

Thesis Project Portfolio

Motion of the Spheres: Constructing a Compact Mechatronic Orrery

(Technical Report)

Public perception of entertainment technologies and the scientific effects of those technologies on the brain development of children

(STS Research Paper)

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Introduction

The motivation behind the mechatronic orrery was to create a fun and educational orrery to teach students about the position of the Moon and Earth. The students would be able to operate the orrery as a method of exciting students and so that it would be more engaging than other orreries. Lastly, it was designed with some artistic sense so that it is naturally beautiful if students simply want to look at it. The motivation behind the STS research paper was also an educational purpose, but rather than students, it was to educate parents on their children's television viewership. I knew that television had been advertised as bad for my health growing up, but I wanted to know if it was truly detrimental to my development. Additionally, I really wanted to know if the worries of television being a detriment to development carried over to other technologies, such as virtual reality.

Technical Project

Orreries are models of the Solar System that accurately show the positions of the planets around the sun through the use of gear ratios. The reason that these orreries are limited in their use is that you cannot look far into the future. Our project will instead create a mechatronic orrery that can snap automatically into a position that corresponds to any date. The orrery will be able to rotate at a constant rate to show how the Earth and Moon will look while they revolve around the sun. The orrery will allow user input and the orrery will automatically rotate to the exact position of the date entered by the user. 3-D printing will be used to manufacture the majority of the orrery as a way of rapid prototyping. This way of rapid prototyping led to a much better product because more iterations of the shafts could be created and eventually perfected. To control the system, sensors will feed information to microcontrollers which will send data to the

motors to tell them when to start. So, the microcontroller will be the brain that determines when the rest of the system will move.

STS Research Project

My STS research paper is focused on the developmental impacts of television on young children. Media sources have long been scared of television impacts and have portrayed it in a negative light. Books like Fahrenheit 451 and The Veldt have sold millions of copies telling a tale of television atrocities. This has undoubtedly led to a massive concern from many parents over television. What this paper has found though, is that a lot of the worries of television's effects on children are not quite right. The real problem with television is that it takes away from real world learning. If a child focuses solely on television as entertainment and learning, they are not spending time in a real world environment, which has been proven to be better for childhood education and learning. Television is simply not a good replacement and if children watch it too much, they could fall behind. A similar connection can be made to virtual reality because of the goals that television and virtual reality have. Since VR and TV both want to entertain and immerse, parents should be wary of the technology, and should make sure that children do not consume too much of either technology, otherwise they are losing out on valuable real world learning experiences.

Conclusion

Conducting my research paper at the same time as my technical project helped me find a new perspective. My technical project focused on educating people on a specific topic, but I also learned a lot about the evolution of technologies. Technologies will continue to become more entertaining and more engaging as innovation occurs. Therefore, the new technologies need to be

tested to make sure it does not harm anyone. Also, in understanding my research paper and the fact that technology can be used for education if done correctly, my technical group made sure to add an education aspect into it. So, by conducting both projects at the same time, I was able to pull from each to add to the other. If I had done both of them in isolation, I would have definitely lost out on some aspects of each. For my technical project, I likely would not have made the educational function of showing the seasons and having user input. For my research project, I likely would not have been able to showcase how technologies evolved as well.