

EXPLORING BUILDING INFORMATION MODELING (BIM) IN INTERIOR DESIGN STUDIO

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INTRODUCTION

Building Information Modeling (BIM) platform is a way for the architecture, engineering and construction industry to manage building data throughout the project's life cycle from conception to construction, and through facility management (Asojo, 2012; Mostafa, 2016). Revit is a BIM software application used to produce two-dimensional (2D) and three-dimensional (3D) drawings during the design process (Slotkis, 2017). In interior design education, limited studies focus on the influence of BIM/Revit on the design process.

Research Purpose

This study examined the influence of BIM/Revit on the design process in an interior design studio setting.

Research Question

How does BIM/Revit influence the design process in the interior design studio?

From the literature review several approaches have been identified. The first examined BIM/Revit application in interior design curricula (Asojo, 2012). The second compared the use of manual and BIM/Revit techniques in the design process (Gibson, 2007). The third compared the use of BIM/Revit between the various phases of the design process (Zuo et al., 2010). To build on existing literature, a qualitative case study was conducted to explore BIM/Revit's influence on the design process in a Midwest University sophomore interior design studio.

Asojo (2012)

- two case studies examining the learning curve needed to engage fully with BIM/Revit in undergraduate courses used ACT-R (a three-stage skill development: cognitive, associative, and autonomous)
- there is an independent progress in the students' design skills and that Revit facilitated this development.

Gibson (2007)

- "cyber-ideation" that improves cognitive processes and provides idea generation tools
- Studied interior designs' development in design using the cyber-ideation approach
- cyber-ideation approach helps the student produce forms that they had not previously considered

Zuo et al. (2010)

- explore a Performance-Based Design (PBD) approach
- the students visualized problems and weaknesses more easily in the digital model and use digital media in their design thinking rather than just using it as a drawing tool.

In a five-week project, students designed a 3rd Place Work Café using Revit. Data was collected by interviews from n=6 students.

METHODOLOGY

In interior design studio, students were asked to design an interior design studio called Airea Studio, that accommodate a work café for visitors, a showroom for the Airea Studio, and a multipurpose space for events using Revit. Students received

desk critiques during the project. After the students signed the consent form, the researcher observed them during the project period and took photos and notes to understand the student's design process. Thus, the data includes photos of the students' design process, observations, and interviews. After the students presented their project, they were invited to a formal semi-structured interview. Students were asked to describe their experience in the 3rd Place Work Café. Interviews were recorded and transcribed and the NVivo program was used for thematic analysis (fig.1, fig.2, & fig.3).



Figure 1: 3d place work cafe (Source: Kotono Watanabe, IDES 2604, Spring 2018)



Figure 2: 3d place work cafe (Source: Elizabeth Elton, IDES 2604, Spring 2018)

RESULTS

The following four themes emerged from the data. They are: 1) initial concept development, 2) space planning exploration, 3) human needs accommodation, and 4) details exploration through different views and design elements (fig.4).

1) Initial concept development. Using Revit would push the initial concept to further development. [P5] "80% probably [was changed], when I changed my overall concept." Thus, using Revit would help to develop the initial concept. Exploring forms and

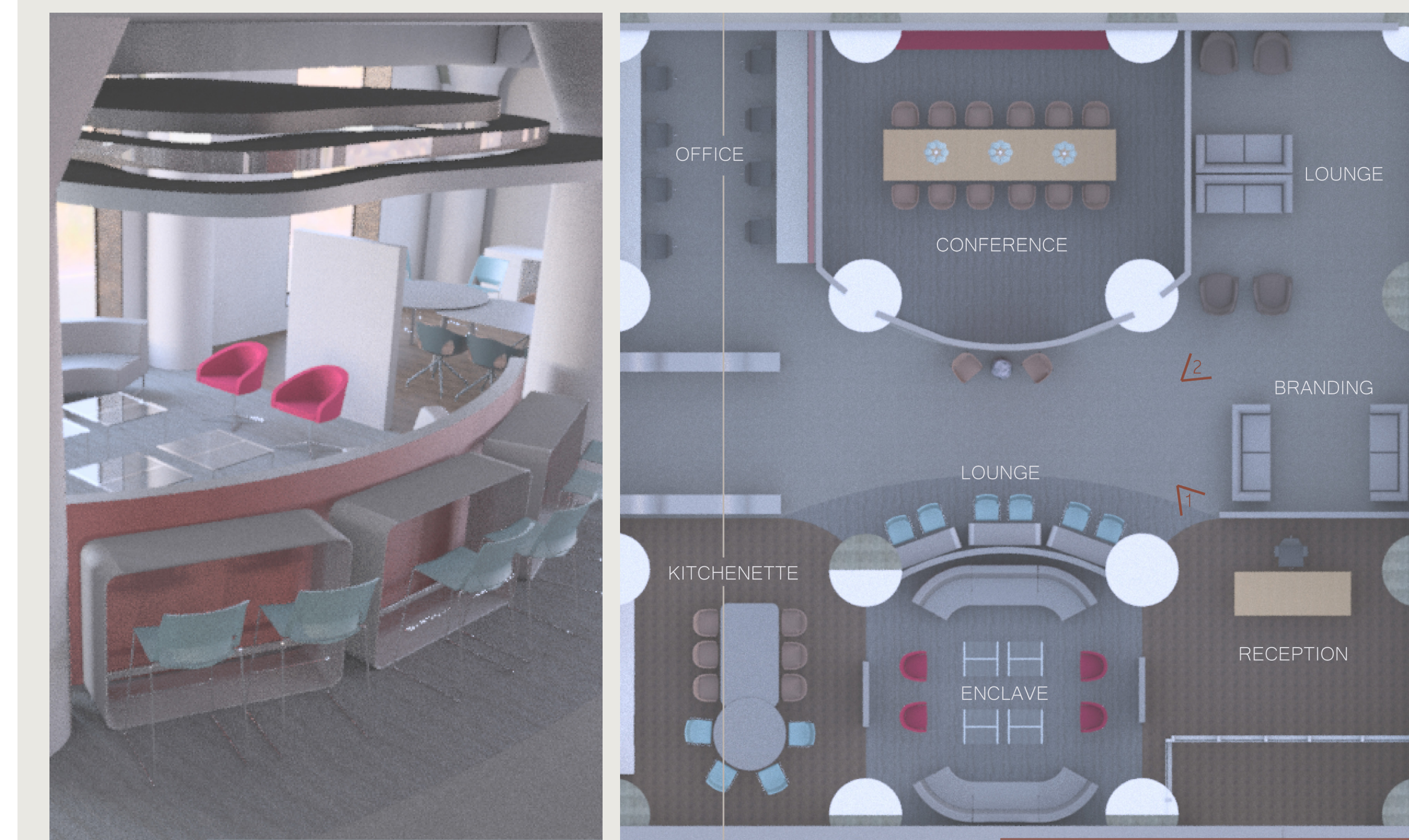


Figure 3: 3d place work cafe (Source: Lindsay LaBeaux, IDES 2604, Spring 2018)

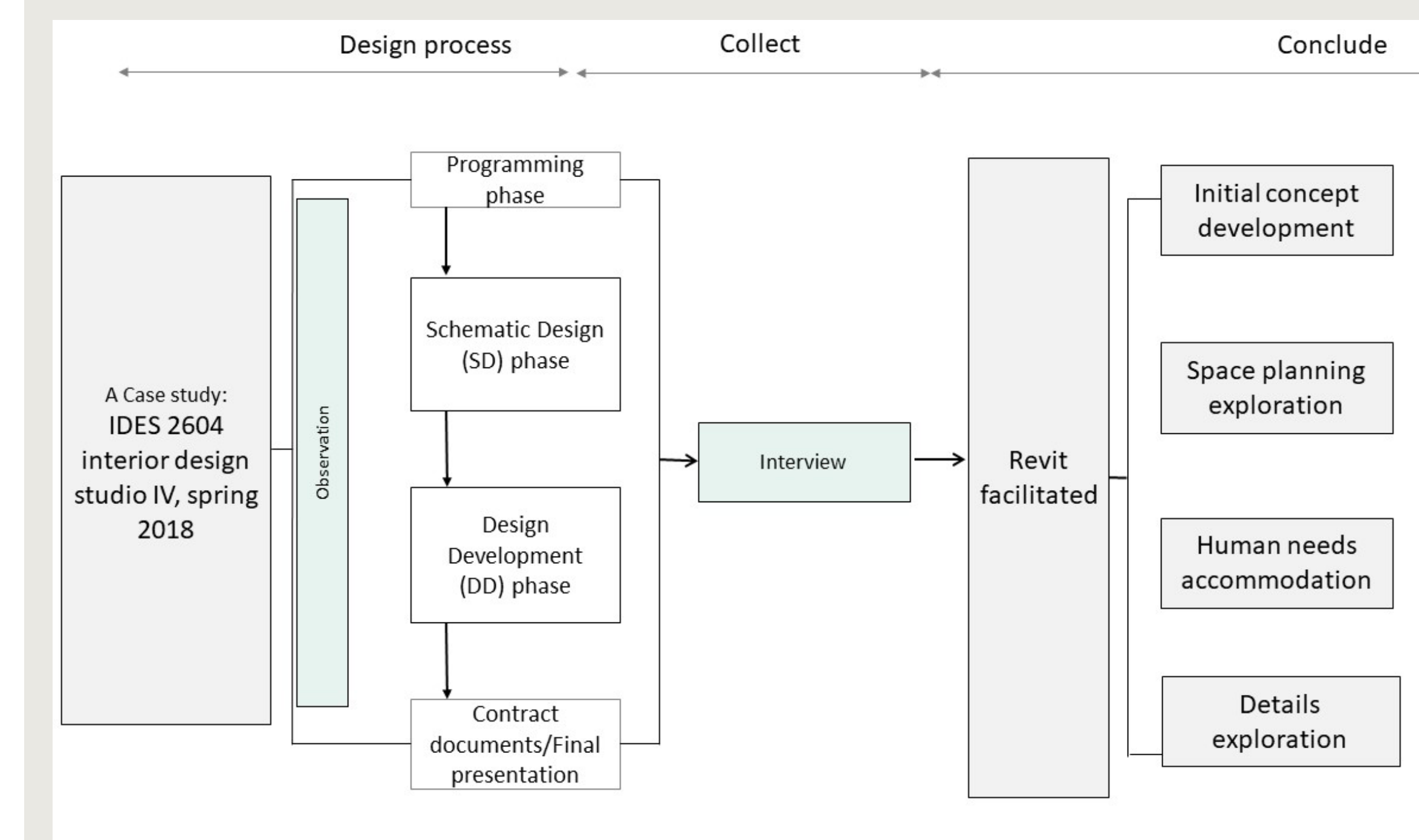


Figure 4. Framework of the Research design

studying the existing structure could lead to the generation of a new concept. [P5] "Revit did help me develop my concept because I didn't think about these arched doorways until I made a section and thoughts oh that would look way better if it was just a little bit more open and I do think like the arched doorways do coincide with an industrial idea."

2) Space planning exploration. With novice students, Revit would be more helpful in the schematic design phase than the design development phase because they used it more in space and furniture configuration and planning. [P2] "with Revit, I can see what works and what doesn't work in space wise." [P3] "Revit helped me figure out space planning." [P4] "it was really easy putting different furniture pieces and putting them in different formations."

3) Human needs accommodation. Visualizing the spatial design during the schematic design phase helped students understand spatial design aspects that relate to human needs and feelings. This understanding helped accommodate these needs within the space. [P6] "being able to see the perspective by using the camera helped me to understand how this ceiling height influence the feeling of this space. Using the Revit tools (such as, the camera tool) help me see what I'm doing."

4) Details exploration through different views and design elements. 3D views and 2D views could be used in the design development phase to help students in design refinement and development. By using different views, students could develop more in ceilings, color, lightings, and materials. [P6] "[Revit] is a design tool because I can do a lot more in it, than I can really on paper. there's a limitation to what I can do on paper, but in Revit is a lot easier to change things then erase everything and redraw it. I can play around in the ceiling, shadows, and light"

CONCLUSION

Revit can be used to explore design solutions that facilitated by multiple views (2D and 3D views). These solutions can be refined based on decisions made by students. In addition, Revit influences the schematic design phase by facilitating the following: initial concept development, space planning exploration, and human needs accommodation. Moreover, Revit influences the design development phase by facilitating details exploration through different views and design elements such as materials, lighting, and color. Thus, the study provides insights into the research question by allowing the educators to understand the influence of Revit on the design process. The use of precise dimension tools and multiple views for one drawing provided a high chance for students to explore and develop their design.

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