

**WATER BOTTLE COOLING STATION**

**VIRTUAL REALITY AND THE HARMS OF EXCESSIVE DATA COLLETION: A CASE OF RISK SOCIETY**

A Thesis Prospectus  
In STS 4500  
Presented to  
The Faculty of the  
School of Engineering and Applied Science  
University of Virginia  
In Partial Fulfillment of the Requirements for the Degree  
Bachelor of Science in Computer Engineering

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November 1, 2021

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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## **TECHNICAL TOPIC**

The majority of people naturally find a cold bottle of water to be more refreshing than a warm bottle of water. However, naturally over the course of time a water bottle warms up due to external heat, resulting in an unfortunate inconvenience. Thus, unless there is a refrigerator nearby, it is impossible to cool the water back down, and oftentimes the water will be dumped out and wasted since it is no longer considered to be drinkable.

One of the most common causes of water waste in households is for people waiting for tap water from the faucet to turn cold. A standard faucet installed in the 1990's flows at a rate of a little over 2 gallons of water per minute, meaning if it takes just 15 seconds for the tap water in the faucet to become cool then over half a gallon of water will be wasted for just a single glass of water.

In an effort to amend this issue, our group designed a portable water bottle cooling station that can cool the water inside the bottle by simply placing the bottle on top of the cooling station. The cooling of the water will be accomplished using a thermoelectric cooler that uses the Peltier effect in order to create a heat flux at the junction of two different types of materials with an electric current applied through the materials. After generating the temperature difference between the two materials, a heat sink dispels the heat, while the cooling side contacts the water bottle.

With sufficient power intake, the water is theoretically able to cool from room temperature to as low as 40 °F in only a few minutes. This portable cooling station provides a convenient and efficient means to cooling water, thus potentially counteracting some peoples' wasteful ways. However, the technical subject of the STS prospectus and the technical topic for the Department of Computer Engineering is not related.

## **INTRODUCTION**

The human brain is strong and can recall a lot of information. However, the brain is also conditioned to interpret information from a three-dimensional (3D) framework (Radke, 2017). Hence, we function best when we see things on a 3-axis plane rather than a 2-axis context. Three-dimension images are better internalized by the brain and interpreted and stored in the mind. In line with this, one can argue that the classroom setting should be filled with three-dimensional teaching tools. Unfortunately, that is not the case, Virtual Reality (VR) and Augmented Reality (AR) are more likely to be applied in a gaming or entertainment event than in the classroom setting (Nichols, 2017).

Virtual Reality has been identified to captivate learners, teleport learners to the reality of the situation being studied and incite the imagination (Nichols, 2017). This activates the brain and gives a learner insights, and important pointers that improve the retention of knowledge.

The proposed research for the thesis will study the extent to which Virtual Reality enhances and promotes learning experiences in the classroom setting. This proposal will present the broad framework of virtual reality in a normal school setting and how the experience differs for what we have in today's classroom.

## **RESEARCH QUESTIONS**

The fundamental research question for this study is: *How can Virtual Reality be used as a tool for development and growth in young students?*

This research question will cover a quest to identify the ways and forms through which virtual reality provides a superior method and approach to learning in the classroom setting. This will provide insights to how children experience VR as students and how this experience can be

optimized and enhanced in order to make school and studies more edifying and more rewarding.

In order to attain that tend, the following specific objectives will be explored:

1. An evaluation of the extent to which VR differ from traditional classroom learning?
2. An analysis of drivers of incitement of imagination, motivation and information retention in VR?
3. An examination of how these pointers can be improved and enhanced in VR to increase the classroom experience?

These research questions will lay the foundation for the collection of data, analysis and review in ways that will lead to the formulation of conclusions. This will be based on the study of a real-life classroom setting and its evaluation in order to draw logical inferences.

## **LITERATURE REVIEW**

Virtual Reality (VR) in the educational context has been studied significantly by numerous experts and academics. They seek to identify the key factors and pointers that make VR an important tool and aid to education and the classroom setting. Nguyen et al (2018) studied the way VR influences logical thinking, participation, creativity and collaboration. They identified that there are elements of effectiveness in activating and strengthening the mind in retaining information and also getting innovation. There are numerous things like:

1. Pre-project presentations;
2. Problem-solving;
3. Demonstration of examples and
4. Discussions that can be enhanced and improved by virtual reality (Nguyen, Hite, & Dang, 2018).

Therefore, it is apparent that Virtual Reality is an important tool that takes the learner closer to the issues and matters being studied so they gain a stronger and deeper understanding of the content. On the other hand, some thinkers view Virtual Reality's contribution to the classroom in two dimensions:

1. Cognitive learning and
2. Participation (Ray & Deb, 2017).

This is an apparently over-simplified notion of VR and how it is used. However, it helps to shift the focus from the many benefits of VR in the classroom and examine what really matters – how the learners absorb information and the way they get to participate (Ray & Deb, 2017). The element of collaborative learning is also essential and identified by some researchers as a major tool that can promote the collective good of a group of learners in a classroom setting (Cooper, Park, Nasr, Thong, & Johnson, 2019).

In spite of this, the high cost of VR equipment makes it difficult for classes to gain enough VR gear to ensure everyone in the class can watch the same thing at the same time (Castaneda & Pacampara, 2016). Also, training and preparation takes time, and this might only change when schools are able to use VR on a large scale (Cooper & Thong, 2018). Other scholars also argue that VR cannot replace traditional ways of researching and finding information, although it is superior at introducing new ideas to students and learners (Oigara, 2018).

## **STS FRAMEWORK & METHOD**

Victory XR has a series of virtual reality systems and tools that have been used successfully in schools and in classrooms. They have over 250 VR experiences that are curated to fit the curricula of various schools in America. This ranges from the planets to maps of cities among other

things. These VR settings are created to replicate the normal classroom setting and this provides an opportunity to examine the way things are compiled and taught over VR systems.

This study will examine a traditional classroom setting for high school students aged 10 to 14 who will study a topic from introduction to assessment in the normal traditional 2D classroom setting. They will take assessment tests and provide feedback of what they have learnt.

After they are done with the traditional classroom work, they will take the same course again with the VR system of Victory XR in order to gain a grasp of the topic again. The experiences of the learners will be recorded and compared. The comparisons will include:

1. An evaluation of the key features of the traditional classroom;
2. The key features of the VR learning experience;
3. A review of the joint use of traditional classroom and VR learning environment.

After this is done, there will be the definition of key pointers of areas that provide obvious benefits and how these benefits can be enhanced significantly to make VR more useful in the classroom setting.

## **METHODS FOR DATA COLLECTION**

Data collection will involve a classroom from a local school. A course will be taken from the Victory XR array of virtual reality courses that the students have not already studied. This will be the basis for the development of a course in the traditional classroom setting. After that, the VR version will also be arranged.

When all is done, a teacher will deliver the traditional classroom version which will be observed and documented. Then, there will be surveys and interviews after everything is completed. The students will present their inputs and the teacher will be interviewed.

After the traditional classroom setting, there will be the VR section that will be observed and also surveyed at the end. Thus, in summary, the data collection will include:

1. Observation of the traditional and VR settings of the course;
2. Conduct of a survey of what the learners thought or felt about the two separate experiences;
3. Interviews to gain a better understanding of the two approaches and how they differ and what the major similarities are.

In the analysis of the research, there will be a review of the absolute features of each of the two types of learning – traditional and VR. This will involve what each of them bring and what makes them unique. Then, there will be the comparative analysis of what each of them does that the other does not do. This will be complemented with a view of how the two can work together in order to improve and enhance the learning process and experience.

**TIMELINE**

This research will be conducted in an eight-week period. And the following activities will be undertaken:

<b>Week/Activity</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
Research model finalization								
Contact of school								
Acquisition of materials								
Literature Review								
Fieldwork								
Analysis								
First Draft								

Final Draft									
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**CONCLUSION**

This research will examine the nature and role of VR in the classroom. This will include the study and duplication of a particular lesson within the context of VR as well as the context of traditional learning. The findings will be compared and they will be reviewed and analyzed in order to draw appropriate conclusions.



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