Team Decision Making

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Introduction

In this software development setting, making correct and well-informed decisions are pivotal to our progress and ability to deliver satisfiable outcomes to the client.

In traditional business decision-making, the task of making decisions purely hierarchical, where it is delegated to one person (e.g., project manager), and a consensus is obtained from those up the hierarchy (e.g., executives). As we adopted an agile developmental process, we also employ agile decision making, where all team members are encouraged to partake in the decision making process. This decision making process is as follows:

Decision Making Process

1. Identification of the issue: if a team member identifies an issue, they will share it with the rest of the group via a communication channel (e.g., WeChat, Zoom, in-person meeting). This issue may be a technical challenge or a change in project requirements.
2. Identification of the decision: As a team, we will determine potential ways forward. Specifically, we analyse potential decisions, and each of their pros and cons.
3. Discussion: Team members share their opinions and insights on the potential decisions, which ensure that all members are well informed by the issue at hand.
4. Decision making by consensus: Finally, we query all team members for their opinion on which route to take. We will select the choice that all team members are happy with.

Through this process, we were able to settle on certain decisions with ease, with every team member thoroughly informed in the process.

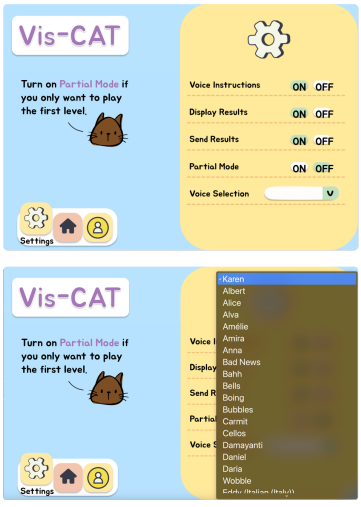
While an exhaustive list of decisions can be found here: Group Meeting & Client Meeting, we list here some of the key decisions we made which altered our path/workflow for this project:

Sprint 1 (Week 3 - 6) Key Decisions Made

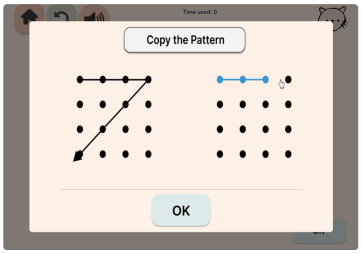
Category	Decision	Date	Description
Tech Stack Selection	Choosing to use React Native for implementing front-end.	08/08/2023	At the start of sprint 1, we set a goal to create a mobile application. Hence, we decided to use the React Native framework to help us realise this. We achieved a consensus to use this framework (out of all other potential frameworks) as it was easy to learn and relatively beginner-friendly.
	Scrapping React Native framework, choosing to use Vue for implementing front-end.	21/08/2023	In a Zoom meeting with the client, it was re-established that the test must be compatible across all end systems and operating systems. We knew that our current framework could not best meet this requirement, since we were on track to create a mobile app. We decided that our best course of action from that point onwards was to create a

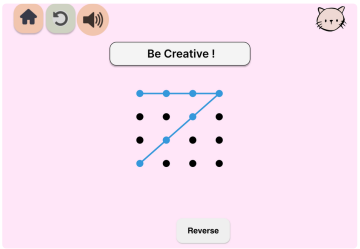
			web app instead, and re-implement all of our code using the Vue framework.
	Choosing to use the tool Figma for UI Design.	11/08/2023	When doing our research in choosing a UI design tool for this project, we came across many potential softwares that we could use to design our UI. Figma stood out to us due to its user friendly interface which makes it easy get started with. In addition, it is an all-in-one tool that has features that are useful for both designers and developers. Hence, all members collectively chose Figma as our UI design tool.
Design Approach	Choice to employ a pastel, cartoon theme for the front end.	13/08/2023	We decided our user interface must be designed to accomodate our target audience - children ages 5 to 12. Hence, our team members deemed it appropriate for the UI to feature: 1. Cartoons, as it makes the test seem more fun and relatable, and 2. Soothing pastel colours, due to its “calming and relaxing effect” on children’s emotions and behaviour (Choudhury and Kumar, 2023).
Sprint Planning	During the sprint planning meeting at the beginning of sprint 1, we committed to a specific number of user stories we wanted to complete in the sprint.	11/08/2023	The user tickets that we targeted (at the start of sprint 1) mainly focused on the UI realisation (i.e., design and implement). On one hand, we were tempted to commit to many user stories due to the high workload of the project. However, we wanted to ensure that all team members were on the same page, and we did not want to take on more than we could handle during a specific period of time.
	Chose to take on more user stories and functionalities for the current sprint.	19/08/2023	Since we had completed the tasks assigned for the sprint ahead of time, and the client was happy with our design (please see Meeting 1 notes Client Meeting), all group members were enthusiastic to work ahead in our sprint and take on more tasks. Hence, we began to focus on the more logical aspect (i.e., test implementation) of the project.

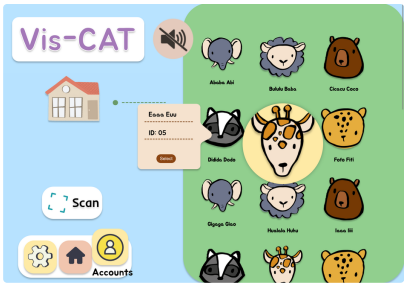
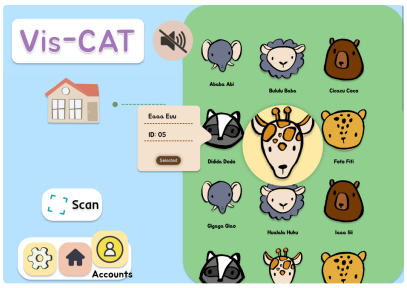
Sprint 2 (Week 6 - 9) Key Decisions Made

Category	Decision	Date	Description
Tech Stack Selection	Choosing to use Heroku for deployment	11/09/2023	As we approach the end of our app implementation, deployment became a necessary next step to consider. Currently, there are many deployment tools on the market. Following research and deliberation, we chose Heroku for our deployment. This is because it is user friendly and as a result, suitable for us - students who are beginners to web deployment. In addition, it offers a free tier that allows students to deploy at no cost, which makes it the most economically viable option. (Deployed app: vue-app)
Functionality	Voice instructions - robotic voice implementation	08/09/2023	As the client requested for us to add a verbal instruction functionality, there were many approaches we could take to implement this feature. We collectively decided on adding a “Voice Selection” dropdown, which gives the user the choice to listen to different audio types. We used the Web Speech API to generate the elements in the dropdown, which provided a plethora of diverse AI generated voices. We believe this fun addition would aid student engagement, since it was a feature that made the process more enjoyable and interactive but does not distract from the actual test itself. 

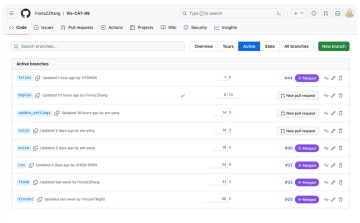
	Voice instructions - human voice implementation	11/09/2023	After implementing the voices, we were disappointed to find that the voices were not child friendly enough. Specifically, the voices lacked intonation and articulation, and were too fast-paced; all factors which may affect the child's engagement and understanding of the test. As a result, we came to a consensus to use our own voices in the vocal instructions. While manually creating dozens of voice recordings is a laborious process, we deemed it necessary as this adds a "human factor" to the test, which makes it more interactive and accessible for the user. Below is just a sample of what the dropdown looks like now, but additional human voices will be added by the start of sprint 3, to recreate the variety we had while using the Web Speech API. 
	Voice instructions - option to turn on/off across different pages	15/09/2023	In the process of testing the app, we observed another issue that may affect the usability of the app. Since many of the instructions were repetitive, the child may find they no longer need the help of vocal instructions midway through the test. While it was an option for the child to simply turn off the voice instructions in settings, they cannot enter the settings page mid-test (without affecting scores). Hence, this button adds convenience and allows the user to control the volume of the voice instructions freely, preventing the vocal instructions from being obstructive. 

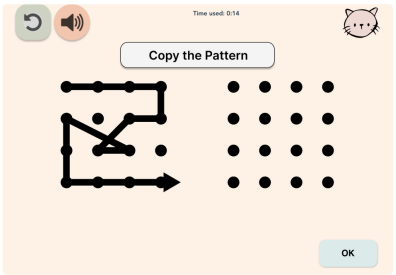
			  General location of sound button
	Add GIF instructions to preface each test	06/09/2023	Previously, there was no demonstration on how to complete the tests on our app. In addition, we all agreed that the child may not know what a “lateral” or “vertical” flip entails. We collectively decided that this lack of information may cause confusion and decrease the accessibility of our app. Therefore, we decided the app would benefit from adding instructional GIFs to the beginning of each test, which can aid the child’s understanding and minimise the occurrence of inaccurate scores. Specifically, at the beginning of each test, a pop-up window appears, showcasing a sample pattern on the left and an empty set of dots on the right. The GIF shows an animated hand tracing the dots in accordance with the current test.  A sample GIF instruction which appears at the start of each test
	Add drawing functionality to Playground page	15/09/2023	Previously, the Playground page was empty and was only used for debugging the testing pages' logic. We deliberated upon either removing the Playground page altogether, or giving it a functionality - allow the child to freely connect the dots on the page without restriction. We chose the latter, as having the Playground page does not distract from

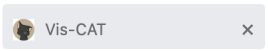
			the actual test itself, and makes the application more interactive and engaging for the child. In addition, it gives the child a chance to practice connecting the dots on their tablet before actually taking the test. This may also reduce the occurrence of false positive results. 
	“Select” on Accounts Page	06/09/2023	Towards the end of Sprint 1, the client had decided that it was feasible for users to load their profile data by scanning a QR code. However, after implementing this solution, we discovered that proper safeguards (preventing the user from selecting the incorrect profile) had not been established. This could have resulted in high levels of data collection errors and false positives. Hence, we decided it was necessary to add a “Select” button after the user clicks on their profile. The “Select” button prompts the user to double check that the profile they clicked is indeed their own. After clicking “Select”, the button becomes “Selected”, and user is unable to click on any other profiles. If they discovered they made a mistake, they can simply click “Selected”, which deselects their profile, enabling the user to reselect the correct profile. This safeguard allows users to confirm their profile is indeed correct, and also prevents a situation where the user accidentally clicks on the wrong profile upon exiting the page; effectively reducing the margin of error in the data collected.

			 A profile is clicked on but not selected. At this stage, other profiles can also be clicked.  A profile is clicked on and selected. As a result, other profiles can no longer be clicked (unless the profile is deselected).
Software development practices	Open git branches to address specific use cases	11/09/2023	In the previous sprint, we used branches named after ourselves (and pushed implementations for features that were delegated to us in previous team meetings). However, we found that this practice does not align with the principles of branch management in Git and is not necessarily organised. Hence, we decided to open Git branches baed on use cases instead. This has been highly useful for many reasons. In particular: 1. Opening branches based on use case has resulted in smaller branches, which are easier to merge and result in less merge conflicts. 2. It has greatly simplified the version history, as code changes are easily traceable in a smaller branch, allowing for easy rollbacks if errors occur. 3. The contents of each branch is now self-explanatory, which greatly assists in sharing code updates with fellow team members in a non-obfuscating manner.

Sprint 3 (Week 10 - 12) Key Decisions Made

Category	Decision	Date	Description
			 Addition of use-case-specific branches
	Use of Meeting Minutes to document client meetings	11/09/2023	In the previous sprint, we simply used tables to document meetings. However, this practice was not structured or well-defined which may affect readability further on. To resolve any possible issues relating to the understandability of the client meeting notes, we decided to use the well established meeting minutes template to document our client meetings. This has allowed us to enhance the structure and guaranteed and was reported to be accessibility of our records. extremely slow for certain operating systems and browsers. This directly updated layout can be found here: Clie nt Meeting) requirements of fast-response time.
Tech Stack Selection	Using AWS for deployment instead of Heroku	10/10/2023	In the previous sprint, we chose to employ Heroku for deployment. While we were able to get the system up and running, we identified a very critical problem: speed. Specifically, the time it took to load our Heroku-deployed product could not be (Client Meeting Documentation with this Hence, our team came to a consensus to replace the current cloud platform with something faster and more reliable. We discovered that AWS loads webpages significantly faster than Heroku, and can maintain a consistent service for different browsers and computers. In addition, we found that using AWS to deploy our small-scale project is free of cost, which is more economically sustainable for our product team in the long term. Therefore, we made the educated switch to AWS for deployment. (More about our deployment here: Deployment)
Functionality	Challenge functionality to be accessed from Lobby page	7/10/2023	In Sprint 2, our client expressed that she was happy for us to add a series of ‘challenge tests’ to the product as a permanent feature. The challenge tests are not a part of the original requirements, and are more challenging than the diagnostic tests. Hence, a decision we had to make was identify the most appropriate location to direct the user to the challenge tests.

			Previously, we appended the challenge tests to the end of the original tests. However, this was not very intuitive because users were unable to opt out if they did not want to participate in these tests. Hence, we decided to add a button (to the Lobby page) which directs users to the challenge tests. This gives users the option to only participate in the tests.  Sprint 3 Lobby appearance
	Removed home button in test pages	14/10/2023	In our testing pages, we realised that users can opt to exit during any test by clicking the home button. This was problematic since it meant that user scores would not be sent to the backend, leading to a (possible) plethora of inconclusive tests. Therefore, our team made the unanimous decision to remove the “Home” button altogether in the testing pages. This will enforce users to complete the test to its entirety and reach the Finish page, consequently allowing the scores to be sent to the backend.  Sprint 3 Test Page appearance
Design	Favicon selection for our product webpage	14/10/2023	By the end of our product development, we were still left with a final UI-related task: adding a favicon (i.e., the small image in our browser tab) to our webpage. We designed several:

			   While all three icons are appropriate in their own right, we decided it would be best to utilise the first one. This is because the design more closely aligned with the “animated” theme of our product, and also because we liked it the best 😄. This is what our product’s browser tab looks like now:  Vis-CAT browser tab
	Sound button appearance updated	15/10/2023	While the sound button works fine and makes the app more easy to use, we all agreed that it did not have the best design.  Initial design As seen above, the sound button looks more like an icon than a button. Ultimately, we agreed that adding a drop-shadow would make it stand out more against the background and look more “clickable”, and consequently help make our product easier to understand.  Final design

Conclusion

When done correctly, decision-making is paramount to meeting goals and expectations. By implementing a concise, step-oriented decision making process, we have been able to make decisions that are consequently transparent, collaborative, and align with client requirements.

References

Choudhury, N. and Kumar, J. (2023). Investigation of Chromatic Perception of School Children During HCI in Computer-Supported Collaborative Learning. *Communications in computer and information science*, pp.225–230. doi:https://doi.org/10.1007/978-3-031-35998-