

## Abstract

Virtual Reality (VR) has emerged as a promising tool with the potential to revolutionize several industries, including finance. However, recent reports and tech trends raise concerns on its marketability for sustained economic use. This study presents a comprehensive review of the capabilities of VR for immersion, collaboration, and visual storytelling as a means to enhance financial data analysis and business collaboration. To this end, we will explore, construct, and evaluate complex visual data models and existing technologies, surveying the benefits and limitations of VR for financial data visualization and collaboration.

## Objectives



Explore the potential for VR to revolutionize financial data visualization in both academic and economic business environments.

Develop multiple immersive financial models using the latest VR technologies.

Use NASA's Task Load Index & AR/VR research to evaluate insights gained from using existing VR software (and their current limitations) in collaborative and immersive settings.

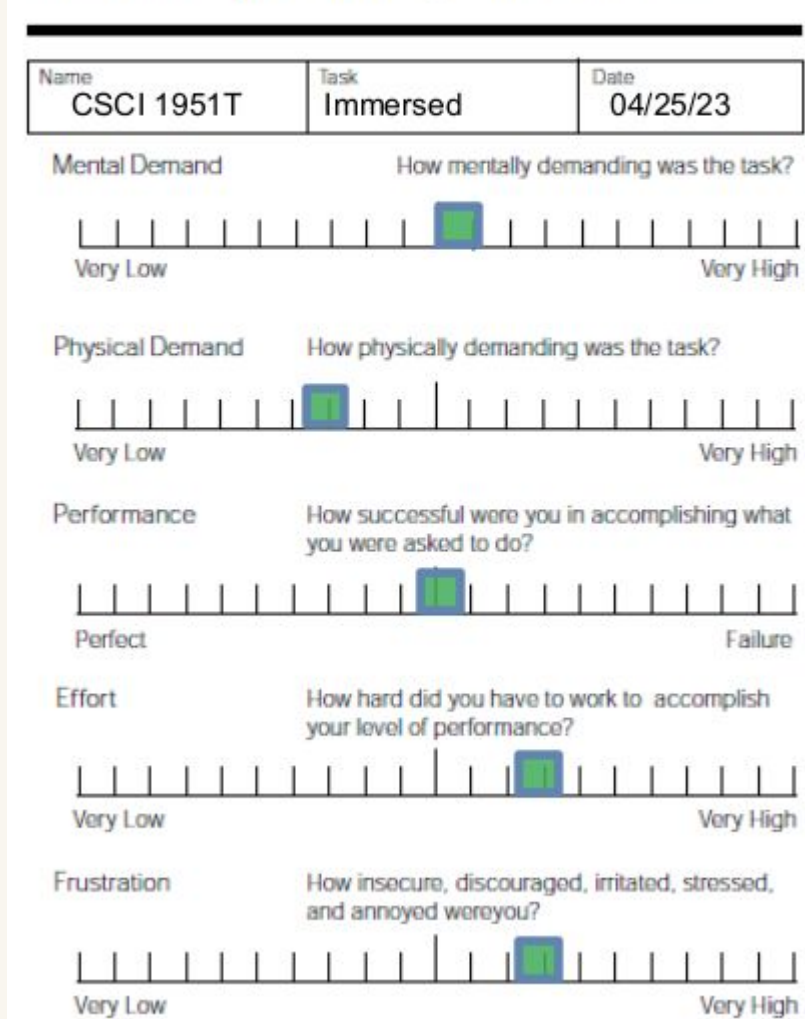
## Technologies & Evaluation Metrics



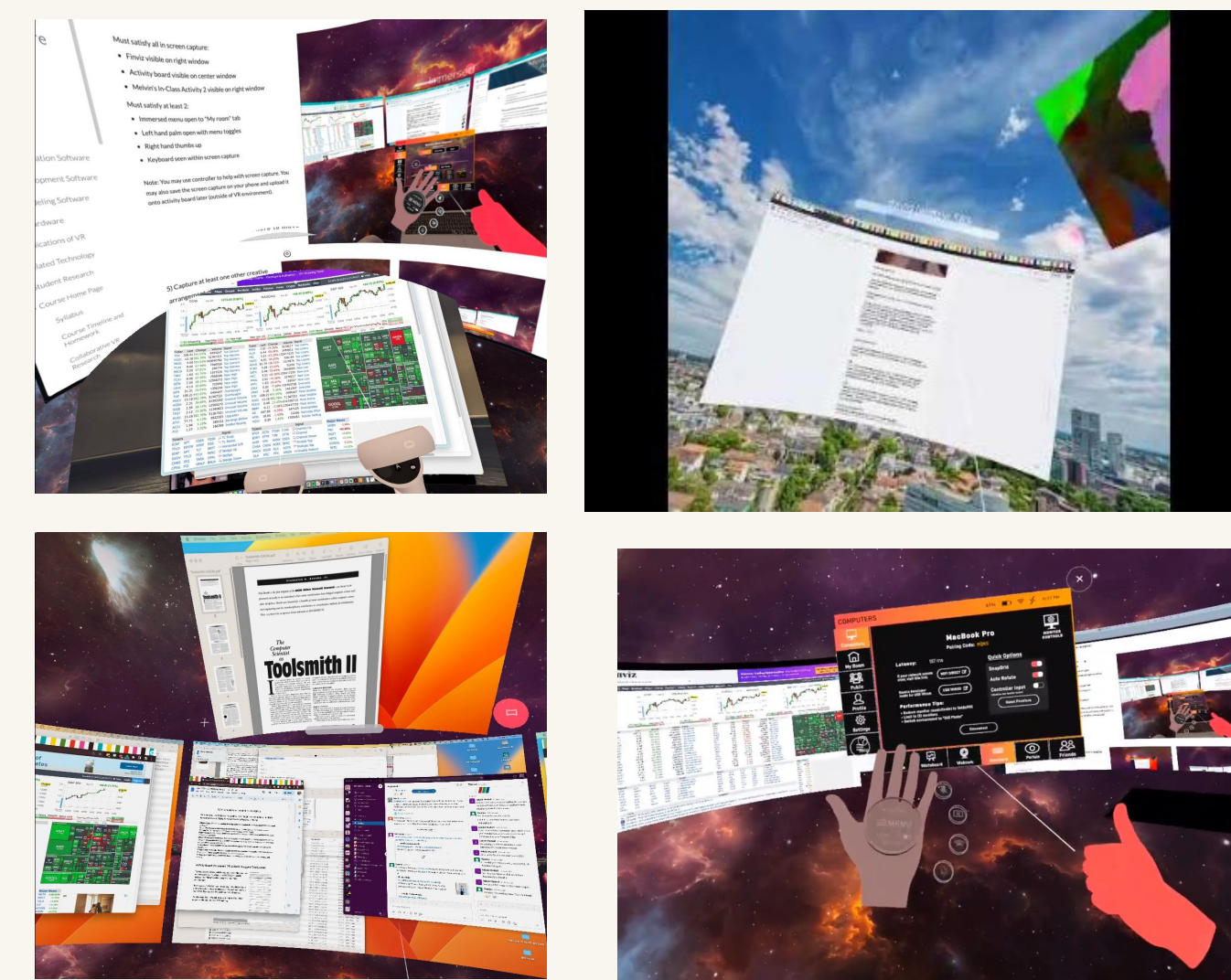
## Evaluating Immersive VR Environments

### NASA Task Load Index

Hart and Staveland's NASA Task Load Index (TLX) method assesses work load on five 7 point scales. Increments of high, medium and low estimates for each point result in 21 gradations on the scales.



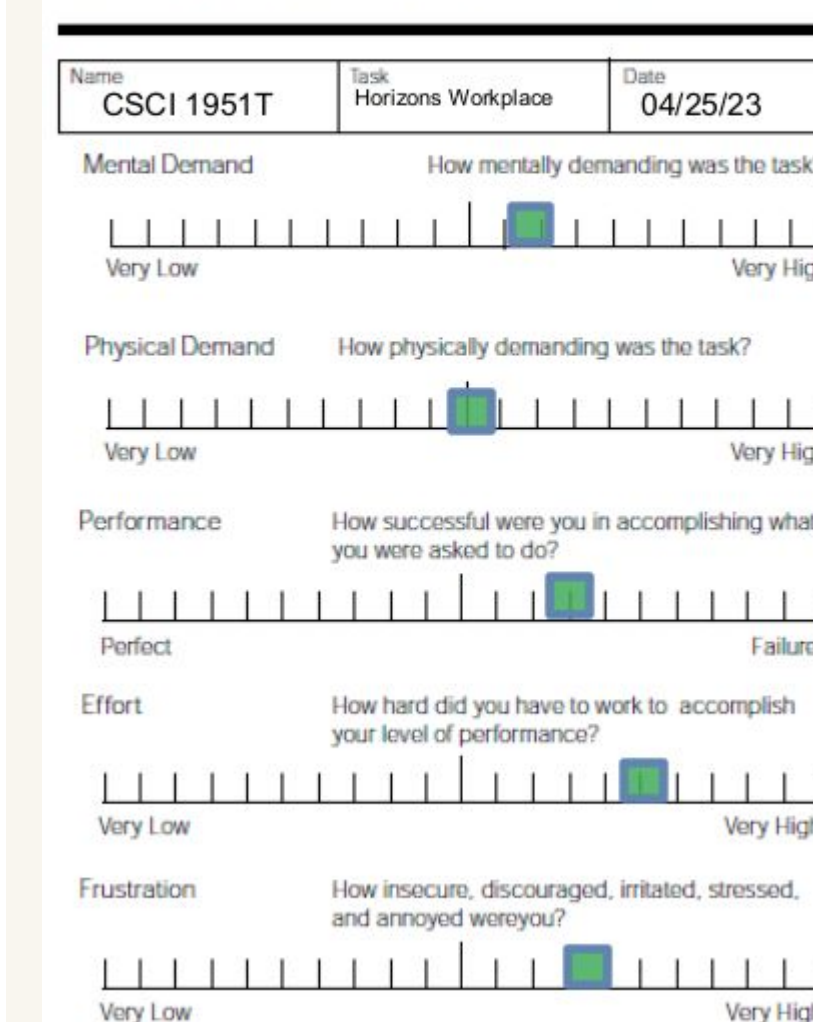
- Immersed VR is ideal for the exploring large amount of multidimensional financial info.
- Accessing notes, research, FinViz terminal etc was **easy & intuitive**
- Collaboration limited** as users viewed screens from own angle
- Hand tracking pinch and drag UI more difficult than controllers
- For-purchase apps like **D6VR, Bloomberg Terminal, dxFeed** provide more specific solutions



## Evaluating Collaborative VR Environments

### NASA Task Load Index

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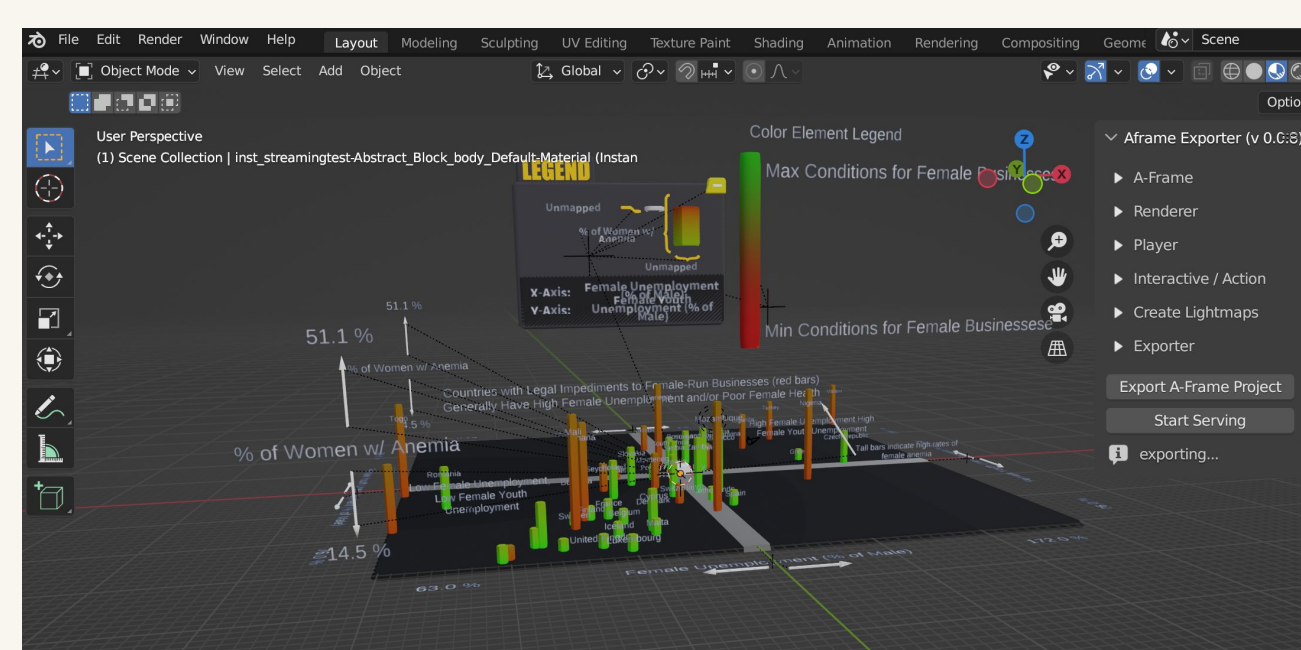
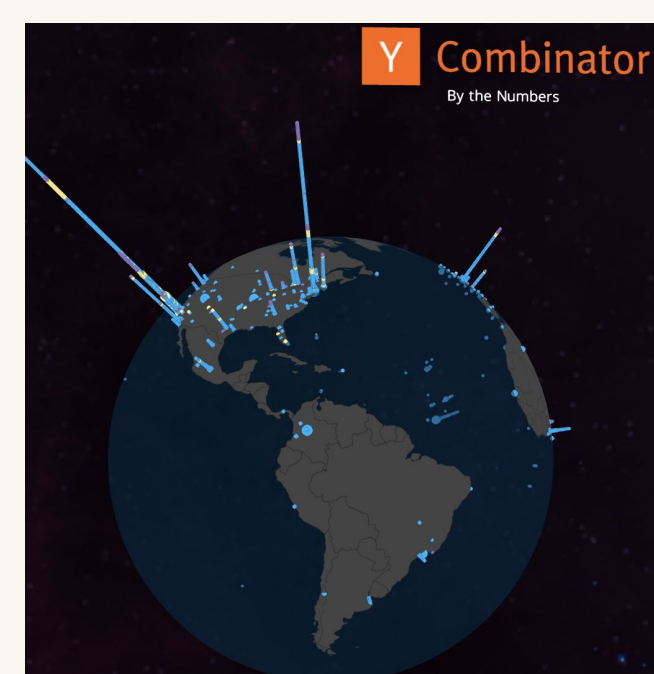


- Meta Horizon Workrooms was particularly effective for **business** and **collaborative** solutions.
- Drawing and painting mimicked control features like **Engage VR**
- Lack of precision** when drawing would make functionality unlikely to be helpful for quant trading.
- Interfaced well with **Meta** apps
- Keyboard intuitive once set up
- Room features create a **3D Zoom-like** feel with added features



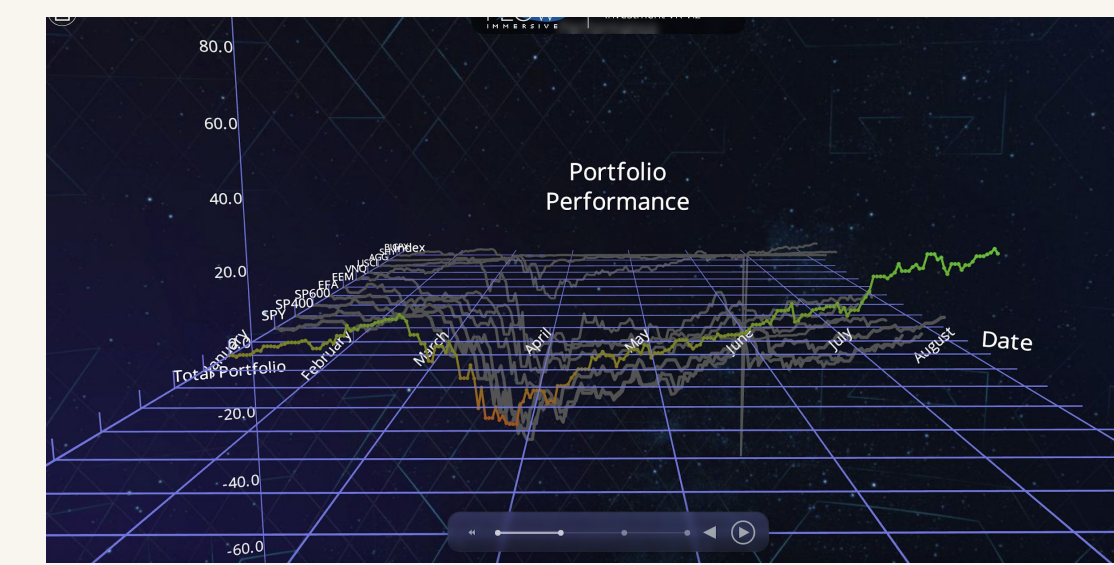
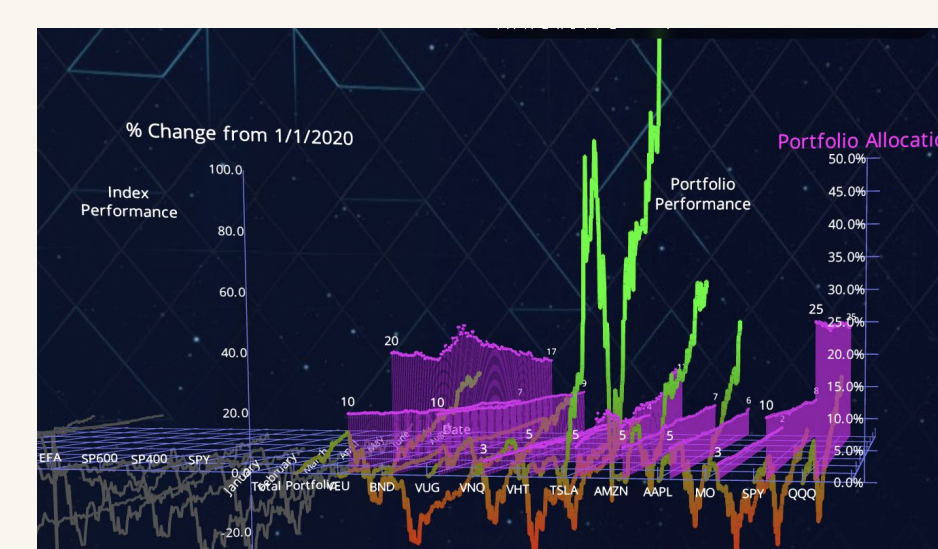
## Developing VR Financial Models

Interactive VR visuals such as portfolio performance, global companies, and employment models were shown to add 7 significant insights and can be developed on platforms such as Flow Immersive, Blender, and Unreal Engine. For a more immersive experience, check out the VR data storytelling demo.



## What were the added insights?

- Presentation of large amounts of data in a limited space
- Overcomes space limitations due to a restricted physical space
- Additional data supporting meaningful additions of information
- Support of cognitive functions as e.g. pre-attentive processing
- Easier knowledge and information discovery
- Visual appealing presentation of qualitative and quantitative data
- Representing inherently complex data in simplified ways



## Conclusion & Special Thanks

- Limitations: clunkiness, headset pricing, unavailability of free/open-source platforms and software, confusing UI of certain apps as well as VR device in general, lack of precision, battery life, and low resolution.
- Overall, the use cases of immersive large multidimensional data visualizations, business meta collaboration platforms, and storytelling models demonstrated that VR has significant market potential and economic viability.
- Special thanks to Professor David Laidlaw and the course staff & students for CSCI 1951T at Brown University.

## References

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## Wiki Pages and some Demo Links

CSCI 1951T Wiki:



Melvin's Wiki:



VR Demos:

