User	Age	Gender	Occupation	Usage frequency	Usage scenarios	Advantages of Zoom Whiteboard	Pain points	Needs	Inspirations
Cong	27	Female	Art teacher	• 3-4 times a week for class • once with colleague or boss	• Before class: make blackboard writing (pictures, videos, PPT) • In class: comment on students' works and add notes • After class: Save pictures and share them with students (continue to finish the work after class) • Teaching and research: Communicate with colleagues about the course	• The text under the icons is easy to understand	• Can't find the entry window of Zoom whiteboard. • Can't do some text note at meeting time（she usually open other document to make some notes). • Can't prepare images and text on whiteboard before class. Thus she has to use other app to work with Zoom.	• Easy to find the entry window of whiteboard. • Can prepare images、text on whiteboard before class. • During meetings, there is an automatic note-taking tool nearby. • Background templates can be richer, not just circular shapes.	• Educators have the habit of preparing classroom materials before class. They need to be able to freely paste pictures, texts and videos just like the real blackboard. Students can simultaneously write answers, make feedback and mark on the whiteboard
Yuanhang	26	Male	English teacher	• Once or twice a week	• Teaching students in the class	• The tools can basically meet my needs in class.	• Can't find the entry window of Zoom whiteboard. • Notes made on the whiteboard can only be exported to PNG and picture formats, and students cannot modify, copy and paste after class. • When I use the whiteboard or share the screen, the toolbar blocks my view.	• Easy to find the entry window of whiteboard. • the notes can be modified when share to student after class. • toolbar can be hidden when not needed.	• Saving as an editable file helps user have the flexibility to use when after meeting • toolbar often blocks some of the view in the meeting
Laura	24	Female	Product student	• Once every two weeks	• Communicate with professor about the progress of thesis, • Work on projects in groups, • Teaching (hand painting/recording)	• The new version can edit the whiteboard at any time function is very convenient	• It is not convenient to add and drag text. You need to click the selection tool to add and drag text (not the user's habit). • Unable to upload pictures to whiteboard • The inability to share the whiteboard and PPT at the same time is important, I think, because meetings and discussions usually use the whiteboard together with sharing, and it is always difficult to switch back and forth. • Unable to scale whiteboard (no infinite zoom in and out function) • When reading papers and designing projects, it would be nice if professors and students could comment and help me mark my documents in real time (see acrobat's real-time marking function)	• add and drag text more easy. • allow to upload pictures to whiteboard. • share the whiteboard and PPT at the same time. • allow to scale whiteboard • comment and help me mark my documents in real time • can connect to a sketchboard, two desktop electronic screen, so that you can talk and also have something to write and draw at the meeting	• It is important to allow multiple devices and multiple forms of content to work together on whiteboards • It is important to allow multiple people to collaborate, such as synchronizing file editing and comments
Randoric	39	Male	sales	• Seldom	• Communicate with customers at meetings (mainly banks) • Internal communication meetings between colleagues	• no special functions	• Prefer share screen，because I can also mark when sharing. This whiteboard function is very troublesome for me, I cannot directly switch to screen sharing when I open the whiteboard.	• easy to switch share screen and whiteboard	• Quick and timely switchover share screen and whiteboard can reduces user operation steps.
Matt	31	Male	SWE	• Less than twice a week	• Meeting with UX designers, often when it's too rush to draw in Figma.	• Instant whiteboard sharing during meeting. • Provide basic tools such as pen, shape, text, and arrow, etc.	• Hard to find the whiteboard when first using. • The location of the toolbar blocks the canvas a lot. • Hard to find where to open the toolbar once it's closed. • The features inside the toolbar are not enough. • Can't insert images or other external media. • Hard to use Remote Control to work together. • Limited canvas size. The button of 'Add a page' is not intuitive. • Can't save the whiteboard to the folder I wanted. No hint if I have saved it successfully or not. • No shortcut key throughout. • Can't edit whiteboard after it's closed.	• Easy access to whiteboard in Zoom. • Better toolbar design with more drafting and design tools. • Better toolbar location and easier way to control it. • Allow inserting external files. • Better remote control that enable fluent collaboration. • Bigger canvas size or more intuitive way to add more pages. • Custom locations to save whiteboard. • Better saving process so that users are confident. • Similar shortcut keys with other drafting tools. • Can edit a whiteboard even after the meeting.	• Expose whiteboard more in Zoom. • Resonsive toolbar for meetings of various themes. • Refer to other online design or drafting products and learn conventions so that users know how to use the tools quickly. • Give users freedom to choose where and how to save whiteboards. • The feature of whiteboard should not be limited in meeting only. • Whiteboard should be more open to allow adding other media other than just drafting.
Fang	38	Female	Architect	• Once a week	• Discuss design with colleagues. • Designe together in a graphic design group.	• Highlighter is good to use as it stays long enough to grab attention. • Color blocks and texts are very useful. • Lines are easy to use and I can even rotate them.	• Hard to find the whiteboard when first using. • Remote control is hard to find out how to use. Need both hosts and participants to turn on permission. • Can't import images which can waste my time. • Can't change color for existing shapes and stamps. • The icon of save and the arrow next to is confusing. • Don't know where the whiteboard is saved after saving. • Can't edit the white board after it's closed. • Can't use share screen and whiteboard at the same time.	• Easy access to whiteboard in Zoom. • More intuitive way to start collaboration. • Allow inserting external files. • More intuitive icon design. • A hint to show where the file is saved. • Can edit a whiteboard even after the meeting. • See shared screen and whiteboard at the same time.	• Let the user easily find whiteboard. • The icons should be intuitive. • Make collaboration easier and let the users know they can edit as participants too. • Give users feedback once they did something like saving a whiteboard. • Users may need to use the whiteboard after the video meeting. • Possibility of multi-tasking/milti-sections during whiteboard sharing.
Jassica	21	Female	College student	• Every one or two weeks	• Online courses like algorithm.	• Easy to follow the teacher's thoughts when she uses whiteboards.	• The pen's handwriting doesn't look good. • Can't do share screen and whiteboard at the same time. • Not easy to interact with the teacher while in whiteboard.	• Refined handwriting look. • See shared screen and whiteboard at the same time. • Interact with the host when the whiteboard is sharing.	• Automatically optimized handwriting or drawing are popular. • When using the whiteboard, users may need to see other screens or contents as well. • When using the whiteboard, users may need other tools in Zoom such as raising hands, etc.
Dan	42	Male	Teacher	• Once a week	• Explain enginering analysis diagram to students.	• I can show students more details lively which has better feedback than using slides. • I can save every whiteboard and send to students if needed.	• Need to change tools frequently and it takes time. • It takes long time to find the saved whiteboard and can't share whiteboards within Zoom. • Can't insert an image.	• Easier way to select tools in the toolbar. • Easier way to find the saved whiteboard. • Share the whiteboard within Zoom. • Allow inserting external files.	• Explore approaches for users to select tools quickly. • Share the whiteboard with the participants in Zoom.
Ken	49	Male	Teacher	• Workday (Five times per Week)	• Teach the students, use the whiteboard to explain the content and explain the questions	• Students can see the content visually • Have a variety of tools to assist teachers in teaching • Students can also use the whiteboard to take notes and take screenshots	• Sometimes when students use Zoom for the first time, they often fail to understand how to use the Zoom whiteboard • Remote synchronization is difficult and reduces interaction between teachers and students • Only screenshots can be used to retain the lecture content, but the content cannot be saved in local files, which reduces students' learning efficiency	• Remote synchronization difficulties can cause delays in people's productivity • Too much pursuit of the tool's UI interface will confuse to students' visual focus	• People need sustainable remote synchronization • Keep the UI simple and focused
Julio	21	Male	play writer	• Three times per week (In midnight)	• Share storyboards and draw your own designs for the scene • Discuss the plot with the director remotely and draw/write a rough description of the scene	• Because of the relationship between the white board, it is very intuitive to draw the two sides of the conception of the scene, and can be real-time suggestions and timely modification	• The initial scale is so small that the user needs to make the scene large at some point • There is no blackboard option, since it is working in the midnight, the visual stimulation of white is much greater than that of black, which makes users feel uncomfortable for their eyes	• Need to provide the ability to scale the whiteboard • Provide different colors for different groups of people or provide whiteboard and blackboard options	• The frequency of scaling is quite high and different scaling rates need to be provided • White board and blackboard switch function for different groups
Elaine	21	Female	College student	• Four times per week	• Online Course	• See the teacher's ideas in time and ask your own questions simultaneously • It's very intuitive to see what the teacher mentioned in the lecture	• Due to the control of the mouse, there may be misunderstanding in writing, which may cost extra time to modify in communication • The mobile app doesn't zoom properly	• Need to provide the ability to scale the whiteboard • Hope it can add an auxiliary mode on the brush to make what the user draws or writes more beautiful	• The frequency of scaling is quite high and different scaling rates need to be provided • Accessibility features can be provided to allow users to better draw their content...
Brian	22	Male	Ad designer	• One times per week(8 hours each time)	• Design ads with colleagues and submit real-time reports to senior management	• Can share ideas with colleagues in a timely manner • Revise the plan in time and draw an outline	• There is no blackboard option, since it is working in the midnight, the visual stimulation of white is much greater than that of black, which makes users feel uncomfortable for their eyes • During the design, special design software is used. Because there is no auxiliary plug-in to synchronize with the whiteboard, it is have to switch back each time	• Make widgets to synchronize content from third-party software to the whiteboard • Provide different colors for different groups of people or provide whiteboard and blackboard options	• Plugins are provided to allow users to synchronize to the whiteboard when using third-party software • White board and blackboard switch function for different groups
Siyi	19	Female	College student	• seldom	• Online courses.	• Easy to follow the teacher's thoughts when she uses whiteboards.	• Some functions are not easy to be found. • When writing, the name label will shake under the pen, which is a little blocking the word. • When typing the text on the comupter, every time you press the space bar to output text, a short microphone will be triggered. • Can't erase other people's words with ipad. • Can't create your own quick meeting without logging in. • When selecting certain information, too many points cause fear.	• Add beauty and virtual background. • Replacing the computer's microphone start button • When a figure is selected, the control points are reduced to some extent • Improve the permission problem of ipad pen • Put the nickname in a place that cannot be touched by mistake when writing text, it will not affect the writing	• Interactive implementation makes the use feel like passing notes in high school. • Eraser wipe size should be adjusted.
Sunhao	23	Male	Arch student	• Never	• Discuss design with teachers.	• The graphics and colors are ok. • Simple design and easy to operate.	• The writing is not smooth. • Writing with a brush, the eraser will erase the entire figure instead of part of the shape	• Can choose different types of erasers.	• The basic tools need to be updated.
Zhen	20	Male	College student	• Seldom	• Participate in some international conferences	• Easy to use.	• It can not be applied well on phone.	• Provides a feature that automatically organizes spoken words into text and graphics on the whiteboard	• No characteristics. It seems no different from the Tencent meeting.
Lei	46	Female	Operation manager	• Never	• Business training	• The indicator function of the whiteboard is very easy to use.	• The whiteboard is too simple to add some graphics functions and fill graphics.	• The whiteboard is too simple to add some graphics functions and fill graphics.	• The features in the tools need to be more diverse and powerful.