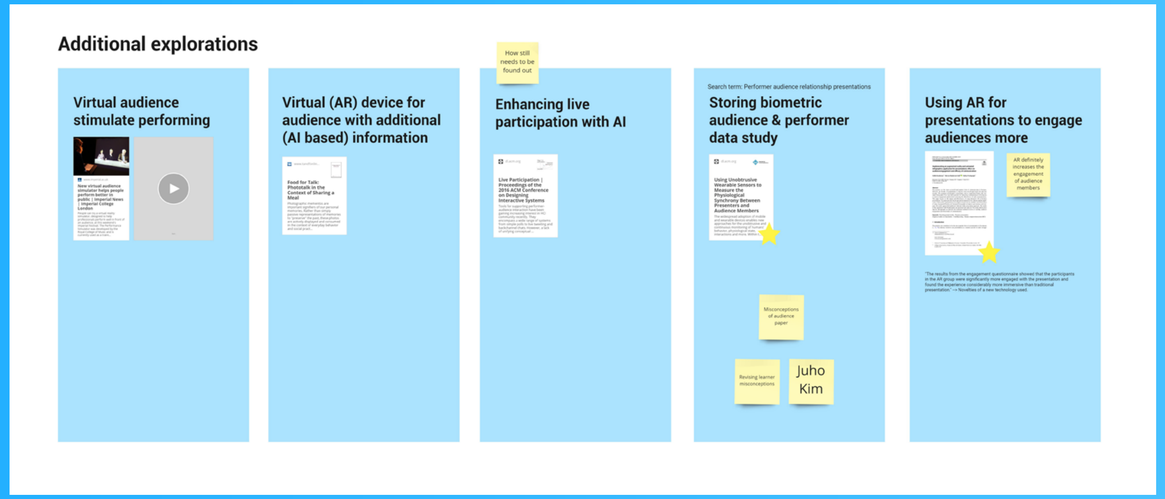


Appendix 02 - Idea generation



Appendix 03 - Practice map

Appendix 04 - Additional exploration areas



Appendix 05 - Exploratory interview questions (Topic guide)

Open interview, important to follow the answers of the interviewee. Ask Why? Why? Why?...

Audience questions
You have probably been an audience member a lot.

- What makes a great presenter?
- Do you notice a big difference between presenters?
- How, why?
- Why do you listen to presentations?
- What keeps you focused during a presentation?
- What makes you distracted during a presentation?
- What do you not like about presentations?

How does giving presentations make you feel?

Presenter questions
Think about the times you presented. How did that make you feel and what did you notice when giving presentations?

- How do you keep the audience focused?
- How and when do you notice if your audience is not focused?
- How does that make you feel?
- How do you act when this happens?

- What is your biggest frustration when giving a presentation?
- What makes you feel fulfilled when giving a presentation?
- What does your

Show video

- What did you think about these different methods of enhancing engagement?
- How did you feel this could enhance your attention towards the speaker?
- Would you be distracted by the examples shown in the video?
- What is your preference for these examples?
- Would you be willing to have this kind of feature be implemented in your presentation?

Appendix 06 - Consent form Exploratory interviews

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Informed consent form

This document gives you information about the user-based interview, which is a part of a group assignment carried out during Project 1: Design (Artifice Squad) taught at the Department of Industrial Design of the Eindhoven University of Technology. The student team conducting this experiment is formed of the following members: Niek van den Berk, Jelle Wijers, Gino Althof, Zhanhong Su. Before we begin, it is important that you learn about the procedure followed throughout the interview and that you give your informed consent for voluntary participation. Please read this document carefully.

The goal of the interview is to study the views that both the audience and the presenters have on presentations. The interview asks the participants to show their perspectives on normal presentations, such as the features of satisfying presenters and presentations, the feeling about the audience's feedback, and how they think about our current prototypes that show our primary exploration. The relevant results are collected from a quantitative number of participants as audience and/or presenters. During the interview, we will ask the questions individually without supervision and record the answers and points of view by writing them down promptly and making audio recordings.
Your participation is completely voluntary. You can refuse to participate without giving any reasons and you can stop your participation at any time during the experiment. Such decisions will have no negative consequences whatsoever.

This experiment does not involve any risks or detrimental side effects.
The study will last approximately 15 minutes.

Confidentiality

We will not be sharing personal information about you with anyone outside of the research team. The information that we will disseminate from this experiment will be used for qualitative study around the topic to form a conclusion to our peers and other researchers at Eindhoven University of Technology. It will be completely anonymous, and it cannot be traced back to you. Only the researchers will know your identity. Audio recordings are made just for listening back among the group members and will not be shared further. If you are dissatisfied with how data privacy is handled, you can submit a complaint to the Chief Information & Security Officer, the Privacy & Security Officer and/or the Data Protection Officer of the Eindhoven University of Technology via privacy@tue.nl or contact the Dutch Data Protection Authority.

More information

If you liked more information about the course that this study is conducted for, you can contact our supervisor Lu Yuan (Y.Lu@tue.nl)

Certificate of Consent

☐ I **do** give permission, to publicly publish photos and videos of me on the internet and social media. Next to this, my data may also be used for the purpose of this research. I understand that this data will be processed anonymously.

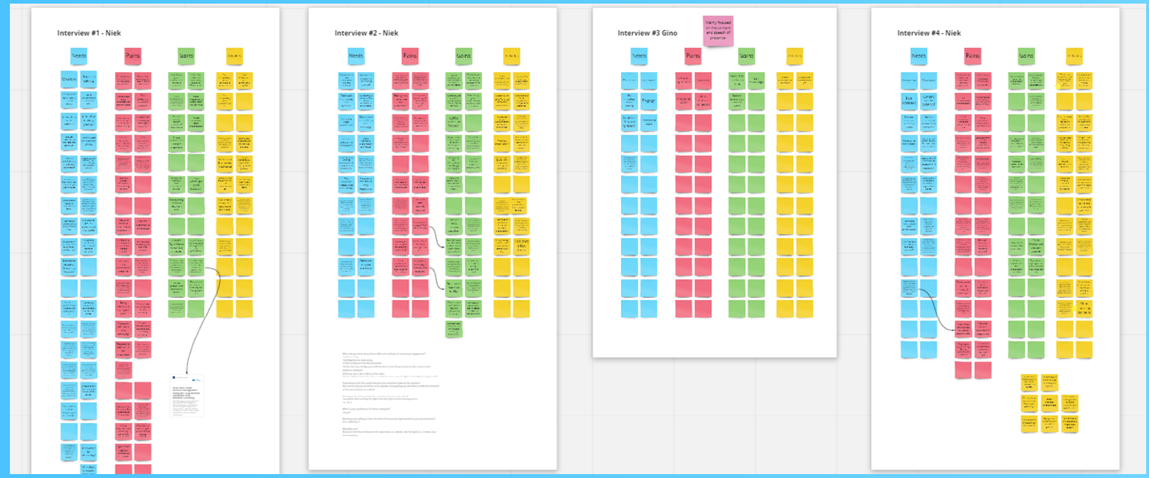
☐ I **do not** give permission to publicly publish photos and videos and photos on the internet or any other media. My data may only be processed anonymously for the purpose of this research. I will not be seen or heard in any photos and videos.

☐ I **do not** give permission to publicly publish photos and videos and photos on the internet or any other media. However, I **do** give permission for my data to be used for the purpose of this research. I understand that this data will be processed anonymously.

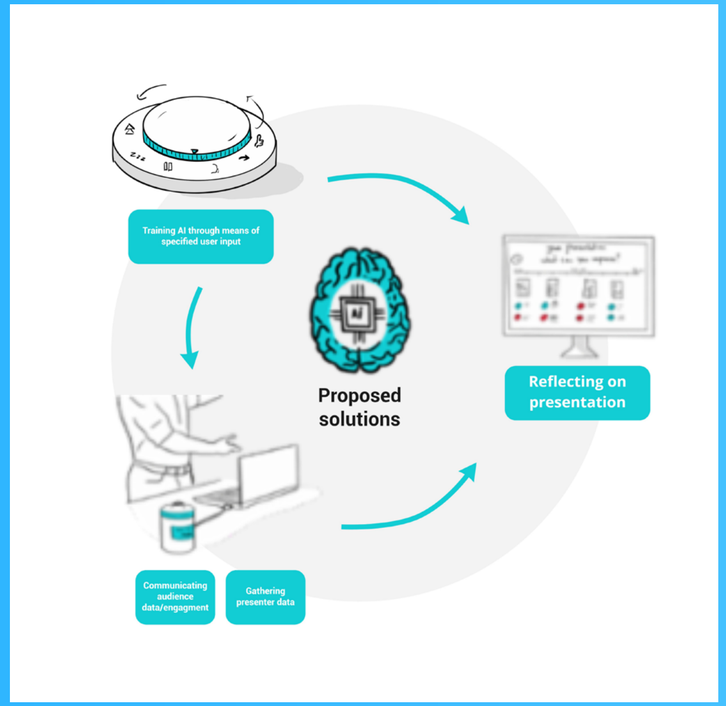
I, (NAME)....., have read and understood this consent form and have been given the opportunity to ask questions. I agree to voluntarily participate in this research study carried out by the student team participating in *Creating Corporate Entrepreneurship* course taught at Department of Industrial Design of the Eindhoven University of Technology.

Participant's Signature Date

Appendix 07 - Exploratory interview notes



Appendix 08 - First iteration concept visualisation



Appendix 09 - UX link prototype user study

https://xd.adobe.com/view/fc9de732-befe-4f22-bf9f-d07773ebebcc-a9ce/

Appendix 10 - User Study Plan

User study plan - PRAISE - M1.1 project. - Artifice squad

The user study for PRAISE consists of 3 parts, each testing a part of the system that uses an algorithm to try and improve the presentation skills and style of presenters by predicting audience mood en requests. This is done through means of a training device that is given to a specific audience of a lecture. The 3 parts that are tested are: The training device with input for audience members, the presenter device for the presenter during the presentation and a reflective interface used after the presentation to reflect back on.

Study 1

User test 1: Audience interface

This test tries to find out which inputs the audience interface of this system needs to contain. Three interfaces are proposed within this study. An interface focusing on request based prompts, emotion based prompts and both request and emotion based prompts.

Plan:

- The user test is conducted within a set-up environment in which users (audience members) are asked to watch a pre-recorded presentation (from Youtube) to give feedback during the presentation.
    - The audience members receive a website where they may give input during the lecture.
    - The group of users is divided into 3. Each group receives different sets of input on this website.
        1. Request based feedback (Go faster, go slower, next slide etc.)
        2. Emotion based feedback (I am bored, this is interesting, that is funny etc.)
        3. Request based feedback + emotion based feedback (Both input sets showing on the screen)
    - The data from this input is anonymously stored and sent to the research team to be used for the algorithm to be trained.
    - After the recorded presentation has finished users are asked to conduct a short interview regarding their experience with the input interface and the set of inputs they received. From each set a minimum of 2 people are interviewed.
    - The results from the interviews are processed and compared to find an appropriate set for the system.

Appendix 10 - User Study Plan

Necessities:

Stuff needed	Description
Consent forms	Link to file: - With participant number - Writing down well which participant got what
Introductory text	Welcome to our user test, today we are going to conduct a user test for our Master Design project within the Artifice squad. We are looking at how to improve presentations from lecturers by using a system using AI to predict audience mood and requests during and after a presentation. To train the AI we make use of a training device that stores data from audience members. We want to ask you to describe your mood and requests during the lecture by interacting with the website we provide while watching. We will provide you with different sets of inputs to discover about your experiences using the system. Feel free to give any feedback you like as the input is anonymously stored within our database. It will be used within our project to realize (part of) the algorithm.
Website with different sets	Links: https://dev.ginoalthof.nl/#/1 https://dev.ginoalthof.nl/#/2 https://dev.ginoalthof.nl/#/3

Interview questions	• What was your experience giving inputs during the presentation?
	  ○ What did you like?
	  ○ What did you not like?
	• Do you think using this device is useful for improving the presentations of lecturers?
	  ○ Why/why not?
	• What were your inputs mostly based on? Content, speaking style?
	• Do you think it is important for such a device to be used for lecturers?
	• What did you think of the different inputs you could indicate?
	  ○ Would you want more/less?
	  ○ What other options would you want?
	• How did you think this device influenced the way you watched a presentation?
	  ○ Did it make you more or less engaged?
	  ○ How would you rate the effort put in to give enough feedback?
	  ○ Did you pay more attention to your speaking style? Did you pay less attention to content?
	• How would you expect this given information to be communicated to the presenter? During? Afterwards?
	• How often would you find yourself using this?
	• If you had to choose between one of the three versions, which would you prefer to have?

(b) Youtube video with presentation (10-15 min)	Link: https://www.youtube.com/watch?v=bLYTCzLaQeE https://www.youtube.com/watch?v=WkUwbPdyMIY time is between 1:00 and 10:37 (when the slides move towards scope) (Architecture & design) Link: Lecture from TU/e recorded during corona? From a course? From MyTU/e website.

Appendix 10 - User Study Plan

Study 2&3

User test 2: Presenter device

The second user test focuses on testing the presenter device which is placed in front of the presentation and displays the input from audience members. The plan for this set-up

Plan

- The user test is conducted within a set-up environment in which users (lecturers) are asked to react to a video scenario supported by a physical model.
  - The presenter device is placed in front of the presenter and through a Wizard of Oz technique the device simulates its functionality within a presentation. The functionality of the device is shown by showing a part of a video of a presentation to which the device reacts.
  - The lecturer is shown the presenter device which he/she is each asked to react to the functionality of it. The version includes
    1. Request based feedback + emotion based feedback (Both input sets showing on the screen). A combination of the icons and use of the LED light ring.
  - The lecturer is asked to react to the change within the device and give his/her opinion on what is shown per version.
  - After this a concluding interview is held with the lecturer to discover his/her opinion.
  - The interview data from the different users is then processed and compared to see what is the best version of the presenter device.

Necessities:

Stuff needed	Description
Consent forms	Link to file:
Introductory text	Welcome to our user test, today we are going to conduct a user test for our Master Design project within the Artifice squad. We are looking at how to improve presentations from lectures by using a system using AI to predict users mood and requests during and after a presentation. To notify the presenter during the presentation about the audience requests and mood the presenter receives a presenter device which is placed in front of you. It both records the lecture and communicates audience feedback. We are going to show you the presenter device and use a video of a presentation to simulate its functionality. Imagine if you were the presenter and got this feedback during the presentation. We encourage you to give your opinion and to be honest about the design. What you would expect from it and how you would react to it during a presentation. All answers are correct.

Interview questions	• What did you think of the device in general?
	  ○ Would it be something you use?
	  ○ Did you understand the information displayed on the presenter device?
	  ○ Would this be useful for you during a presentation?
	• In what way would this device be distracting to your way of presenting?
	• How would you respond during a presentation if such a prompt would pop up?
	
	• What do you think about the different visualisations shown during this test?
	  ○ What do you think about the icons shown?
	  ○ What do you think about the light shown?
	
	• How do you feel about the emotion/distraction shown in the ring?
	• How do you feel about the icons shown?
	  ○ Which would you not like to see?
	  ○ Which would you like to see?
	• Do you feel that seeing both is too much?
	• What would you change/add/remove from the device?
	• What would you expect to happen to the data presented within this presenter device?

(b) Youtube video with presentation (3 - 5 min)	Link: https://www.youtube.com/watch?v=bLYTCzLaQeE (Architecture & design) Link: Lecture from TU/e recorded during corona? From a course? From MyTU/e website.

Appendix 10 - User Study Plan

User test 3: Reflective interface

For the third user test the reflective interface is tested which is provided to the presenter after the presentation has finished. It essentially is a web application that uses the data from the presenter device (video + audio) and the audience input (later the AI output) to create a reflective interface. The presenter can have a look at this interface after the presentation to improve him/herself and become a better presenter. The interface includes a timeline and highlights of the presentation with notes about how to improve the presentation.

Plan:

- This user test is set up like a UX user test in which the user (lecturer) is shown the reflective interface and asked to click through the interactive interface.
  - The lecturer is asked to click through the interface and react on the interface accordingly. It is told all answers are correct.
  - This UX user test only includes 1 interface version. The UX user test will follow an iterative approach in which changes are made after several tests. In this way the UX design will become tailored to the users (lecturers) of the system.
  - After having reacted on the UX design itself the users are asked a few questions about the interface in order to touch upon important aspects of the design.

Necessities:

Stuff needed	Description
Consent forms	Link to file:
Introductory text	Welcome to our user test, today we are going to conduct a user test for our Master Design project within the Artifice squad. We are looking at how to improve presentations from lectures by using a system using AI to predict users mood en requests during and after a presentation. The system includes reflective parts which you can have a look at after the presentation to reflect on yourself as a presenter. The system is essentially a web application. We created a prototype for this application which you can click through and interact with. We encourage you to speak out loud what you think. Everything you say is correct as we want to improve this interface based on your opinion. After having walked through the interface we will ask you a few questions within an interview.

Interview questions	• What was your general experience like using this interface?
	  ○ What did you like?
	  ○ What did you not like?
	• Did you find the information structure easy to understand?
	  ○ Does the current structure confuse you? Why?
	  ○ In what sequence would you like the interfaces to be presented?
	• Did you find the information within this interface useful?
	  ○ What did you miss?
	  ○ What would you remove?
	• Is this something you would use after a presentation?
	  ○ Do you think it would help you?
	  ○ Would you consult other channels to improve your way of presenting?

Interactive interface	Link to (online) interactive interface:

Appendix 10 - User study consent forms

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

Information form for participants

This document gives you information about the user evaluation part of the design process of "PRAISE – Presenter Reflection Audience Involvement Speaker Engagement", Before the study begins, it is important that you learn about the procedure followed in this study and that you give your informed consent for voluntary participation. Please read this document carefully.

Aim and benefit of the study
The aim of this study is to measure the needs, desires and opinions of prospective users of our design 'PRAISE' within the roles of audience and presenter. The information gathered is used to further the design process

This project is performed by G. Althof, N.J.A.J van den Berk, J.A. Wijers and Z. Su under supervision of D.Kim of the Eindhoven University of Technology (TU/e).

Procedure
Evaluation participants will be asked to watch a video of a lecture or presentation, and throughout use one of a set of digital interfaces to give feedback about the presentation and express their level of attention towards the presentation. Afterwards participants will be shown additional versions of the interface and will be asked to compare and evaluate the interfaces.

Audio will not be recorded unless you provide specific consent for it, but the person conducting the test may transcribe or take notes on your commentary. No personal information will be gathered.

Risks
The study does not involve any risks or detrimental side effects.

Duration
This study will run for one session that will last roughly 20 minutes. This includes both the prototype tasks and the interview.

Voluntary
Your participation is completely voluntary. You can refuse to participate without giving any reasons and you can stop your participation at any time during the study. You can also withdraw your permission to use your data immediately after completing the study. None of this will have any negative consequences for you whatsoever.

Confidentiality and use, storage, and sharing of data.
All research conducted at the Eindhoven University of Technology and adheres to The Netherlands Code of Conduct for Research Integrity and the Code of Scientific Conduct. This study has been approved by the Ethical Review Board.

In this study personal data will not be gathered. Participants will be identified by participant number only, and you will be told this participant number in case you want to withdraw permission to use your data. Other data (e.g. notes taken by the interviewer during the test, or

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

the transcription of the interview) will be recorded, analyzed, and stored. The goal of collecting, analyzing, and storing this data is to evaluate the prototype and concept. No data that can be used to personally identify you will be recorded or stored. No video or audio recordings will be made that could identify you.

Further information
If you want more information about this study, the study design, or the results, you can contact Jelle Wijers (contact email: j.a.wijers@student.tue.nl).

If you have any complaints about this study, please contact the supervisor, Dajung Kim (contact email: d.kim@tue.nl) You can report irregularities related to scientific integrity to confidential advisors of the TU/e.

Informed consent form

"PRAISE – Presenter Reflection Audience Involvement Speaker Engagement"

- I have read and understood the information of the corresponding information form for participants.
- I have been given the opportunity to ask questions. My questions are sufficiently answered, and I had sufficient time to decide whether I participate.
- I know that my participation is completely voluntary and for educational purposes. I know that I can refuse to participate and that I can stop my participation at any time during the study, without giving any reasons. I know that I can withdraw my permission to use your data immediately after completing the study.
- I agree to voluntarily participate in this study.
- I know that no information that can be used to personally identify me or my responses in this study will be recorded.

Certificate of consent

I, _____
want and provide consent to participate in this study.

☐ I consent with the fact that audio recordings will be made during the session.

_____ _____
Participant's Signature Date

Appendix 10 - User study consent forms

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

Information form for participants

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Aim and benefit of the study
The aim of this study is to measure the needs, desires and opinions of prospective users of our design 'PRAISE' within the roles of audience and presenter. The information gathered is used to further the design process

This project is performed by G. Althof, N.J.A.J van den Berk, J.A. Wijers and Z. Su under supervision of D.Kim of the Eindhoven University of Technology (TU/e).

Procedure
In the first half participants will be asked to watch a video scenario that is paired with a physical device. The device expresses feedback gained from a hypothetical audience in different ways. Afterwards they will be asked to evaluate the interface.

In the second half participants will explore a digital reflective interface and talk through their exploration, commenting on the interface and its content and usability.

Audio will not be recorded unless you provide specific consent for it, but the person conducting the test may transcribe or take notes on your commentary. No personal information will be gathered.

Risks
The study does not involve any risks or detrimental side effects.

Duration
This study will run for one session that will last roughly 30 minutes. This includes both the prototype tasks and the interview.

Voluntary
Your participation is completely voluntary. You can refuse to participate without giving any reasons and you can stop your participation at any time during the study. You can also withdraw your permission to use your data immediately after completing the study. None of this will have any negative consequences for you whatsoever.

Confidentiality and use, storage, and sharing of data.
All research conducted at the Eindhoven University of Technology and adheres to The Netherlands Code of Conduct for Research Integrity and the Code of Scientific Conduct. This study has been approved by the Ethical Review Board.

In this study personal data will not be gathered. Participants will be identified by participant number only, and you will be told this participant number in case you want to withdraw

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permission to use your data. Other data (e.g. notes taken by the interviewer during the test, or the transcription of the interview) will be recorded, analyzed, and stored. The goal of collecting, analyzing, and storing this data is to evaluate the prototype and concept. No data that can be used to personally identify you will be recorded or stored. No video or audio recordings will be made that could identify you.

Further information
If you want more information about this study, the study design, or the results, you can contact Jelle Wijers (contact email: j.a.wijers@student.tue.nl).

If you have any complaints about this study, please contact the supervisor, Dajung Kim (contact email: d.kim@tue.nl) You can report irregularities related to scientific integrity to confidential advisors of the TU/e.

Informed consent form

"PRAISE – Presenter Reflection Audience Involvement Speaker Engagement"

- I have read and understood the information of the corresponding information form for participants.
- I have been given the opportunity to ask questions. My questions are sufficiently answered, and I had sufficient time to decide whether I participate.
- I know that my participation is completely voluntary and for educational purposes. I know that I can refuse to participate and that I can stop my participation at any time during the study, without giving any reasons. I know that I can withdraw my permission to use your data immediately after completing the study.
- I agree to voluntarily participate in this study.
- I know that no information that can be used to personally identify me or my responses in this study will be recorded.

Certificate of consent

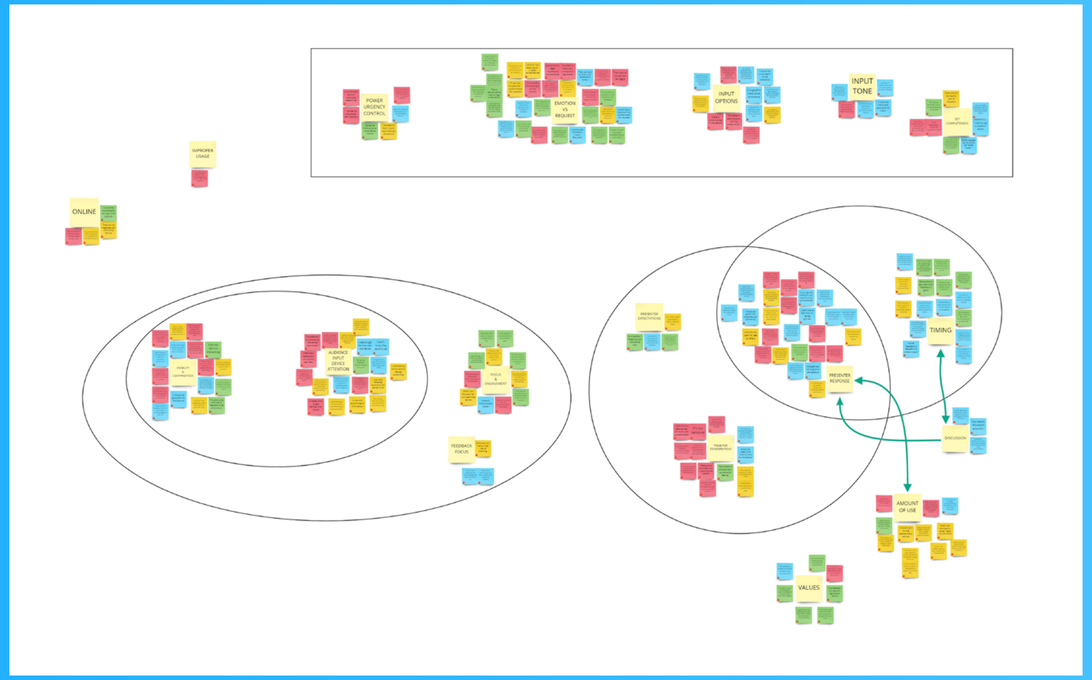
I, _____
want and provide consent to participate in this study.

☐ I consent with the fact that audio recordings will be made during the session.

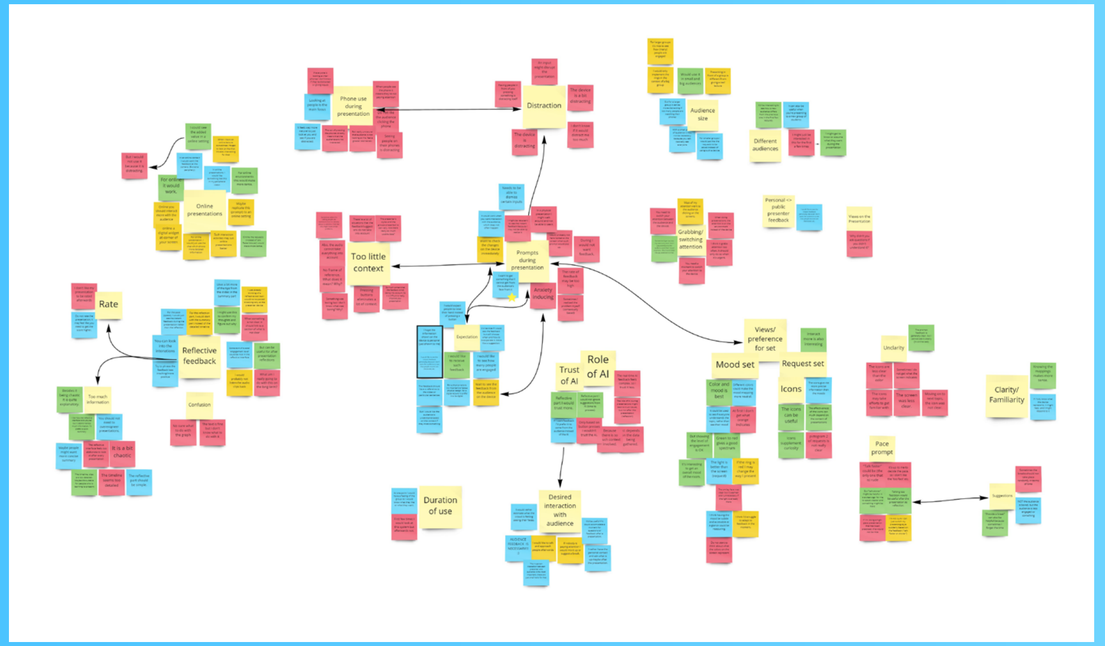
_____ _____
Participant's Signature Date

Appendix 10 - User study transcriptions

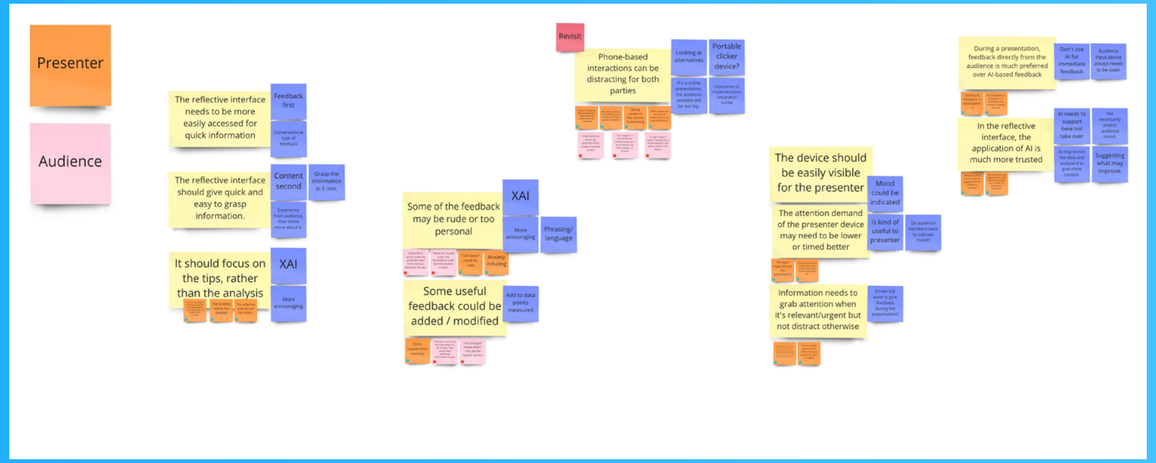
Appendix 10 - User study insight map



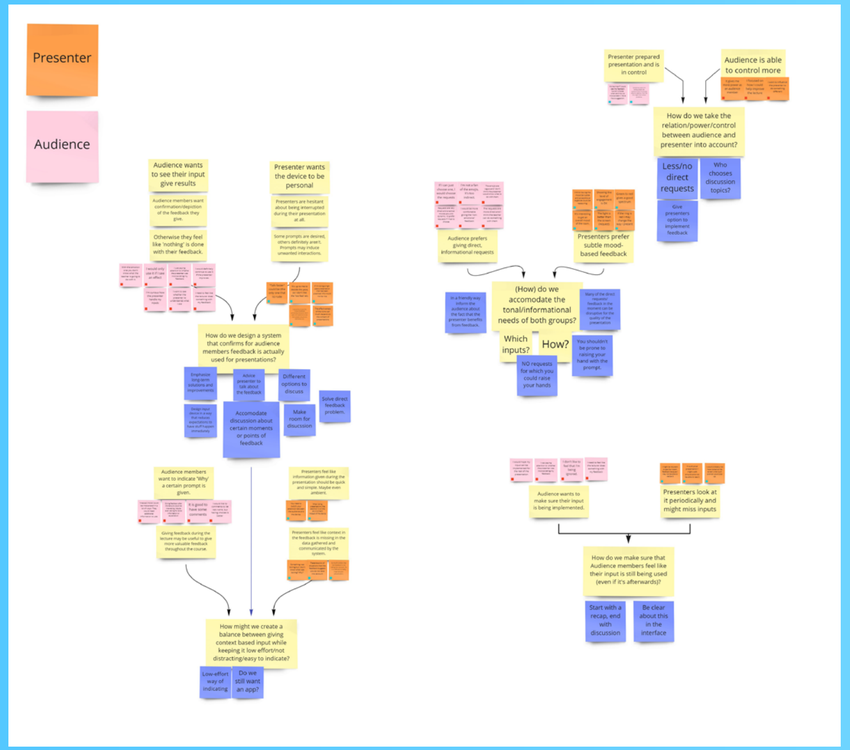
Appendix 10 - User study insight map



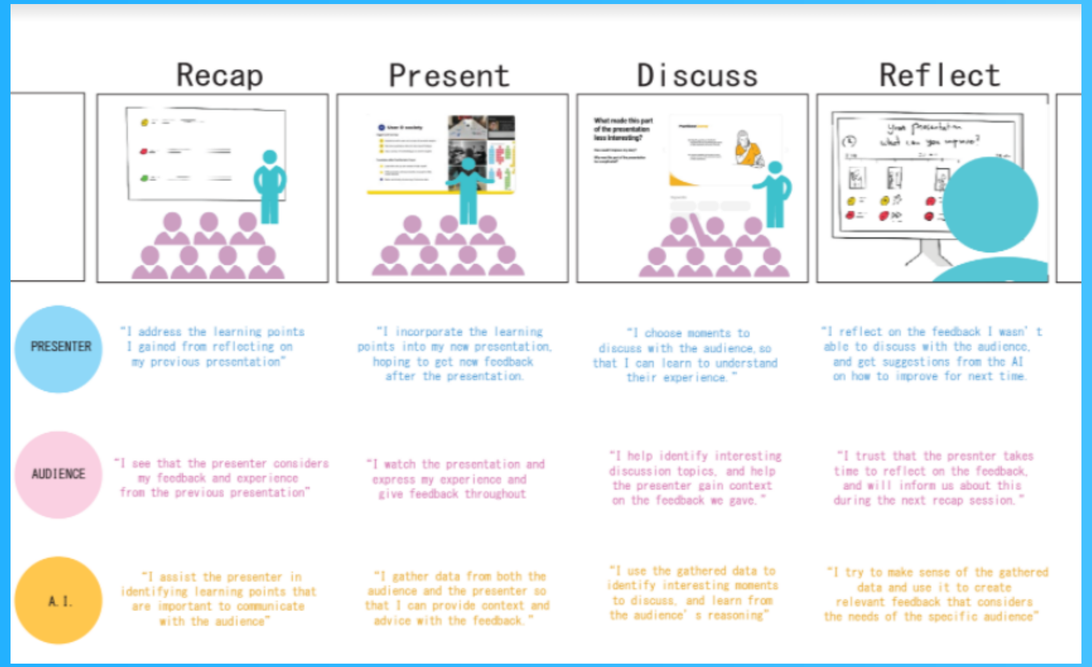
Appendix 11 - Needs & requirements



Appendix 12 - Design challenges



Appendix 13 - Concept scenario (pre-demoday)



Appendix 14 - Links to UX and code

Audience website:
- praise.ginoalthof.nl

Presenter device screen website:
- praise-presenter.ginoalthof.nl

Discussion suggestions UX design:
- https://www.figma.com/proto/osl90ARkm0bqlyN3Izbz1W/Praise-Discussion-suggestions?page-id=0%3A1&node-id=2%3A323&viewport=241%2C48%2C0.18&scaling=contain&starting-point-node-id=2%3A323

Reflective app UX design:
- https://www.figma.com/proto/4lQTSgC4DdfRKNdpISwENm/Praise-Reflective-App?page-id=0%3A1&node-id=2%3A303&viewport=241%2C48%2C0.25&scaling=scale-down&starting-point-node-id=2%3A303

Audience code:
- https://gitfront.io/r/user-2651808/7f2ab291cf88047d3e7674fce6acd32373b5f1d8/praise/

Presenter website code:
- https://gitfront.io/r/user-2651808/f5dbd8caa57e7b85dd24da7dd7ab9099733c0578/praise-presenter/

Presenter LED's code:
- https://gitfront.io/r/user-2651808/610ab207c65ed170a7866045add5bdd8e2dffd01/LED-Matrix/

AI:
- https://github.com/ZhanhongSu/PRAISE

Appendix 15 - Links Miro boards

Ideation workshop:
- https://miro.com/app/board/o9J_lvUo2U8=/?invite_link_id=439181356882

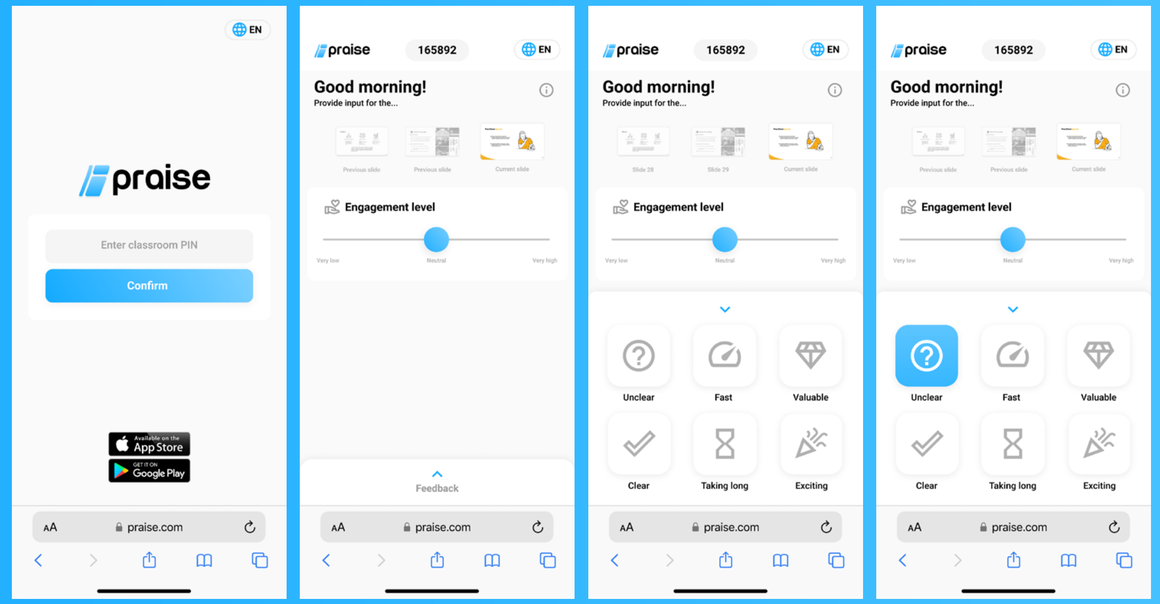
Prototyping workshop
- https://miro.com/app/board/o9J_ltIzz_U=/?invite_link_id=942502452357

Interview notes (including transcripts)
- https://miro.com/app/board/o9J_lrLivd8=/?invite_link_id=670059401551

Interface ideation
- https://miro.com/app/board/o9J_ljCQKyg=/?invite_link_id=294472120635

User study insights (including transcripts):
- https://miro.com/app/board/o9J_lgjCt5g=/?invite_link_id=866246304396

Appendix 16 - Audience input webpage UX design in Figma



Appendix 17 - Persona & concept explanation