IMMERSIVE TOUR IN ARCHITECTURAL DESIGN AND REAL ESTATE USING VIRTUAL REALITY

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ABSTRACT

The term immersive refers to an experience that fully engages and involves the senses and emotions of an individual in a particular environment or situation. It is a state of being completely absorbed in an activity or situation. Virtual reality technology has revolutionized many industries including architecture and real estate. In recent years, immersive tours in architectural design and real estate have become more popular using virtual reality. The aim of this research paper is to explore the limitation of blueprint methodology and find the solution. Also explore the potential benefits and drawbacks of immersive tours. in architectural design and real estate using virtual reality. The research methodology used in this paper is a systematic review of existing literature, including research

articles, case studies and online publications. The findings suggest that immersive tours using virtual reality can improve the design process, facilitate communication between architects, clients and stakeholders, increase sales and provide an enhanced experience for potential buyers. However there are also challenges such as the cost of VR equipment and the potential for technical difficulties.

KEYWORDS

Immersive technology, Architecture design, Real Estate, Virtual Reality, Blueprint Methodology.

INTRODUCTION

Architecture and real estate have traditionally been industries where clients and stakeholders have struggled to visualize the final product before it is built. However, with the advancement in Virtual Reality technology, it is now possible to create immersive tours of architectural design and real estate development. Immersive tours using virtual reality allow clients and stakeholders to experience the design or property before it is built, providing a better understanding of the spaces and enabling them to make informed decisions. Blueprint methodology emphasizes the importance of understanding the overall goals of the project, defining the requirements and constraints and creating a detailed plan that outlines all the necessary steps to achieve those goals. It is widely used in various industries, including software development, construction and manufacturing. Its structured approach helps to minimize risks and

ensure that projects are completed on time , within budget and to the satisfaction of stakeholders.

Limitation with blueprint

Blueprints are a type of architectural design that provides a detailed plan for constructing a building or structure. While blueprints can be helpful in visualizing the layout and design of the project , they do have some limitations:-

1. Lack of real world representation
2. Limited communication
3. Limited scope
4. Costly revisions
5. Lack of flexibility

Overall, while blueprints are an important tool in the construction process , they have limitations that need to be taken into consideration .

Different solutions

There are several solutions that can be used to address the limitation of blueprint:

1. Use 3D modeling software
2. Use building information modeling (BIM)
3. Use augmented reality (AR) or virtual reality (VR)
4. Involve all stakeholders in the design process
5. Use agile design methodology

Overall, these solutions can help to address the limitation of blueprint and provide a more effective and collaborative approach to construct design and planning.

How VR can be used in designing

Virtual reality (VR) is an interactive experience that immerses users in a computer-generated simulation of a three-dimensional environment. The user can interact with this environment through

a VR headset that tracks their head and hand movements and displays a stereoscopic view of the virtual world.

Here are the basic steps of how VR works:

- Tracking
- Rendering
- Display
- Interaction
- Audio

In summary,all these together create an immersive and interactive experience that Simulates a 3-dimensional environment.

In architectural design, VR technology is used to create a 3D virtual environment of building or space, which can be explored and experienced in a realistic and immersive way. Here's a general overview of how VR works in architectural design:

1. Modeling : The first step in using VR for architectural design is to create a 3D model of the building or space using specialized software, such as Autodesk Revit or SketchUp.
2. Importing : The 3D model is then imported into a VR software platform, such as Unity or Unreal

Engine, which is used to create the virtual environment.

3. Optimization : The model is optimized for use in VR , with attention paid to factors such as polygon count , texture size , and lighting.
4. Navigation : The virtual environment is then programmed with navigation and interaction controls, allowing users to move around and interact with objects in the space.
5. Testing : The VR environment is tested to ensure that it accurately reflects the real-world space and that it runs smoothly on the target VR platform.
6. Presentation : The VR environment can then be presented to clients, allowing them to experience the space in a realistic and immersive way, and make more informed decisions about the design.

Overall, VR technology is used in architectural design to create realistic, immersive virtual environments that allow architects, designers and clients to experience a building or space in a way that is not possible with traditional 2D drawings or models. This allows for better visualization, iteration and collaboration throughout the design process.

PUBLIC SURVEY

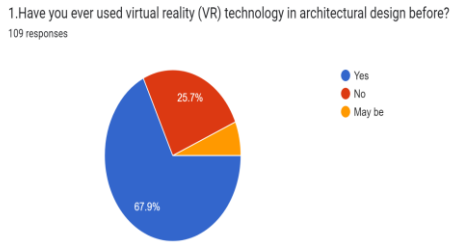
We deployed our data gathering utility, through google form to a variety of people and collected information on various aspects of their understanding.

QUESTIONNAIRE

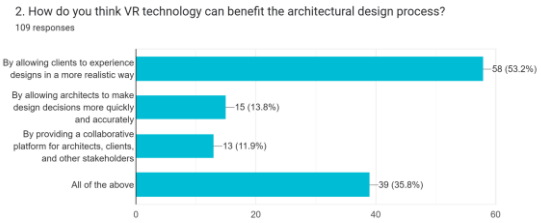
1. Have you ever used virtual reality(VR) technology design before?
2. How do you think VR technology can benefits the architectural design process?
3. What VR tools or software do you prefer to use for architectural design?
4. Virtual reality technology is an effective tool for showcasing architectural designs to clients.
5. Virtual reality technology can enhance the overall customer experience in real estate by allowing clients to virtually tour properties.
6. Virtual reality technology can save time and reduce costs in the architectural design and real estate industries.
7. How do you integrate VR technology into your design process?
8. Virtual realty technology can help increase sales and revenue in the real estate industry.
9. Virtual reality technology can help increase sales and revenue in the real estate industry.

10. Virtual reality technology is not yet advanced enough to fully replace traditional methods of showcasing architectural designs and real estate properties.

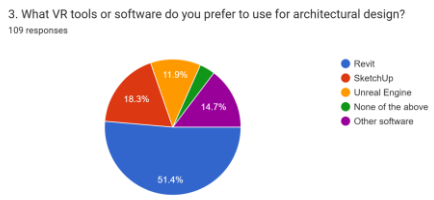
RESULTS



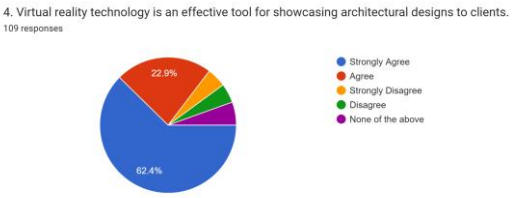
When people were asked Have you ever used VR technology in architectural design before? About 67.9% people selected Yes and 25.7% No and remaining choosed May be.



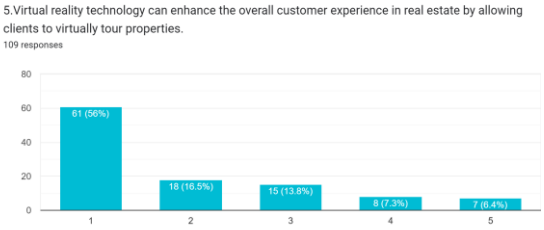
When people were asked How do you think VR technology can benefit the architectural design process? Maximum people responded to By allowing clients to experience designs in a more realistic way.



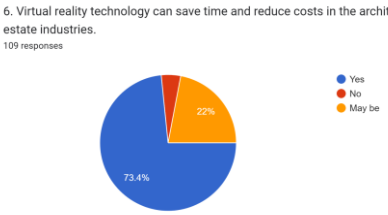
When people were asked what VR tools or software do they prefer to use for architectural design? Around 51.4% people use Revit software for designing.



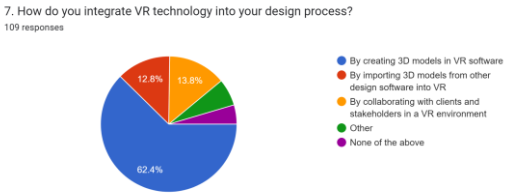
When people were asked Virtual reality technology is an effective tool for showcasing architectural designs to clients. 62.4% strongly agree with this and 4.6% respondent were strongly disagree.



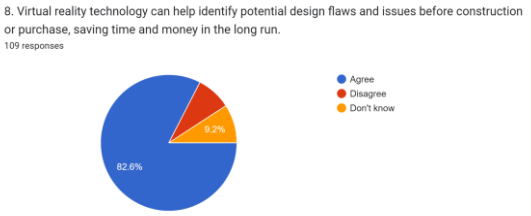
When people were asked Virtual reality technology can enhance the overall customer experience in rest estate by allowing clients to virtual tour property. 56% agreed and 6.4% disagreed.



Whether virtual reality technology can save time and reduce costs in the architectural design and real estate industries. 73.4% respondent said Yes, 4.6% said No and 22% said May be .

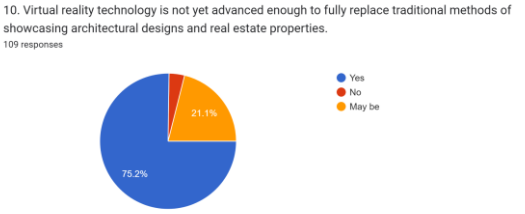


How to integrate VR technology into your design procee? 62.4% said by creating 3D models in VR software, 12.8% said by importing 3D models from other software , 13.8% said by collaborating with clients and stakeholders in a VR environment and remaining choosed Other and None of these accordingly.



Whether virtual reality technology can help identify potential design flaws and issues before construction or purchase, saving time and money in the long run. 82.6% selected Agree and 8.3% selected Disagree and 9.2% Don't know.

Whether virtual reality can help increase sales and revenue in the real estate industry. 78% respondent said Yes and 8.3% said No and 13.8% said May be.



Whether virtual reality technology is not yet advanced enough to fully replace traditional methods of showcasing architectural designs and real estate properties. 75.2% said Yes , 21.1% said May be and 3.7% said No.

DISCRIPTIVE STATISTICS

Descriptive statistics is a means of describing features of a data set by generating summaries about data samples.

1.Have you ever used virtual reality (VR) technology in architectural design before?	
Mean	36.33333333
Standard Error	19.784955
Median	28
Mode	#N/A
Standard Deviation	34.26854729
Sample Variance	1174.333333
Kurtosis	#DIV/0!
Skewness	1.029586386
Range	67
Minimum	7
Maximum	74
Sum	109
Count	3

2. How do you think VR technology can benefit the architectural design process?	
Mean	13.625
Standard Error	6.834621685
Median	5
Mode	1
Standard Deviation	19.33122936
Sample Variance	373.6964286
Kurtosis	1.642170459
Skewness	1.635663756
Range	52
Minimum	1
Maximum	53
Sum	109
Count	8

3. What VR tools or software do you prefer to use for architectural design?

Mean	21.8
Standard Error	8.946507699
Median	16
Mode	#N/A
Standard Deviation	20.00499938
Sample Variance	400.2
Kurtosis	3.516483887
Skewness	1.742418023
Range	52
Minimum	4
Maximum	56
Sum	109
Count	5

4. Virtual reality technology is an effective tool for showcasing architectural designs to clients.

Mean	21.8
Standard Error	12.16305883
Median	6
Mode	5
Standard Deviation	27.19742635
Sample Variance	739.7
Kurtosis	2.914568126
Skewness	1.764932522
Range	63
Minimum	5
Maximum	68
Sum	109
Count	5

5.Virtual reality technology can enhance the overall customer experience in real estate by allowing clients to virtually tour properties.

Mean	3
Standard Error	0.707106781
Median	3
Mode	#N/A
Standard Deviation	1.58113883
Sample Variance	2.5
Kurtosis	-1.2
Skewness	0
Range	4
Minimum	1
Maximum	5
Sum	15
Count	5

6. Virtual reality technology can save time and reduce costs in the architectural design and real estate industries.

Mean	36.33333333
Standard Error	22.51172534
Median	24
Mode	#N/A
Standard Deviation	38.99145205
Sample Variance	1520.333333
Kurtosis	#DIV/0!
Skewness	1.280977191
Range	75
Minimum	5
Maximum	80
Sum	109
Count	3

7. How do you integrate VR technology into your design process?

Mean	21.8
Standard Error	11.71067889
Median	14
Mode	#N/A
Standard Deviation	26.18587405
Sample Variance	685.7
Kurtosis	4.46668009
Skewness	2.084736113
Range	63
Minimum	5
Maximum	68
Sum	109
Count	5

8. Virtual reality technology can help identify potential design flaws and issues before construction or purchase, saving time and money in the long run.

Mean	36.33333333
Standard Error	26.83488608
Median	10
Mode	#N/A
Standard Deviation	46.47938611
Sample Variance	2160.333333
Kurtosis	#DIV/0!
Skewness	1.73114888
Range	81
Minimum	9
Maximum	90
Sum	109
Count	3

9. Virtual reality technology can help increase sales and revenue in the real estate industry.

Mean	36.33333333
Standard Error	24.39489928
Median	15
Mode	#N/A
Standard Deviation	42.25320501
Sample Variance	1785.333333
Kurtosis	#DIV/0!
Skewness	1.69284214
Range	76
Minimum	9
Maximum	85
Sum	109
Count	3

10. Virtual reality technology is not yet advanced enough to fully replace traditional methods of showcasing architectural designs and real estate properties.

Mean	36.33333333
Standard Error	23.48285427
Median	23
Mode	#N/A
Standard Deviation	40.67349669
Sample Variance	1654.333333
Kurtosis	#DIV/0!
Skewness	1.316638383
Range	78
Minimum	4
Maximum	82
Sum	109
Count	3

CONCLUSION

Based on current technology and trends, immersive tours using virtual reality have the potential to revolutionize the way people experience architectural design and real estate. By providing a highly realistic and interactive experience, virtual reality can give clients and investors a much better sense of what a space will look like before it is built or purchased.

In addition,virtual reality can save time and resource by allowing clients to visualize multiple design option quickly and easily,without the need for physical models or prototypes. This can lead to more efficient decision making and faster project timelines.

However,it is important to note that virtual reality is still a relatively new

technology,and there may be limitations or challenges that arise as it becomes more widely adopted.It may also be expensive to implement initially, which could limit its accessibility to smaller firms or individual designers.

Overall,immersive tours using virtual reality have the potential to greatly enhance the architectural design and real estate industries,but careful consideration and planningare necessary to ensure its success and widespread adoption.

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