VIRTUAL BUILDINGS

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Abstract *¾ Using the Virtual Reality Modeling Language, virtual buildings have been created for distance-learning courses in Fire Protection Engineering. Through these models, on- and off-campus students have access to virtual project centers, which offer visual reinforcement of class concepts; link to experimental data; and form the basis for course projects.*

Index Terms ¾ distance-learning education, fire protection engineering, virtual buildings, VRML.

INTRODUCTION

Students of the Fire Protection Engineering (FPE) program at Worcester Polytechnic Institute can receive a Master's Degree without ever setting foot on campus. Research has been conducted into an alternative means of content delivery to remote students [1], [2]. One of the great challenges for our distance-learning classes? Providing students with sufficient information to enable them to perform evaluations required for structure-based projects.

For classes comprised entirely of on-campus students, we can take field trips to study nearby buildings. We rarely have sufficient information – pictures, blueprints, building descriptions, and the like – to construct a viable project for the distance-learning classroom, and the inevitable student-sharing network prevents the use of well-documented buildings for multiple contiguous years.

VIRTUAL PROJECT CENTER

Enter the virtual building. With off-the-shelf software packages used by the gaming community and others to develop virtual worlds, we have created realistic buildings for use as virtual project centers. We "built" these structures with the Virtual Reality Modeling Language (VRML), with which many others have fashioned three-dimensional representations of objects, buildings, and natural environments [3], [4].

To date, we have created two buildings for this project to serve different purposes. The first structure represents a mobile home for a series of full-scale fire tests [5]. The VRML construct enables students to explore the home and to view experimental data by clicking on equipment locations. This first structure is intended for a wide variety of FPE courses; e.g., those for computer modeling (comparing fire model results to data generated during full-scale tests) and fire dynamics (providing representations for extensive fire data to be used to prove or disprove theories).

We created a second structure with an immersive environment built around an office building. Within the construction, we provided links from objects, such as fire sprinklers, to external data and multimedia files, such as sprinkler animations and references to fire codes. (The latter is similar to the virtual representation of the American for Disabilities Act Accessibility Guidelines provided by the Shake-a-Leg foundation [3].)

Students and instructors for FPE distance-learning courses may study a VRML building for different reasons. Students in an introductory FPE course might benefit from a general walk-through, which would enable them to envision fire protection elements in appropriate locations. Our suppression class may view sprinkler pipe locations and fire alarm conduit routing, which can be torturous to find on simple blueprints. Students in a codes course might focus on structural and mechanical considerations, e.g., the locations of fire walls. Finally, instructors in all of these courses might use part or all of a VRML building as a basis for a semester project, perhaps requiring students to work with fire modeling programs to determine the maximum expected egress time for a given fire scenario. One very intriguing benefit: students will see the same building in multiple courses, for different reasons. Applying the same information to different problems; a very effective teaching tool.

After we have tested the concept in the classroom during the Fall, 2002, semester, we intend to create multiple buildings of this type, enabling us to address the myriad concepts involved in Fire Protection without leaving the (virtual) classroom.

REFERENCES

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Racianska 96, 83102 Bratislava, Slovakia. Virtual Building Ã© 2017. Visualized by NEXTPAGE. Virtual team building activities are group games, challenges and exercises via platforms like Zoom, Microsoft Teams and Google Meet. Examples of activity types include icebreaker questions, virtual campfires, and group fitness classes. The purpose of these virtual activities is to build relationships, improve communication, and boost employee morale. These activities are also called â€œremote team building activitiesâ€ and â€œvirtual team bonding activities.â€ Top 50 Virtual World Buildings List. All-Type Art Casino Conference Gallery Game NFT. All-World Decentraland Somnium Space Cryptovoxels.