[Requirements] Elicitation

Interview 1

Hi, may I have your full name and email?
Sam Solichin
z5310849@unsw.edu.au

Do you use any communication platforms for teamwork purposes? (e.g. Discord, Skype, Zoom, etc.)
Yes, I use Discord, and Zoom

What work do you mainly do in conjunction with these communication applications?
I use Discord and Zoom to tutor highschool students Indonesian and Maths

What specific features of the program do you particularly use for your work?
Screen sharing, audio calling, sending images

Are there any specific instances where you're not satisfied with any of the built-in features of that program?
Nah Discord and Zoom suit my needs as a Indonesian and Maths tutor

Thank you for trying out UNSW *Dreams*, what are your first impressions of it? Perhaps you can comment on what you liked about it, what you didn't like and what features could be added to further improve your experience?
My first impression is that it is severely limited in capabilities.
I think the standup feature is pretty cool, but I don't think I'll ever find myself using it.
I am a highschool tutor for Maths and Indonesian, so features such as audio calling, screen sharing and sending images are integral to my work. Since UNSW *Dreams* doesn't have any of these features, it is impossible for me to conduct my tutoring sessions on it and hence I won't be using it any time soon.

Thank you so much for participating in this survey. Your feedback is very much appreciated. :)

Interview 2

Hi, may I have your full name and email?
Allan Zhang
allanzhang4@gmail.com

Do you use any communication platforms for teamwork purposes? (e.g. Discord, Skype, Zoom, etc.)
Discord, Zoom

What work do you mainly do in conjunction with these communication applications?
Society Meetings, group work meetings

What specific features of the program do you particularly use for your work?
calling

Are there any specific instances where you're not satisfied with any of the built-in features of that program?
Zoom limits me to a certain timeframe.

Thank you for trying out UNSW *Dreams*, what are your first impressions of it? Perhaps you can comment on what you liked about it, what you didn't like and what features could be added to further improve your experience?
I loved dreams. My first impression of using dreams was asking myself "is this a dream?" because I was so invested in its ability to satisfy all my unique needs as someone who frequently participates in meetings where I need to message people. I really liked how unlike Zoom, it allowed me to seamlessly continue my meetings through messages without a timeframe. However, I wasn't really a fan of the fact that I couldn't video call as my teammates on the other side found it more difficult to interpret my emotions and tone which I used. Thus, it would be perfect if you could add a video calling feature with this absolute beauty of a messaging program.

Thank you so much for participating in this survey. Your feedback is very much appreciated. :)

[Requirements] Analysis & Specification - Use Cases

User Stories
1. As a high school tutor, I want to be able to provide an effective learning environment online that enables visual learning though calling, screen sharing and sending images.
2. As an individual who participates in many team meetings for various activities, I want to be able to communicate freely through video calls to be able to express myself completely.

Users Acceptance Criteria
- Being able to send visual messages (images)
  - Providing a button that allows the user to browse through media files to send
- Being able to call
  - Providing a button that initiates either an audio-only or video call
  - There must also be a button that allows the participants to end a call
  - Being able to share screens
    - Whilst calling, there should be an option to share screens
    - Also a button to stop screen sharing
    - All participants may be able to share screens, but only one screen at a time
  - Requirements:
    - The call is ended when there are no participants left in the call
    - The call must raise a notification to all participants in the channel/dm
    - The interface must show who is speaking and who is sharing screens
- Extras:
  - An mute/unmute microphone button
  - A video camera on/off button
  - Being able to select which screen share to view.

Use Case: The users can start or join a call in either a channel or dm and be able to share their screens in the call.
Goal in Context: A tutor/teacher wants to be able to conduct lessons remotely in a manner which does not deviate from the experience of teaching in a physical classroom.
Scope: UNSW *Dreams* as an app/browser
Level: Primary Task
Preconditions: There are multiple users in the channel/dm.
Success End Condition: Any user (including both students and tutor/teacher) is able to initiate/end a (video) call with other participants being able to join/leave. During the call, all participants are also able to share screens and as well as send messages in both text and images.
Failed End Condition: All users are unable to initiate/end a (video) call with his/her students other participants unable to join/leave. During the call, all participants are also unable to share screens and as well as send messages in both text and images.

Primary Actor: The tutor/teacher
Trigger: A user clicks on the "Initiate Call" button on the top right-hand side of the channel/dm on the interface.

Main success scenario
1. A user clicks on the "Initiate Call button" at the top-left of the channel/dm chat page. This begins the call.
2. The other users in the channel/dm receive a notification.
   - If no-one responds to the call after a period of 45 seconds, the call is terminated.
3. A message in the chat log appears, noting that a call is in place.
4. The other users join the call.
5. During the call, all users may choose to do the following:
   - Mute/unmute their microphone
   - Turn on/off their video camera
   - Share/unshare their screen
   - Leave the call
   - Rejoin the call (while the call is still active of course)
6. Once there is only one user left in the call, the call automatically ends.
7. A message in the chat log appears, noting that the call has ended.

[Requirements] Validation

Feature that they wanted to see:
Video + audio calling, screen sharing and sending media

Questions that they had:
1) Will users be able to access UNSW dreams offline?
2) Is UNSW dreams going to stay browser based?

Answers:
1) No, as UNSW dreams runs off a flask server and hence can't be operate offline
2) At this current moment in our development cycle we plan to keep UNSW dreams browser based until we have built a solid foundation but in 2-3 years we can look to expand it into an app

Further comments about use cases:
<u>Sam</u>
"The user acceptance criteria and use case efficiently satisfy the problems that I had initially brought up. However, I do have some questions in regards to video-calling. Many of the times when I am tutoring students I do not want them to have the option to share their screen in the case that it may distract the students and hence would it be possible for only specific individuals to share their screen?

<u>Allan</u>
"The use cases have effectively covered all of the features that I wanted to see implemented. During my meetings, there are often times when there are multiple people speaking at once and hence how will you be discerning who is speaking if multiple individuals are speaking at once?"

Post-interview considerations:
After discussing with Sam and Allan and factoring in their concerns, we will now implement a permissions system in which whoever begins the video call will have permission to change screen-sharing abilities for others in the video call and there can only be one person sharing screen at any given point in time. Furthermore, if there are multiple people speaking at once the video calling feature will fixate on the individual that began talking first until they are done and then from there move to whoever talks after they have finished speaking.

[Design] Interface Design

Name & Description	HTTP Method	Data Types	Exceptions
communications/call/create - Authorised user creates a voice call session in either a DM or a channel. If the dm_id is -1, then it is created in a channel and vice versa. Can initiate a call with other users to notify them OR just initiate with an empty u_ids list	POST	**Parameters:** (token, channel_id, dm_id, u_ids) **Return Type:** {}	**InputError** when any of: ● channel_id does not refer to a valid channel. ● Dm_id does not refer to a valid dm ● u_id in list u_ids does not refer to a valid user **AccessError** when any of: ● Authorised user is not a member of this DM with dm_id ● Authorised user is not a member of this channel with channel_id
communications/call/attendees Given a channel or DM that the authorised user is part of, provide details about who is in the call. If dm_id is -1, then the call was created in a channel and vice versa. Function returns a dictionary containing: attendee_details containing u_id, handle_string, microphone_on, video_on, screen_sharing and call_timer of each attendee in call.	GET	**Parameters:** (token, channel_id, dm_id) **Return Type:** {attendee_details}	**InputError** when any of: ● channel_id does not refer to a valid channel. ● Dm_id does not refer to a valid dm **AccessError** when any of: ● Authorised user is not a member of DM with dm_id or channel with channel_id
messages/sendimage Given a URL of an image on the internet, send this image within the	POST	**Parameters:** (token, img_url, channel_id,dm_id)	**InputError when any of:** ● img_url returns an HTTP status other

			than 200 ● Image uploaded is not a JPG

		Return Type: {message_id}	than 200 ● Image uploaded is not a JPG **AccessError when:** ● The authorised user is not a member of the DM or Channel they are trying to post to
channel or DM. Function will return the message_id, which is a dictionary containing the message id of the photo message If the dm_id is -1, then it is created in a channel and vice versa.			
communications/call/sharescreen Within a call in a certain DM or Channel, the authorised user is given the ability to share their screen and for other participants to be able to view what is on their screen in real-time. Function will return an empty dictionary {} If the dm_id is -1, then it is created in a channel and vice versa.	POST	**Parameters:** (token, channel_id, dm_id) **Return Type:** {}	**InputError when any of:** ● channel_id does not refer to a valid channel ● Dm_id does not refer to a valid dm ● There is no active call currently running in DM or channel **AccessError when:** ● The authorised user is not a member of the DM or Channel they are trying to share screen in ● The authorised user is not the owner of the call within the DM or channel ● There is already a user sharing screen within the call
communications/call/viewsharescreen Within a call in a DM or Channel, authorised user can view the screen currently being shared Shared_screen is a live feed of screen shared If the dm_id is -1, then it is created in a channel and vice versa.	GET	**Parameters:** (token, channel_id, dm_id) **Return Type:** {shared_screen}	**InputError when any of:** ● channel_id does not refer to a valid channel ● Dm_id does not refer to a valid dm ● There is no active call currently running in DM or channel ● There is no screen

			being shared **AccessError when:** ● The authorised user is not a member of the DM or Channel ● The authorised user is not a member of the call within the DM or channel
communications/call/leavecall Within a call in a certain DM or channel, the authorised user is given the ability to leave the call. Auth_user_id will also be removed from the list of call attendees. Function will return an empty dictionary {} If the dm_id is -1, then it is created in a channel and vice versa.	POST	**Parameters:** (token, channel_id, dm_id) **Return Type:** {}	**InputError when any of:** ● channel_id does not refer to a valid channel ● Dm_id does not refer to a valid dm ● There is no active call currently running in DM or channel **AccessError when:** ● The authorised user is not a member of the DM or Channel ● The authorised user is not in the call within the DM or channel they are trying to leave
communications/call/joincall If there is a call active in a certain DM or channel, gives the authorised user the ability to join the call. Will also add auth_user_id to the list of attendees on call. Function will return an empty dictionary {} If the dm_id is -1, then it is created in a channel and vice versa.	POST	**Parameters:** (token, channel_id, dm_id) **Return Type:** {}	**InputError when any of:** ● channel_id does not refer to a valid channel ● Dm_id does not refer to a valid dm ● There is no active call currently running in DM or channel **AccessError when:** ● The authorised user is not a member of

			the DM or Channel that they are trying to join call from
communications/call/togglecamera If authorised user in a call in a channel or DM, give them the ability to toggle their camera on and off. If the camera is currently off, it will change it to on and vice versa. Within the attendees list for the call, will also change camera_on key to True. Function will return a dictionary {camera_on} with boolean values, "True" for when the camera is on and "False" when it is off If the dm_id is -1, then it is created in a channel and vice versa.	POST	**Parameters:** (token, channel_id, dm_id) **Return Type:** {camera_on}	**InputError when any of:** ● channel_id does not refer to a valid channel ● Dm_id does not refer to a valid dm ● There is no active call currently running in DM or channel ● The device the user is on has no webcam capability **AccessError when:** ● The authorised user is not a member of the DM or Channel that they are trying to join call from ● The authorised user is not in the call within the associated channel or DM
communications/call/togglemicrophone If authorised user in a call in a channel or DM, give them the ability to toggle their microphone on and off. If the microphone is currently off, it will change it to on and vice versa. Within the attendees list for the call, will also change camera_on key to "True". Function will return a dictionary {microphone_on} with boolean values, "True" for when the microphone is on and "False" when it is off If the dm_id is -1, then it is created	POST	**Parameters:** (token, channel_id, dm_id) **Return Type:** {microphone_on}	**InputError when any of:** ● channel_id does not refer to a valid channel ● Dm_id does not refer to a valid dm ● There is no active call currently running in DM or channel ● The device the user is on has no audio capabilities **AccessError when:** ● The authorised user is not a member of the DM or Channel

in a channel and vice versa.			that they are trying to join call from ● The authorised user is not in the call within the associated channel or DM

[Design] Conceptual Modelling (State)

```
                                                                User does not have
                                                                permission to share
                                                                     screen
                                                                                    ┌──────────────────────────────────┐
                                                                                    │                                  │
                                              There is already                      │                                  │
                                              an active screen                      │                                  │
                                                   share                            │                                  │
                                                       ┌────────────────────────────┼──────────┐                       │
                                                       │                            │          │                       │
                                            User          ┌──────────────┐  There is no   ┌──────────────┐  User has         ┌──────────────┐
                                            shares        │Dreams checks │  active screen │Dreams checks │  permission to    │Users screen is│
                                            screen        │whether or not│    share       │whether or not│  share screen     │displayed for  │
                                        ┌──────────────→  │this is       │ ─────────────→ │user has      │ ───────────────→  │all to see    │
                                        │                 │already a     │                │permission to │                   │              │
                                        │                 │screen being  │                │share screen  │                   └──────────────┘
                                        │                 │shared        │                └──────────────┘
                                        │                 └──────────────┘
                                        │                                                    Video      ┌──────────────┐
   User starts                Notif is sent to                                               is on      │Turns video   │
   call in        ┌────────┐  other users          ┌────────────┐                       ┌──────────→   │off for user  │
   channel or     │        │  that a call has       │            │                       │             └──────────────┘
   DM             │Call is │  been started          │Call is     │  Multiple   ┌─────────┴──┐  User    ┌──────────────┐
┌──────────┐ ───→ │started │ ─────────────────────→ │active with │  users join │Call is     │  toggles │Dreams checks │  Video
│No call in│      │        │  Message is sent to    │one user    │  call       │active with │  video   │whether video │  is off  ┌──────────────┐
│channel or│      └────────┘  the chat that a call  │            │ ──────────→ │multiple    │ ──────→  │is on for user│ ──────→  │Turns video   │
│DM        │                  is in place           └────────────┘             │users       │          └──────────────┘          │on for user   │
└──────────┘                                                                   └─────┬──────┘                                    └──────────────┘
    ↑  ↑                                                                             │
    │  │                                                                             │        User                                       Video    ┌──────────────┐
    │  └──────────────────────────────────────────────┐                             │        toggles                                     is on    │Turns video   │
    │                 No one picks                     │                             │        microphone              ┌──────────────┐ ┌──────→    │off for user  │
    │                 up after 45                      │                             ├──────────────────────────────→ │Dreams checks │ │           └──────────────┘
    │                 seconds                          │                             │                                │whether video │ │  Video    ┌──────────────┐
    │                                                  │                             │                                │is on for user│ │  is off   │Turns video   │
    │                                                  │                             │                                └──────────────┘ └──────→    │on for user   │
    │                                                  │                             │                                                             └──────────────┘
    │                 All users leave                  │                             │
    │                 call                             │                             │        User         ┌──────────────┐
    └──────────────────────────────────────────────────                             │        leaves       │User is       │
                     Message is sent to                                             │        call         │removed from  │
                     the chat that call has                                         ├──────────────────→  │list of       │
                     been ended                                                     │                     │attendees     │
                                                                                    │                     └──────────────┘
                                                                                    │
                                                                                    │        User         ┌──────────────┐
                                                                                    │        sends        │Image         │
                                                                                    │        image        │appears in    │
                                                                                    └──────────────────→  │channel or    │
                                                                                                          │DM            │
                                                                                                          └──────────────┘
```