

Submission Template for ACM Papers

Unwanted: A Virtual Reality Project

Bullying, Its Global effects, and How It Can Be Solved Through Design

Maria, M.R., Romero

University of Illinois at Chicago, mromer37@uic.edu

Jiayuan, J.S., Sun

University of Illinois at Chicago, jsun75@uic.edu

Jasmine, J.W., Washington

University of Illinois at Chicago, jwashi29@uic.edu

Bullying is a global problem that kids and adolescents face. With new technologies (Virtual Reality) we have created an environment where others can have an up-close experience of bullying in a school/classroom environment. Our group did research to develop our project and the creativity/design of each group member to do our project. This paper focused on our project description, and what we created as a group: designing a solution, challenges, and overall, our approach to designing a project that can be experienced in virtual reality (Quality Education).

CCS CONCEPTS • Social and professional topics • Human-centered computing • General and reference

Additional Keywords and Phrases: Virtual Reality, Design, Bullying, Sustainable Development Goals

ACM Reference Format:

Maria, M.R., Romero, Jiayuan, J.S., Sun, Jasmine, J.W., Washington, 2022. The Title of the Paper: Unwanted: A Virtual Reality Project: Bullying, Its Global Effects, and How It Can Be Solved Through Design.

1 INTRODUCTION

Virtual reality has been used for entertainment, in medical care, the military, and in business. In this virtual reality project, we explore the relation between virtual reality and design. How we can

create something that is not only immersive but gives a solution to a real-world issue(s). Virtual reality has been known for the empathetic feelings it can create in a player specifically when touching topics that are relatable or even to more solemn matters such as war, violence, and climate change. Although it's great for the player to have these empathetic feelings it doesn't bring the player to a sense that they are also part of the bigger picture and that they themselves can make a change within their own individual life [1].

So, when approaching the idea of the 17 Sustainable Developmental Goals created by the United Nations our main goal was to create a solution that the player wouldn't view as impossible or something that would be too complex because a solution doesn't have to be complex to be good it just has to be effective, whatever that intended effect maybe. The sustainable goal that our group chose is the 4th goal which is Quality Education. We chose Quality Education because it was something that we are all interested and passionate about. We recognize that there are many children without an education and that many of these same children encounter numerous challenges to even receive an education. Some of these challenges maybe a lack of resources, financial instability, transportation, discrimination, violence, etc.

Our group specifically focused on bullying as a sub-topic of Quality Education. Bullying is something that all kids and adolescents face, at least once in their lifetime. Some may of course experience it more severely than others but the way it disrupts a child's learning environment and prohibits them from having a well-rounded education which in turn affects their mental health as well as how they view education needs to be addressed and solved. And surprisingly enough design through the use of virtual reality can help to bring a solution to this global issue.

1.1 Why Bullying?

As briefly described in our introduction above, bullying is a problem in education that is global. Most people think that bullying is simply a Western problem but in fact it goes more in-depth than that. As shown in [3], 1/3 of adolescents globally have experienced bullying. UNESCO also claims in [2] that it is estimated that, "246 million children and adolescents experience violence in and around school every year." To some this might be a small number considering the billions of people that live on this earth but when you consider how most bullying happens in poorer and high population countries the numbers don't seem so small after all. As shown in [4] youth faced the most violence in the continent of Africa even more than Europe and in Asia. The continent of Africa alone has a population of 1.4 billion as of 2021. The more inequality that is in a country the less there is a focus on education and the more violence is experienced especially among the youth [4]. So, the issue of bullying is not something that starts in the classroom but is part of a broader systemic issue within education itself and the social perspectives of the country.

But bullying is not always physical violence, due to our current technological society cyberbullying has become even more prevalent than physical violence. In Spain, 39.85% of its adolescent population have undergone cyberbullying, 27.43% of that same group have experienced it more than once, and 88.5% started experiencing psychological issues like fear or anxiety [5]. In America, in a survey done by the CDC in 2019 pertaining to youth risk behavior, that around 15.7% of high school students suffered cyberbullying a year before the survey [9]. This evidence is not

surprising due to how easy it is for people to hide behind computer screens and phones where they know they can get away anonymously with bullying practically anyone they would like. Social media is also an easy way to do this because people are more comfortable, with sharing their personal lives, images of themselves and friends/family, or even building an online persona.

Overall bullying has shown to be a global issue. It is the most prevalent in less affluent countries, where there is the most discrimination, and online. It is systemic and because of it being systemic it is harder for students who are bystanders to stand up for their peers [6].

2 OUR SOLUTION

Our solution came to be during the design process and with that came different design challenges.

2.1 The Design Process and Building the Virtual Environment

First, we determined the design direction. We wanted to reflect the campus environment and let the players have an immersive experience. In the original story version, we wanted to compare a friendly and a bullying campus environment. In contrast, it reflects the influence of campus bullying on students' psychological health and life. However, we found that it doesn't give any solutions. Later, we revised the storyboard [Figure 1]. We started to focus on the part that embodies bullying. We set the participant(s) in a classroom setting. Over time, the participant(s) experienced positive words and then encountered negative words. The classroom environment becomes negative and depressing. This change is reflected in both the visuals and in the audio we chose. For example, you can change the color of the environment and the background sound effects to achieve the goal of an immersive environment. To show the solution, in the end, the participant(s) sees a mobile phone in the middle of the classroom. The bullying elements in the classroom are completely removed when the participant(s) clicks the mobile phone.

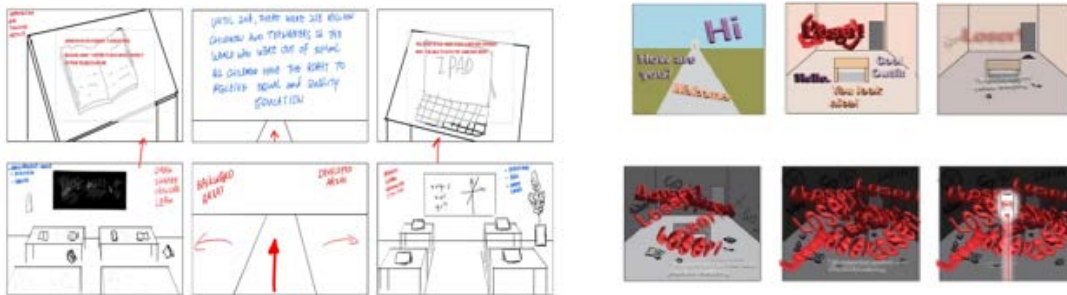


Figure 1: First and last storyboard ideations/illustrations using Illustrator and Photoshop.

After determining the storyboard and design direction, we sorted out the required materials. The primary materials needed are models of classrooms and mobile phones, good words and bad words, and interactive functions. We collected models of classrooms and mobile phones from some resource websites. Text materials and models are established through Illustrator. We put and created these models into Maya and then from that to Unity. Lastly, we achieved the desired interactions through learning the code (C#) in Unity.

2.2 Technology and Development

In this project, we were faced with many challenges. For example, we had to become familiar with a program in a limited time, how to find some available resources, and the problem of synchronizing project files. The biggest challenge for us was coding. As we are all graphic design majors, we are only familiar with HTML and CSS coding. C# is a new thing for us. We encountered many problems in coding. Our scenario scope is relatively small, so we had to design more interactive functions. For example, if the participant enters the classroom, the sound effect will be played automatically. The wall color and light will automatically change. All harmful elements will leave the scene after you click the phone, shown when the user collides with an empty object in the middle of the classroom [Figure 2]. To achieve the goal of returning the classroom back to a friendly environment, we set in the code (which was done by Jiayuan) that all materials will come back after the players leave the classroom. However, in the process of implementation, we encountered many headaches. For example, the code usually runs, but the effect differs from what we want. Or it does not report errors, but it did not work correctly. Most of our time was spent on finding a code tutorial only. Fortunately, by changing our thinking and testing in the CAVE2™, we finally found the cause of the problem [Figure 3]. This process was beneficial to us. In continuous learning, inspection, and improvement, we learned how to adjust our thinking and find effective learning methods.



Figure 2: Image of phone in classroom in Unity.



Figure 3: Testing in the CAVE2 and this was our final test (Test 2).

Another challenge comes from teamwork. How to allocate the appropriate workload to everyone is difficult. We finally adopted a cross-collaboration approach. We first list the work to be done at each stage, and members receive part of the work. When one member encounters an unsolvable problem, the other members help. The most depressing situation occurred when the project was about to be tested, and we, unfortunately, got infected with COVID-19 and the flu. That delayed the progress of the work by nearly a week. With everyone's coordination, we caught up with the test. In this process, we have deepened members' trust and understood that member cooperation is essential to teamwork.

When working remotely, we also encountered the inability to synchronize project files. Because one member's MacBook is an M1 processor, the compatibility problem makes it unable to use Unity Cloud Build. Therefore, we originally planned to use plastic. However, plastic didn't work on another member's MacBook. At the final stage of the project, we decided to move the project to Box. The final challenge is how to present the solution. In the plan, our solution is set as a phone. When making this part, we found that it needed to be clarified for players. In essence, the phone is just one step; the real solution is the anonymous reporting platform. Therefore, we created a

poster for the phone to show the anonymous reporting platform. The poster has a platform title, anti-bullying slogan, and an anonymous report button [Figure 4]. After completing the report, the power of anti-bullying helps players eliminate the bad environment (removing all negative elements). Establishing an anonymous reporting platform is the first step to solving the bullying problem. When there is an anonymous reporting platform, bullies or those who find bullying will have the opportunity to improve the surrounding environment through anonymous reporting. It also allows schools and relevant institutions to know whether the environment in which students experience is healthy and time to take necessary countermeasures and measures. Through the immersive reporting process, players can understand the negative impact of bullying and how to counteract bullying through anonymous reports effectively.

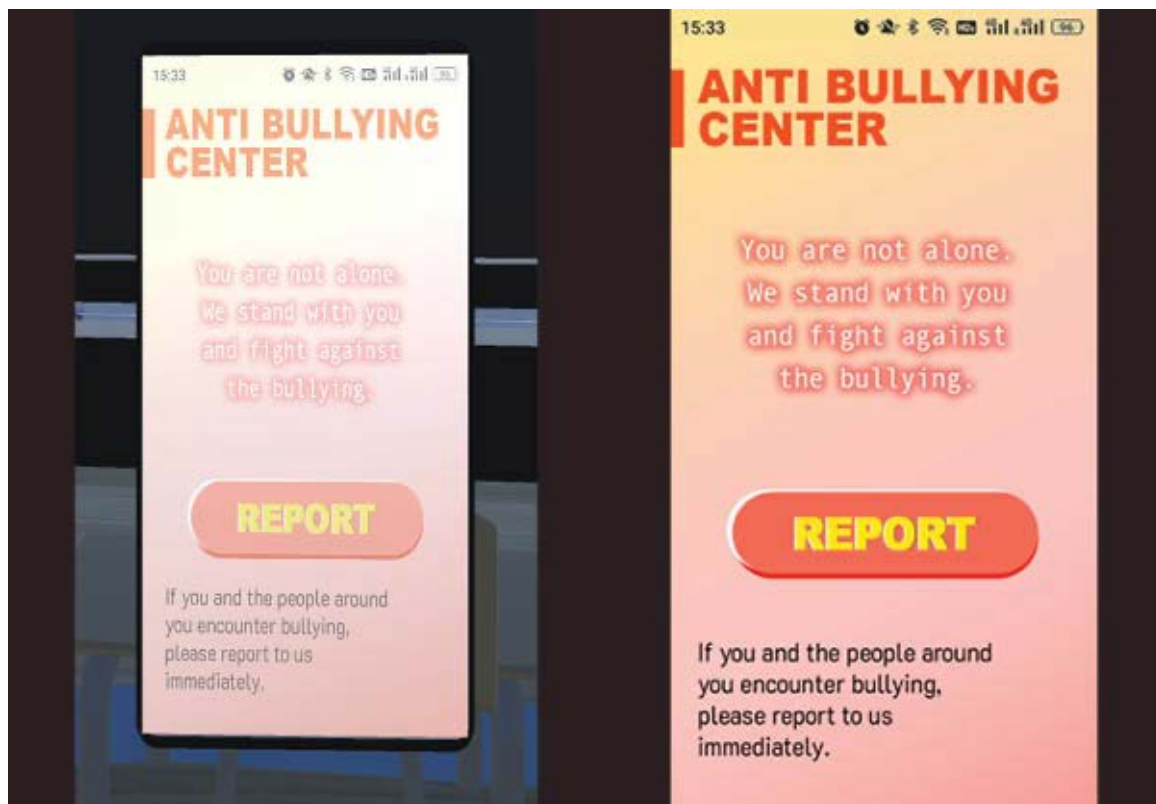


Figure 4: Mobile phone in the first image is in Unity and the second image is a closer look at the app itself.

2.3 Conclusion

Bullying is a global problem that kids and adolescents face. With new technologies (Virtual Reality) we have created an environment where others can have an up-close experience of bullying in a

school/classroom environment. Our group did research to develop our project and the creativity/design of each group member to do our project. This paper focused on our project description, and what we created as a group: designing a solution, challenges, and overall, our approach to designing a project that can be experienced in virtual reality (Quality Education).

REFERENCES

- [1] Martingano, A. J., Herrera, F., & Konrath, S. (2021). Virtual reality improves emotional but not cognitive empathy: A meta-analysis. *Technology, Mind, and Behavior*, 2(1). <https://doi.org/10.1037/tmb0000034>
- [2] *New SDG 4 data on bullying*. UNESCO UIS. (2018, September 28). Retrieved November 20, 2022, from <http://uis.unesco.org/en/news/new-sdg-4-data-bullying>
- [3] *School violence and bullying*. UNESCO. (2021, April 13). Retrieved November 20, 2022, from <https://en.unesco.org/themes/school-violence-and-bullying>
- [4] Elgar, F. J., McKinnon, B., Walsh, S. D., Freeman, J., D. Donnelly, P., de Matos, M. G., Garipey, G., Aleman-Diaz, A. Y., Pickett, W., Molcho, M., & Currie, C. (2015). Structural determinants of youth bullying and fighting in 79 countries. *Journal of Adolescent Health*, 57(6), 643–650. <https://doi.org/10.1016/j.jadohealth.2015.08.007>
- [5] Méndez, I., Jorquera, A. B., Ruiz-Esteban, C., Martínez-Ramón, J. P., & Fernández-Sogorb, A. (2019). Emotional intelligence, bullying, and cyberbullying in adolescents. *International Journal of Environmental Research and Public Health*, 16(23), 4837. <https://doi.org/10.3390/ijerph16234837>
- [6] Lacharite, M., & Marini, Z. A. (2008). 12. bullying prevention and the rights of children: Psychological and Democratic aspects. *Children's Rights*. <https://doi.org/10.3138/9781442687615-015>
- [7] Kaloyirou, C., & Vong, S. K. (2022). Re-conceptualisation of school bullying from a children's rights' perspective: The illustrative case of the Cypriot Educational Context. *Children & Society*, 36(5), 899–915. <https://doi.org/10.1111/chso.12546>
- [8] Sticca, F., & Perren, S. (2012). Is cyberbullying worse than traditional bullying? examining the differential roles of medium, publicity, and anonymity for the perceived severity of bullying. *Journal of Youth and Adolescence*, 42(5), 739–750. <https://doi.org/10.1007/s10964-012-9867-3>
- [9] Centers for Disease Control and Prevention. (2020, August 20). *YRBSS Overview*. Centers for Disease Control and Prevention. Retrieved November 20, 2022, from <https://www.cdc.gov/healthyouth/data/yrbs/overview.html>