



FACULTY AND PROFESSIONAL STAFF ACCOMPLISHMENTS

August 2018

I. PUBLICATION

 X Refereed Journals

Ozcan-Deniz, G., Fryer, R. and de Castro Amorim Ferreira, A. (2018), "The Design of a Net Zero Energy Affordable Housing in Philadelphia", *Designs Journal*, 2 (3), 26, <https://doi.org/10.3390/designs2030026>.

Abstract: Sustainable buildings are often considered expensive alternatives to conventional designs. However, a decline in costs associated with materials, technology, labor and whole building approaches make green homes realistic to construct even within low-income neighborhoods. This can address the critical shortage of affordable housing in cities, and the emerging recognition of their impact on healthy communities. This study proposes an affordable and energy-efficient design for a low-income rowhouse in Philadelphia as a city having the highest poverty rate in the U.S. The design can be replicated as an investment in the future where people live with net zero energy and zero emissions. Furthermore, residents have the opportunity to create a more vibrant and healthy neighborhood economy by investing their savings locally. The results showed that the proposed prototype has a payback of approximately just over 16 years. Although this seems long, the building is affordable since the ongoing operating expenses are significantly less than a typical house. This is achieved by the combination of an efficient building design, onsite power generation, water conservation and rainwater harvesting. The payback period may suggest that larger-scale projects than just a single urban residence (two residences and larger) are needed to improve investment paybacks. This is discussed. Considering the added benefits (energy and water) that will continue after the payback period, the design can be a pioneer for low-income neighborhoods.

Keywords: net-zero buildings; affordable housing; whole building performance; life-cycle assessment

Ozcan-Deniz, G. (2018), "Emerging CAD and BIM Trends in the AEC Education: An Analysis from Students' Perspective", *Journal of Information Technology in Construction (ITcon)*, 23, 138-156, <http://www.itcon.org/2018/7>.

SUMMARY: As the construction industry is moving towards collaborative design and construction practices globally, training the architecture, engineering, and construction (AEC) students professionally related to CAD and BIM became a necessity rather than an option. The advancement in the industry has led to collaborative modelling environments, such as building information modelling (BIM), as an alternative to computer-aided design (CAD) drafting. Educators have shown interest in integrating BIM into the AEC curriculum, where teaching CAD and BIM simultaneously became a challenge due to the differences of two systems. One of the major challenges was to find the appropriate teaching techniques, as educators were unaware of the AEC students' learning path in CAD and BIM. In order to make sure students learn and benefit from both CAD and BIM, the learning path should be revealed from students' perspective. This paper summarizes the background and differences of CAD and BIM education, and how the transition from CAD to BIM can be achieved for collaborative working practices. The analysis was performed on freshman and junior level courses to learn the perception of students about CAD and BIM education. A dual-track survey was used to collect responses from AEC students in four consecutive years. The results showed that students prefer BIM to CAD in terms of the friendliness of the user-interface, help functions, and self-detection of mistakes. The survey also revealed that most of the students believed in the need for a BIM specialty course with Construction Management (CM), Structure, and Mechanical-Electrical-Plumbing (MEP) areas. The benefits and challenges of both CAD and BIM-based software from students' perspectives helps to improve the

learning outcomes of CAD/BIM courses to better help students in their learning process, and works as a guideline for educators on how to design and teach CAD/BIM courses simultaneously by considering the learning process and perspectives of students.

KEYWORDS: Building information modelling (BIM), computer-aided design (CAD), architecture, engineering, and construction (AEC) education.

II. CONFERENCES

Ozcan-Deniz, G. (2018), "Can We Discuss This Online? Online Discussion Board Strategies for Blackboard", *2018 Teaching and Learning with Technology Symposium*, May 7, 2018, Wilmington University, New Castle, DE, USA.

Abstract: The Community of Inquiry (CoI) theoretical framework represents a better experience through social, cognitive, and teaching presence (Garrison, Anderson, and Archer 2000). Social presence is defined as communications happening in a trusted environment, cognitive presence is where the learning happens through construction of knowledge, and teaching presence is the facilitation of cognitive and social processes to achieve learning outcomes. Online Discussion Boards (DBs) present opportunities to support the CoI framework via how they are created and operated by educators. This presentation will discuss online DBs within the CoI theoretical framework, while giving tips on how to design and operate online DBs on Blackboard as the learning management system (LMS). Attendees will be able to: (1) understand the pedagogy behind using DBs, (2) how to effectively design DBs on Blackboard, and (3) how to run and assess DBs effectively by using a rubric embedded on Blackboard.

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education model. *The Internet and Higher Education*, 2(2-3), 87-105.

Ozcan-Deniz, G. (2018), "An Application of BIM-based Virtual Punch Listing in Construction Education", *The Proceedings of the Academic Interoperability Coalition (AiC) 12th BIM Academic Symposium & Job Task Analysis Review Conference*, March 26-27, 2018, Orlando, FL, USA.

ABSTRACT: Virtual reality (VR), as a modern, effective, and popular type of information and communication technology (ICT), allows students to interact with the 3D model of the building before even it is constructed. Users enter into a virtual environment with high levels of interactivity and visualization, and perform actions in real-time that affect the virtual world. It is no doubt that the VR technology will change the way of learning with its active participation and interaction. The virtual environment is created based on building information, where Building Information Modeling (BIM) plays an important role in providing the dynamically changing data and a 3D building representation. With the help of BIM, VR environment can be explored by designers and contractors to resolve potential issues at the design stage, and even afterwards, when punch lists are created. Punch listing is crucial in completing and closing out a construction project on time. However, virtual punch lists are yet to be produced to check the 3D model beforehand and resolve potential issues related to the design and use of the building at the early stages of the project.

Future construction graduates need to be equipped with the VR technology and the virtual punch listing knowledge to keep up with the emerging technologies and the needs of the industry. This study uses VR and BIM as tools to explore their combined use and benefit for construction management (CM) students. The objectives of this paper are to discuss: (1) how VR technology can be implemented in construction education, (2) how virtual punch listing can be used effectively to improve the understanding for CM students. This study gives an overall guideline to help educators in implementing VR in CM courses.

Keywords: BIM, Virtual Reality (VR), CM Education, Virtual Punch Listing

III. EXHIBITIONS

IV. GRANT

V. AWARD

VI. EDUCATION

VII. OTHER PROFESSIONAL ACTIVITY



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August 2018

I. PUBLICATION

Pastore, C. M. and Klemens, J.A.. 2018. *Environmental Science: A Systems Thinking Approach* (2nd ed.). Kendall Hunt Publishing Co. Ebook.

“4D-Textiles: Hybrid textile structures that change structural form with time”, D. Schmelzeisen, H. Koch, and C. Pastore, Chapter 17, *Narrow Fabrics and Smart Textiles*, eds. Y. Kyosev, B. Mahltig, and A. Schwarz-Pfeiffer, Springer International Publishing, Berlin, Germany, 2018.

II. CONFERENCES

“4D Textiles and Shape Memory Polymers”, C. Pastore, D. Schmelzeisen, S. Shajoo, and J. Hairer, *Kármán Conference: Additive Fabrication of Interactive Material Systems*, Bergisch Gladbach, Germany, July 15-18, 2018.

“Game-Based Learning to Enhance Student Engagement”, J. Suss, C. Pastore, R. Fleming & D. Orsetti, *Faculty Days*, Thomas Jefferson University, June 5, 2018, Philadelphia, PA.

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Associate Editor, *Journal of Textiles and Fibrous Materials*, SAGE