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Report On potential of the VR Simulation for Informed Practise with children

Written by David James McCann

Initial project Assessment

The VR simulation for informed practise with children is a project to create a self-reflection and assessment tool. The project is to be used with 1st year university students as part of a semester long course, where the tool will provide them the opportunity to practise assessing a children's environment for Strengths and Challenges. This course is intended to begin in November 2020. Students will be expected to unpack their own biases in how they assess environments in specific ways throughout the course, and this simulation is intended as a tool to better facilitate that. As an example, the provided transcript from a focus group shows a significant bias towards negatively judging clients instead of acknowledging the strengths and challenges of the children's environment.

When brought on to the project in April of 2019, our small team was tasked with refining the prototype put together by 2018's previous placement team. We quickly identified several Key targets to meet:

Reacquire and relocate the Git repository:

The previous team had used a private repository under the control of the previous programmer, William Holman. Additionally, they had local repositories on the three available VR development PC's. On the first day one of those PC's needed to be formatted and the local repository was lost. As such, we resolved to create a new Git Repository under the control of Shepard Masocha. By the end of our placement Shepard will be in control of the repository and able to add new members to it as new placements take effect

Refine initial prototyped design:

As with the focus group, the initial design pass showed a tendency towards negatively judging clients. This was most clear in the Design documents language and discussion of 'finding evidence of abuse'. As such, the design was refined to remove as much of this negative bias as possible. Rather than defining specific points of interest in a scene such as knives, the current philosophy focuses on tracking a participant's approach to the assessment. The team removed extraneous tools such as 'examining' objects, as that encouraged unwanted behaviour in participants (note: social workers do not generally walk into a clients home and pick things up to look at their labels). And refocused on tracking metrics such as where a participant looks and how often they look at those spaces.

Transition original prototype to 360 videos

The original prototype was developed to use a single 360 degree still image. This approach meant that more complicated scenarios for users would never be implemented and hampered further development. Additionally, multiple scenes needed to be implemented into the new prototype over one static scene. These two tasks were combined into one target.

Refine User Interface

The clients focus is on a clear, lifelike approach to the sim. Ideally there should be as little 'video gamey' interference as possible. Instead, students are required to experience the scene in as close a way as possible to real life. All extraneous UI elements should be removed and new ones should be implemented in a non-intrusive way.

Ability to load up previous metrics

This was established as a stretch goal. The clients requested the ability to save and reload sessions as necessary.

Establish a clear direction for future development

Finally, the team was tasked with creating a baseline that future teams could use for further development. The team established two unique vectors to approach this target. Firstly, a comprehensive documentation phase. One 6th of the time spent on the project was to be devoted to documentation and assessment. This included refactoring the project for future users and attempting to clear any extraneous files from the project. Secondly, the team focused on implementing an initial pass on an 'interactive' scene. The interactive scene is intended as a side stream of development, hopefully pulling all the behaviour from the 360 video scenes while also allowing participants to move around and inspect scenes. It requires a large chunk of time from the art department to implement the scenes and is expected to be a long term goal of each future placement team.

Final project Assessment

After six weeks the current state of the project is summarised as follows:

Git repository:

The git repository was recreated on the first day of the project and subsequently used for the next six weeks. On the final day of placement control was placed into Shepard's GitHub account.

Refine Initial Prototype:

The extraneous elements of the design were removed early in development. Testing was conducted on an ongoing basis to ensure anything intended to replace old functionality worked. The current implemented features are as follows:

Head tracking –

The simulation records the point that the headset is looking at every .1 of a second. At the end of a session users are given the ability to display this metric as a colour graduated line of how their vision progressed around the room. This line has points on it that show timestamps for their assessment.

Heat Mapping –

Heat mapping uses the recorded data from head tracking to assign places of high and low interest in the scene, showing areas the participants focused on as progressively 'hotter' areas. Again, this is a metric that can be displayed at the end of a session.

Sound priming –

The initial main menu uses a basic 'puzzle' looped track to try and prime participants towards being inquisitive rather than antagonistic. As per the client's instructions there is no audio intrusion into the actual assessment scene excluding some basic audio for UI interface interaction and the recorded audio of the video.

Transition to 360-degree scenes

The build has three distinct scenes for users to transition too. Each scene tracks its own metrics so that when users finish their session they can visit each scene and observe the different approaches they took to their assessments. Additionally, each scene plays a full 360 degree rendering of the supplied video files, audio included. This could potentially allow future designers to record new scenarios for students to participate in and plug them in as necessary, allowing faculty and designers to create staged and ramped sessions that present students with increasingly more chaotic scenes to assess.

Current UI

The current user interface builds on the previous implementation. It can now be turned on and off by holding the trackpad for a moment, and users interact with the buttons through single taps now rather than double taps. When the interface is on it is stationary in the scene. When it is turned on it appears relative to the players head position, so they can always see it.

Ability to Load previous Sessions

The current build has a load and save feature that allows users to save their session and load up new ones. These options become available when the user 'finishes' the scene. There is currently no way to name these sessions, as that would require a virtual keyboard and was deemed to be more of a hinderance to a user than a boon.

Future Development base

This report is part of the base for further development. It helps to communicate any needed information to the following designer and any stakeholders interested. Additionally, the GDD is up to date, as is the TDD. Finally, code refactoring has been taking place over the full 6 weeks.

The artist department suffered a small set back due to personal issues but has still made progress on the interactive scene. A first pass grey box will be in to the scene by the end of placement. Additionally, there is some basic functionality in the scene. It is a far off from being complete and simply transposing the 360-degree functionality will not work unfortunately. These issues are detailed in the GDD.

Potential future branches of development

The unique challenge of this project comes from a complete lack of doctrine or policy put forward by social workers regarding how an assessment takes place. For example, when asked for things to track a 'good' assessment versus a 'bad' assessment an experience social worker is apt to be puzzled by the need for such things. They view that sort of 'objective' approach as contrary to their job and more of a psychologist's field of expertise. A Doctrinal approach or a policy driven approach is deemed as counterproductive because it often alienates clients and rarely actually supports a worker's assessments. It seems to be a point of pride in fact that each social worker focuses on their own way of doing things.

To most social workers asked about this, there is no 'right' way to assess a client's home. No specific approach. There are plenty of specific wrong ways to do it though. Every social worker asked about this process so far will very quickly tell you how not to assess a child's home, but when asked about the commonalities of doing it properly they will look draw a blank. A clear example comes from Marguerite McCann. It took half an hour of conversation to establish that when inspecting a home,

the first thing she always does is sit down in the lounge somewhere. In practise, this simple act gives her a moment of calm. If she's sitting down someone is going to 'attend' her, and that low energy interaction affords her time to look around the space and assess it. Finding basic habits like this in other approaches would be the key to defining new metrics we can measure for students.

There are also 3 key areas that have been defined over the last 6 weeks that could be further developed in new and interesting directions.

Continued work on the interactive scene

The interactive scene affords a number of possible metrics to measure in students behaviour. Initially there is simply the ability to measure where a student moves in the space. By itself we would be able to show how long they spend in certain places as well as where they look from those places. With the proper input from staff and faculty it may even be possible to define key points in the scene that students should be assessing from. The process of finding those points and using them provides more data about how well students assess the environment and provides them with evidence for defining and unpacking their biases.

Further, the interactive scene could allow students to practise interaction with clients while in the space through more traditional elements of game development, such as ai actors with programmed behaviour. While the fidelity is unlikely to ever reach 'realistic' standards, it will still afford new opportunities to examine students biases and approaches to environmental assessment.

Potential scenarios through 360 videos

The 360 videos present a unique opportunity. If Designers could get involved with the actual recording of sessions, then they could craft more complicated scenarios that take place as users watch. Additionally, this affords them the opportunity to have a more graded approach to the sessions users experience through a 'levelled' process. They could have initial, calm spaces for their introductory classes and then have more involved stimuli in later sessions which ramp up the challenge. In final iterations they could potentially have actors talking directly to users and asking them questions which serve as distractions while things happen in the background of the scenes.

Potential metrics built on concrete, objective goals

Finally, a further element of development could be to work closely with experience social workers and to try and define a framework that shows what a good assessment of an environment requires in a behavioural sense. A framework that defines how a social worker looks through the space would afford more metrics to track and reveal new ways for users to interact with the scenario.

Potential Blockers of future Development

Hardware limitations

The current build is designed and implemented for use with a Samsung Gear VR. The Samsung Gear VR hasn't specifically been discontinued, but there hasn't been any move to develop the technology much since 2017. Samsung and Oculus have stated in 2019 that they are still partnered and working to support the headset, but they haven't released any updates on it. There is the potential that in the future the headset may become unfit as a platform to deliver a curriculum required course.

Possible Solutions

If the Gear VR fails to provide the functionality required from it, then it would be quite easy to port the project over to the Oculus Go. This is a standalone piece of hardware that is currently in development by Oculus and has shown a healthy number of updates in the last few years. Additionally, there are many other stand alone headsets available such as Google's Daydream View Mobile Headset.

VR Sickness

VR Sickness is still a prevailing problem for many people. A student that suffers from VR Sickness is effectively cut off from the tools they would need to improve. In that situation, it is the Universities responsibility to provide alternatives

Possible Solutions

Currently there is a 360-degree video of the scenes that has been stitched together for upload on YouTube. While this doesn't provide the functionality of the prototype, it does at minimum provide the students some opportunity to experience and understand the discussions that are prompted by the VR Tool.

Additionally, further placement teams could be tasked with developing an AR version of the tool. It would function in a similar manner to the Debug version of the current tool on mobiles (the debug version of the build can be accessed through the services menu on the phone in the VR section and provides the full functionality of the app without a user needing a headset. It functionally acts as an AR viewport)

Limitations of the development process using placement teams

Currently there are three computers available to work on the current project. These computers must be shared amongst the placement team. However, for future development there is a clear need for a team with more than one artist, in order to help flesh out some of the other avenues of development. In a six-week period it may be possible to have a relatively well modelled single room, or a first pass on a rig.

Possible Solutions

Providing more art students to teams could help alleviate some of the mounting art work and allow quicker progress on some of the development avenues available. Alternatively the University could hire some freelance artists to work with placement teams.

Focus for Next Placement

The clients have identified that video quality is a high priority focus for the next placement team. Currently Unity is rendering out the 360-Degree videos with screen tearing and low resolutions. Additionally, the Samsung Galaxy S6 phone being used in conjunction with the Gear VR is refusing to take higher quality videos in the build as they are too large. The next teams focus will have to be on finding a middle ground between video quality, size and the restraints of the platform. The Technical Design Document has specific details on how this might be achieved, but the problems were revealed very late in this development phase and fact finding was limited.