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Exploring the Ethiopian Museum Design Student Project: Contributions to an American Interior Design Program's Accreditation

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ABSTRACT

An American Interior Design program, located at a large University in the Midwestern United States of America sought key evidence of their students' compliance with the Council for Interior Design Accreditation (CIDA) standards, in preparation for their 2021 accreditation site visit. Accreditation standards continue to evolve and are a recognized measure of interior design programs' competence. Programs are required to develop an exhibit of student work for initial accreditation or their periodic site visits for re-accreditation, to write a report, and to provide key evidence of competency with several standards. In 2021, due to the global pandemic, the site visit exhibit was produced in a digital format and the site visitors reviewed all documentation online. University researchers pre-reviewed the digital inputs and outputs from 25 courses for the exhibit, including the students' Ethiopian Museum Design project produced during three-year period, 2019-2021. This Ethiopian Museum Design project was completed during the interior design students' third year course, Interior Design Studio IV: Environmental Design, which covers lighting and thermal/atmospheric comfort and their application using computer-aided and drafted techniques. Although museum projects are often assigned to students enrolled in interior design and architecture undergraduate programs, no previously published studies of interior design students' museum projects' compliance with interior design standards were found. Researchers found that the studied museum project contributed key evidence to four standards: Global Context, Human-Centered Design, Light and Color and Construction. The CIDA site visitors reviewed the program documents in 2020 and the Interior Design Program was notified of accreditation.

Keywords: Museum, Accreditation, Student, Project

1. Introduction

1.1 Interior Design Profession and Interior Design Program Accreditation Background

According to the Council for Interior Design Accreditation (CIDA),

"Interior design encompasses the analysis, planning, design, documentation, and management of interior non-structural/non-seismic construction and alteration projects in compliance with applicable building design and construction, fire, life-safety, and energy codes, standards, regulations, and guidelines for the purpose of obtaining a building permit, as allowed by law. Qualified by means of education, experience, and examination, interior designers have a moral and ethical responsibility to protect consumers and occupants through the design of code-compliant, accessible, and inclusive interior environments that address well-being, while considering the complex physical, mental, and emotional needs of people" [1].

As the interior design profession matured, there was a need for accreditation of interior design educational programs [2]. American accreditation standards have changed over time. Since 1995, the Foundation for Interior Design Education and Research (FIDER) produced 1995 standards for undergraduate interior design program accreditation. Later, in 2006, FIDER was renamed the Council for Interior Design Accreditation (CIDA) [2].

Accreditation standards continue to evolve and are a recognized measure of interior design program competence. The recently updated standards for undergraduate interior design program accreditations include Professional Standards 2020 which

"are divided into two sections that broadly reflect the program identity and context as well as the knowledge acquisition, and application characterizing graduate preparation for interior design practice. Each standard sets forth specific student learning expectations and/or program expectations. Section I. Program Identity and Context 1. Program Identity and Curriculum 2. Faculty and Administration 3. Learning Environments and Resources Section II. Knowledge Acquisition and Application 4. Global Context 5. Collaboration 6. Business Practices and Professionalism 7. Human-Centered Design 8. Design Process 9. Communication 10. History 11. Design Elements and Principles 12. Light and Color 13. Products and Materials 14. Environmental Systems and Human Wellbeing 15. Construction 16. Regulations and Guidelines" [1] p. II-7.

Programs are required to develop an exhibit of student work for a periodic accreditation site visit, to write a self-report, and to provide key evidence of competency with several standards.

Due to the pandemic, the scheduled site visit discussed in the current study was moved to online-only. A virtual exhibit was therefore created and all key evidence for the CIDA

standards in Sections 1. 3 and II was posted by the Interior Design program to a restricted website for viewing by the accreditation site visitors. In the current study, the applicable CIDA standards from Section 1.3 and Section II were the foci.

1.2 Museum Project Background

An American instructor's University had long enjoyed relationships with several Ethiopian Universities [3]. Educational opportunities which could support further linkages between The United States of America and Ethiopia have been encouraged by the American University [4]. The instructor for Design, Housing and Merchandising (DHM) 3453 Interior Design Studio IV represented the host institution on a multi-university trip to Ethiopia in 2014 and sought student classroom linkages and potential projects related to Ethiopia. The description of the course, DHM 3453 Interior Design Studio IV: Environmental Design is as follows: "(3 hours credit, Lab and Theory) Exploration of the design factors and human performance criteria for lighting, acoustics, and thermal/atmospheric comfort and their application in studio projects using computer-aided and drafted techniques." [5]. During the 2014 Ethiopia trip, one of the visited Ethiopian Universities' staff members requested design assistance from the American instructor for a proposed University museum [18]. Ethiopia possesses abundant examples of historic and contemporary art, craftsmanship and ceremonial artifacts [6, 7]. In 2015, and annually afterwards, the Ethiopian Museum Design project was conducted in DHM 3453. The course was normally face-to-face but due to the pandemic in both 2021 and 2022, the course moved to a synchronous-online format [8].

Previously, professional interior designers have contributed towards museum design projects [9]. Museum design projects may be assigned to interior design or architecture students as part of undergraduate studio coursework [4, 10, 11]. However, no published studies of interior design students' museum projects' compliance with interior design standards were found.

The American University's DHM 3453 instructor had cultivated relationships with museum-specific vendors for display and conservation furniture, furnishings and other products. The instructor attended museum conferences and examined and photographed museum display furniture exhibited there. Gaylord Archival provided the instructor with a miniature display case for educational purposes which she has utilized for annual demonstrations in DHM 3453. These activities helped to inform the Ethiopian Museum Design project. Both Gaylord Archival and MBA Display Products provided vendor literature to the instructor for the course project. Concurrently or previously, most of these students had also enrolled in another required course, DHM 3033, Material Culture, taught by the same instructor as DHM 3453. This course's description is as follows: "An exploration of a variety of theoretical approaches toward

understanding what objects mean. Psychological, sociological, economic and other approaches are examined using culture theory models" [5] p. 238. The course's textbook was entitled, "What Objects Mean: An Introduction to Material Culture" [12]. The Material Culture course also potentially influenced students' work on the Ethiopian Museum Design project.

The Foundation for Interior Design Education and Research (FIDER)'s 1995 accreditation standards promoted interior designers "study of the built environments of diverse cultures…(which) enables a designer to anticipate and design for present and future demand" [13] p. 9. Also, previously, other interior design educator authors [14, 15]. had published articles about the general lack of cultural diversity in interior design education and the corresponding need for correction. In 2011, Jani wrote: "To embrace the challenges of the twenty-first century, we must learn to design buildings and interior environments that reflect the ideas and attitudes of our rapidly emerging global society", [16] p. XIV. Jani advocated that "educators teach design from an inclusive perspective that acknowledges the contributions of all world cultures" [16] p. xiv). Published research documented that interior design educators have conducted Africa-based interior design projects with American interior Design students. Students designed "affordable housing in the countries of South Africa and Nigeria" [17].

For eight consecutive Spring semesters (2015-2022), a total of 181 students enrolled in an environmental design course, DHM 3453, at a large university in the southern Midwest U.S. Students were assigned a museum design project located in Ethiopia [8].

1.3 Program Accreditation Standards Applicable to Ethiopian Museum Project

As part of national accreditation or re-accreditation processes for undergraduate interior design programs, evidence of student work related to "global exposures" is required [1]. An American Interior Design program, in preparation for their 2021 accreditation site visit, sought key evidence of their students' compliance with CIDA standards [18]. The explanation and details follow.

1.3.1 CIDA Standard 4. Global Context

"Standard 4. Global Context: Interior designers have a global view and consider social, cultural, economic, and ecological contexts in all aspects of their work" [1] p. II-16. Museums are considered by some to be reliquaries that showcase objects and artifacts. However, museums have not always represented cultural diversity in their exhibits. Sometimes they have reflected a dominant culture or seem to promote a homogenous culture. Ang (2005) wrote about the *"biases inherent in…the art museum, especially in its non-negotiable reliance on a Western concept of 'art'…"* [19].

1.3.2 CIDA Standard 7. Human-Centered Design

"Standard 7. Human-Centered Design - Interior designers apply knowledge of human experience and behavior to designing the built environment" [1] p. II-21. *"This standard ensures that graduates understand theories of human-centered design, and identify, analyze, and apply information from a variety of stakeholders and sources to develop a successful response to user needs and to promote health and wellbeing"* [1] p. II-20).

1.3.3 CIDA Standard 12. Light and Color

"Standard 12. Light and Color -Interior designers apply the principles and theories of light and color effectively in relation to environmental impact and human wellbeing" [1] p. II-26.

In her seminal book, "Bringing Interiors to Light", published in 1986, Fran Kellogg Smith advocated the use of "lighting techniques" to create a composition in interior spaces [20]. These techniques included: "Highlighting, Beam Play, Shadow Play, Wallwashing, Silhouetting, Backlighting Structural, Downlighting, Grazing, Uplighting, Sparkle (light as) Art, Decoratives" [20] p. 38. Other authors have used compositional lighting techniques in teaching interior design students [21]. Gordon (2015) wrote the textbook "Interior Lighting for Designers" [22] that is utilized throughout the DHM 3453 course, and some aspects of the material covered within are relevant to the Ethiopian Museum Design Project. Gordon speaks about many attributes of lighting and also the interaction of light and color [22] however, the Ethiopian Museum Design Project focused on an achromatic interiors with yellow color applied only to show lighting effects in renderings.

Definitions : Light-mapping

According to Russell, *"The first step in expressing light ideas is to graphically represent light as light. We draw this light how we envision it, and where we envision it. We identify the surfaces and objects that we want bright, and we draw brightness onto them…Drawing light onto surfaces, object and spaces requires only the simplest of tools. A yellow colored pencil can represent "light" in its most generic form. With this single colored pencil, we can sketch light onto architectural elevations, sections, plans and perspectives. We can print out images and sketch onto them… I can communicate it immediately without a lot of big words and hand waving. understanding…I call this process of expressing light through graphics 'light mapping'"* [23] p. 121.

Definitions : Luminaire

"A complete lighting unit consisting of a light source(s) and ballast(s) or driver(s) (when applicable), together with the parts designed to distribute the light, to position and protect the light source(s), and to connect the light source(s) to the power supply. Also known as a light fixture" [24].

1.3.4 CIDA Standard 15. Construction

"Standard 15. Construction - Interior designers understand…systems" [1] p. II-29. CIDA has indicated the following as the intent for Standard 15, *"This standard ensures graduates have an understanding of the documentation, specification, environmental impact, and application of non-load bearing interior construction methods, systems, and details. Graduates should consider the interrelationship of base-building construction to interior construction"* [1] p. II-29.

Multiple standards included security and surveillance systems.

Definitions : Surveillance

Surveillance may be defined *as "The general crime prevention strategy that seeks to decrease crime opportunity by keeping …intruders under observation and/or by increasing the perception of the risk of being observed"* [25] p. 269. Hadjiyanni and Kwon stated, *"…electronic surveillance schemes are typically the realm of engineers, with architects and interior designers playing a much smaller role. The result is a downgrading of the physical and social dimensions. On the physical level, cameras are rarely initially integrated into the overall design proposal, neither do they serve as part of the design's conceptual basis. Instead, cameras are often treated as add-ons, added onto the walls, ceilings, or structural elements of a building along with other electrical equipment"* [26].

According to O'Shea & Awwad-Rafferty, *"There are currently thousands of new security products available for integration into the design solution that assist in providing safer and more secure built environments. It is essential that designers research and understand the use and integration of these products in overall design solutions, as well as their associations, costs and overall function to educate clients on their use"* [25] p. 79.

2. Research Methodology

2.1 DHM 3453 Interior Design Studio IV Methodology

To meet the course's project and CIDA standards' requirements, students selected a variety of artifacts for their museums including apparel, baskets, jewelry, maps, pottery and sculpture. They specified luminaires and other technical products. The students self-reported that utilized hand-drafting techniques and/or AutoCAD, Canva, Enscape, Google Slides Photoshop, Procreate, SketchUp software to develop 3D interior perspectives and developed light mapping to show design indent. Students were simultaneously enrolled in DHM 4373, Advanced Computer-

Aided Design for Interior Design. A description of this course is as follows: *"Advanced computer-aided design and visualization for three-dimensional interior systems"* [5] p. 23. Refer to Figure 1.

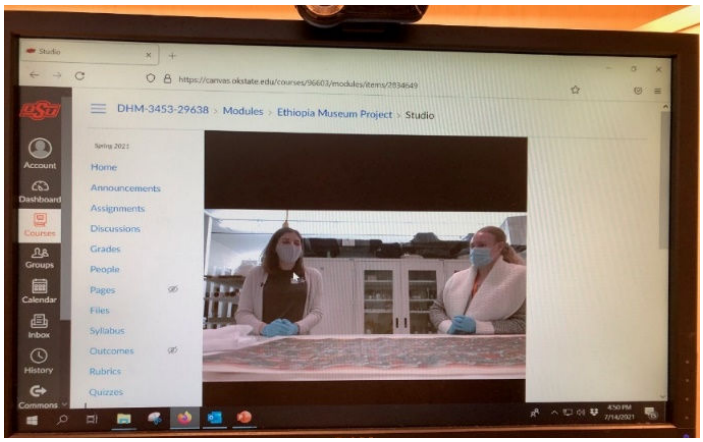


Figure 1 Students accessed University Art Museum pre-recorded tour via online learning platform.

Over the course of the seven-week project, students submitted preliminary design progress to the "discussion" board for the University's educational platform, Canvas, and received written and verbal instructor feedback. Students' final designs were submitted electronically to Canvas [4].

2.2 Accreditation Pre-Review Methodology

In 2021, in preparation for accreditation, University researchers reviewed documents from 25 different courses in their interior design program for the last three years (2021, 2020 and 2019). The researchers performed a content analysis and reviewed electronic artifacts which would become part of the accreditation site visitor virtual exhibit, including 1) course syllabi, 2) course assignment requirements, 3) student inputs (i.e. instructors' handouts, lecture slides and blank tests) and 4) student outputs (i.e., design drawings, papers, reports, spreadsheets, specifications and tests results). Over a three-month period, the researchers identified all evidence regarding all of the applicable standards [8]. The current study reports on evidence from the Ethiopian Museum Design project.

3. Research Results

3.1 Course Inputs

3.1.1 University Art Museum

Several short, professional, presentations were filmed at the University Art Museum. As a precedent for their upcoming Ethiopian Museum Design project, students were provided the following five videos via the students' online learning platform, Canvas. Videos included: 1). Tour (The museum staff identified and explained the museum's existing lighting, heating, ventilation, air-conditioning and security systems); 2). Interviews (with the curator and museum staff discussing their museums' needs as an example of a museum's "real-world" concerns); 3). Artifacts examination (a virtual presentation of the Ethiopian artifacts held in this museum's permanent collection); and 4). Detailed viewing of the museum's previously-installed Mila-Wall, an explanation of the features of their own display casework and a discussion of pros and cons of special features (Mila wall, display cases); 5). Digital catalog tutorial.

The partnership between the instructor, class and the museum grew during the pandemic with "the studio course relying on University Art Museum resources" [8] especially since this museum's collection included Ethiopian artifacts. Students were directed to the University Art Museum website [27] and to the previously-produced catalog of the museum's holdings [28]. Additionally, the enrolled students were provided with links to other museums and Ethiopian artifact databases and were encouraged to search for additional Ethiopian artifacts online [4]. The University Art Museum was found to have been featured heavily in the inputs for the Ethiopian Museum Design project. Researchers found that none of the other 24 reviewed courses had utilized the University Art Museum as a resource of any kind. Refer to Figure 2.

Figure 2 Students working in class on Ethiopian Museum Design project.

3.1.2 Readings

Students were assigned readings which were also utilized as resources throughout the semester. Lighting techniques, discussed in "Interior Lighting for Designers", presented the idea of illuminating interiors with "patterns of brightness": "Downward Light", "Upward Light", "Multi-directional Diffuse" and "Sparkle" [22] p. 36-55. Fran Kellogg Smith's pioneering work, "Bringing Interiors to Light", advocated the use of "compositional lighting techniques". These techniques included: *"Highlighting, Beam Play, Shadow Play, Wallwashing, Silhouetting, Backlighting Structural, Downlighting, Grazing, Uplighting, Sparkle (light as) Art, Decoratives"* [22] p. 38.

During class time, the instructor provided hard copies of Ethiopian maps, books on Ethiopian artwork, and 3-d reproductions of physical Ethiopian artifacts for students' inspection and reference.

3.1.3 Lectures

Students were exposed to the Gordon (1995) textbook [22] and the Smith (1986) textbook [20] and their respective "patterns of brightness" and "lighting techniques" via an in-class lecture. Henceforth for the purposes of this article related to student work, "lighting techniques" will be used to refer to both Gordon [22] and Smith's (1986) "patterns of brightness" and "lighting techniques" [20]. Guest speakers, (i.e., from MBA Design and Display Products Corp)., presented museum-specific products via Zoom. The instructor provided a museum lighting case study slideshow to students, highlighting a local museum as an example, via Zoom.

3.1.4 Vendor Literature

Catalogs provided by Gaylord Archival [29] and MBA Design and Display Products Corp. [30] were disseminated to students. Students were required to use these resources in their selections and specifications of furniture and furnishings for the Ethiopian Museum Design project.

3.2 Student Outputs

Aspects of the following four CIDA standards were found to have been manifested in the Ethiopian Museum Design Project.: 4. Global Context, 7. Human-Centered Design, 12. Light and Color, and 15. Construction. Refer to Tables 1-6.

Table 1 Student Learning Expectation

Ethiopian Museum Project Compliance with CIDA 2020 Standards for **Student Learning Expectation** by Indicator					
Standard Number	Standard Name	Indicators			
		Codes	Quantity	Number Compliant	Percentage Compliant
4	Global Context	4a-4c	3	2	66. 66
5	Collaboration	51-5e	5	0	0
6	Business Practices and Professionalism	6a-6h	8	0	0
7	Human-Centered Design	7a-7f	6	1	16.66
8	Design Process	8a-8i	9	0	0
9	Communication	9a-9e	6	0	0
10	History	10a-10e	5	0	0
11	Design Elements and Principles	11a-11d	0	0	0
12	Light and Color	12a-12l	12	1	8.33
13	Products and Materials	13a-13e	5	0	0
14	Environmental Systems and Human Wellbeing	14a-14i	9	0	0
15	Construction	15a-15j	10	2	20
16	Regulations and Guidelines	16a-16e	5	0	0
TOTAL			83	6	7.22

Table 2 Program

Ethiopian Museum Project Compliance with CIDA 2020 Standards for **Program** by Indicator					
Standard Number	Standard Name	Indicators			
		Codes	Quantity Total	Number Compliant	Percentage Compliant
4	Global Context	4d, 4e, 4f	3	2	66.66
5	Collaboration	NA	0	0	0
6	Business Practices and Professionalism	6i-6n	6	0	0
7	Human-Centered Design	NA	NA	NA	NA
8	Design Process	8j-8l	3	0	0
9	Communication	9f-9j	2	0	0
10	History	NA	NA	NA	NA
11	Design Elements and Principles	NA	NA	NA	NA
12	Light and Color	NA	NA	NA	NA
13	Products and Materials	NA	NA	NA	NA
14	Environmental Systems and Human Wellbeing	NA	NA	NA	NA
15	Construction	NA	NA	NA	NA
16	Regulations and Guidelines	NA	NA	NA	NA
TOTAL			14	2	14.28

Table 3 Global Context

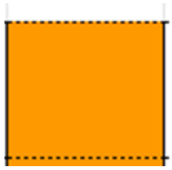
Standard 4. Curriculum Matrix	
 **Orange designates that the course was supported by key evidence for a particular standard.**	**Third Year** **Spring** DHM 3453: INTERIOR DESIGN STUDIO IV - ENVIRONMENTAL DESIGN
Standard 4. Global Context - Interior designers have a global view and consider social, cultural, economic, and ecological contexts in all aspects of their work.	
Student Learning Expectations	
Students ***understand*** that human and environmental conditions vary according to geographic location and impact design and construction decisions. **4a**	
Student work demonstrates *understanding* of:	
how social, economic, cultural, and physical contexts inform interior design. **4b**	
how systems thinking informs the practice of interior design. **4c**	
Program Expectations	
The interior design program provides:	
exposure to current and emerging issues that are shaping contemporary society and the world. **4d**	
exposure to a variety of cultural norms. **4e**	
opportunities for developing multi-cultural awareness. **4f**	
Notes:	
DHM 3453 - students learn about Haramaya University in Ethiopia and select cultural artifacts from Ethiopia.	

Table 4 Human-Centered Design

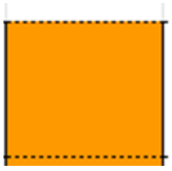
Standard 7 Curriculum Matrix		
 **Orange designates that the course was supported by key evidence for a particular standard.**		**Third Year** / **Spring** / DHM 3453: INTERIOR DESIGN STUDIO IV - ENVIRONMENTAL DESIGN (PH)
Standard 7. Human-Centered Design - Interior designers apply knowledge of human experience and behavior to designing the built environment.		
Student Learning Expectations		
Student work demonstrates *understanding* of:		
theories related to the impact of the built environment on human experience, behavior, and performance.	**7a**	
the relationship between the natural, built, virtual, and technological environments as they relate to the human experience, wellbeing, behavior, and performance.	**7b**	
Student work demonstrates the *ability* to:		
gather and apply human-centered evidence.	**7c**	
analyze and synthesize human perception and behavior patterns to inform design solutions.	**7d**	
apply human factors, ergonomics, inclusive, and universal design principles to design solutions.	**7e**	
apply wayfinding techniques to design solutions.	**7f**	
Notes:		
DHM 3453 Studio IV - Students select components of various systems and furnishings in the built environment to support museum patrons and their security, comfort level, and ease of viewing artifacts in Project 1: Ethiopia Museum. Student design solutions address technological aspects of the environment such as security cameras and lighting systems.		

Table 5 Light and Color

Standard 12 Curriculum Matrix		
 **Orange designates that the course was supported by key evidence for a particular standard.**		**Third Year** **Spring** DHM 3453: INTERIOR DESIGN STUDIO IV - ENVIRONMENTAL DESIGN (PH)
Standard 12. Light and Color - Interior designers apply the principles and theories of light and color effectively in relation to environmental impact and human wellbeing.		
Student Learning Expectations		
Students are ***aware*** of the environmental impact of illumination strategies & decisions.	**12a**	
Students *understand*:		
the principles of natural and artificial lighting design.	**12b**	
strategies for using and modulating natural light.	**12c**	
Students competently select and ***apply*** luminaires and light sources.	**12d**	
Students have ***awareness*** of a range of sources for information & research about color.	**12e**	
Students ***understand*** how light and color impact health, safety, and wellbeing in the interior environment.	**12f**	
Student work demonstrates *understanding* of:		
color terminology.	**12g**	
color principles, theories, and systems.	**12h**	
color in relation to materials, textures, light, and form.	**12i**	
Student work demonstrates the *ability* to appropriately:		
select and apply color to support design concepts.	**12j**	
select and apply color to multiple design functions.	**12k**	
use color solutions across different modes of design communication.	**12l**	
Notes:		
DHM 3453 Studio IV - Students utilize the technique of "light mapping" to identify and communicate targets to illuminate in horizontal and vertical planes. They are required to utilize a variety of lighting techniques and identify their choice while utilizing LED energy-saving sources. Students learn about illuminating Engineering Society (IES)-light level recommendations. Students identify Light Reflectance Value (LRV) and lighting selections.		
DHM 3453 Studio IV - various aspects of natural and artificial lighting design, shading devices and window treatments. Students specify luminaires and light sources in lighting fixture schedules.		

Table 6 Human-Centered Design

Standard 15 Curriculum Matrix		
 **Orange designates that the course was supported by key evidence for a particular standard.**		**Third Year** **Spring** DHM 3453: INTERIOR DESIGN STUDIO IV - ENVIRONMENTAL DESIGN (PH)
Standard 15. Construction - Interior designers understand interior construction and its interrelationship with base building construction and systems.		
Student Learning Expectations		
Students have ***awareness*** of the environmental impact of construction.	**15a**	
Student work demonstrates *understanding* that design solutions affect and are impacted by:		
base-building structural systems and construction methods.	**15b**	
interior systems, construction, and installation methods.	**15c**	
detailing and specification of interior construction materials, products, and finishes.	**15d**	
the integration of building systems including electrical (such as power, data, lighting, telecommunications, audio visual) and mechanical (such as HVAC, plumbing, and sprinklers).	**15e**	
monitoring systems pertaining to energy, security, and building controls systems.	**15f**	
vertical and horizontal systems of transport and circulation such as stairs, elevators, or escalators.	**15g**	
Students ***understand*** the formats, components, and accepted standards for an integrated and comprehensive set of interior construction documents.	**15h**	
Students are *able* to:		
read and interpret construction documents.	**15i**	
contribute to the production of interior contract documents including drawings, detailing, schedules, and specifications appropriate to project size and scope.	**15j**	
Notes:		
DHM 3453 Studio IV Environmental Design: Project 3 Atherton Hotel requires students to coordinate various systems in their designs and manifest them in their drawings. Students specify lighting products, produce room finish schedules and lighting fixture schedules. Students produce reflected ceiling plans which show integration of various systems in the ceiling plane, including mechanical system components, luminaires and sprinkler heads. Students produce lighting plans, power plans and telecommunication plans. Project 1-Ethiopia Museum - students select security system and moisture control components.		

3.2.1 CIDA Standard 4. Global Context

'Interior designers have a global view…" [1] p. II-16. Of the possible six opportunities within Standard 4. (4a-4f), the University researchers found four instances (67%) of key evidence of Global Context in the Ethiopian Museum Design project. Refer to Tables 1, 2 and 3. Two pieces of evidence were found under evidence of "student work" and two pieces of evidence were found under "program expectations". The researchers identified the 3rd year design students' Ethiopian Museum Design project as meeting four specific Standard 4 indicators [18]: "Student work demonstrates understanding of b). *"how social, economic, cultural, and physical contexts inform interior design"* and c). *"…how systems thinking informs the practice of interior design"*; *"The interior design program provides e.) exposure to a variety of cultural norms"* and f). *"…opportunities for developing multi-cultural awareness"* [1] p. II-16.

b) "Student work demonstrates understanding of how social, economic, cultural, and physical contexts inform interior design" [1] p. II-16.

"DHM 3453 Studio IV Environmental Design – Key Evidence: Students learn about Haramaya University in Ethiopia and select cultural artifacts from Ethiopia, via databases and print sources, to place in their Project 1: Ethiopian Museum" [31].

"Students created a variety of drawings utilizing various media and historic and/or contemporary material culture artifacts (i.e., apparel, jewelry, sculpture, masks, baskets, pottery etc.) integrated into a custom museum design" [18]. Refer to Figure 3.

Figure 3 Sample of student's selection of artifacts for display in the Ethiopian Museum Design project.

c) Student work demonstrates understanding of how systems thinking informs the practice of interior design [1] p. II-16.

"DHM 3453 Studio IV Environmental Design – Key Evidence: Students select security system, HVAC system and lighting system components in Project: 1 Ethiopian Museum Design." [31] p. 45.

Program Expectations

The interior design program provides:

e) exposure to a variety of cultural norms." [1] p. II-16.

"DHM 3453 Studio IV Environmental Design – Key Evidence: Students learn about Ethiopian culture by examining artifacts such as masks, jewelry and apparel, and illuminate and protect these in Project 1: Ethiopia Museum Design" [31].

f) opportunities for developing multi-cultural awareness" [1] p. II-16.

"DHM 3453 Studio IV Environmental Design – Key Evidence: Students become aware of Northern African culture as they search for Ethiopian artifacts in museum databases for their Ethiopian Museum Design project" [31].

3.2.2 CIDA "Standard 7. Human-Centered Design

"Interior designers apply knowledge of human experience..." Of the possible six opportunities within Standard 7., there were one instance (17%) of key evidence found of Human-Centered Design in the Ethiopian Museum Design project. Refer to Table 4. The evidence was found under "student work" and 0 evidence was found under "program expectations".

Student Learning Expectations

b) Student work demonstrates understanding of the relationship between the natural, built, virtual, and technological environments as they relate to the human experience, wellbeing, behavior, and performance" [1] p. II-20.

"DHM 3453 Studio IV Environmental Design – Key Evidence: Students select components of various systems and furnishings in the built environment to support museum patrons and their security (security systems), comfort level (HVAC) and ease of viewing artifacts (lighting) in Project 1 Ethiopian Museum Design. Some aspects of students' design solutions for museum address technological environments (such as security cameras, LED lighting systems)" [31].

3.2.3 CIDA "Standard 12. Light and Color

"Interior designers apply the principles and theories of light and color... "

Of the possible 12 opportunities within Standard 12., there was one instance (8 %) of key evidence found of Light and Color in the Ethiopian Museum Design project. Refer to Table 5. One instance was found under evidence of "student work" and 0 evidence was found under "program expectations" [31].

Student Learning Expectations

a) Students are aware of the environmental impact of illumination strategies and decisions." [1] p. II-26.

"DHM 3453 Studio IV Environmental Design – Key Evidence: Students utilize the technique of "light mapping" to identify and communicate targets to illuminate in horizontal and vertical planes in Project 1: Ethiopian Museum Design. Students learn various "lighting techniques" from textbook and lecture and are required to utilize a variety of lighting techniques in Project 1: Ethiopian Museum Design and identify their choices" [31].

Part 1: ...In Studio IV, they utilize the technique of "light mapping" to identify and communicate targets to illuminate in horizontal and vertical planes in a museum environment. Students create reflected ceiling plans and learn about modulating light through window treatment solutions. [31].

Students produced "light mapping", which communicated lighting design intent and showed a hierarchy of light levels on the selected museum artifacts [32]. Lighting and other environmental systems were specified to provide proper museum display conditions while preserving and protecting artifacts [32]. Students created a variety of drawings utilizing various media and historic and/or contemporary material culture artifacts (i.e., apparel, jewelry, sculpture, masks, baskets, pottery etc.) integrated into a custom museum design [1] p. II-16.

Students practiced "light mapping", which communicated proposed lighting techniques with yellow pencil color overlaying hard copies of black and white 3-D perspective sketches. Yellow pencil application conveyed hierarchy of lighting...students created multiple iterations of design solutions submitted electronically via the classroom's Dropbox software. The instructor forwarded student solutions to the Ethiopian University [33]. Refer to Figures 4-10.

Figure 4 Student conducts light-mapping exploration with a yellow pencil for Ethiopian Museum Design Project.

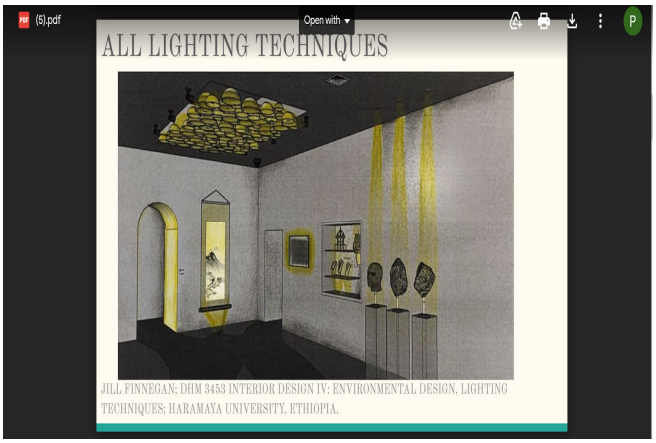


Figure 5 Student's hand-drawn, light-mapping perspective using yellow pencil for Ethiopian Museum Design project which was posted on online learning platform.

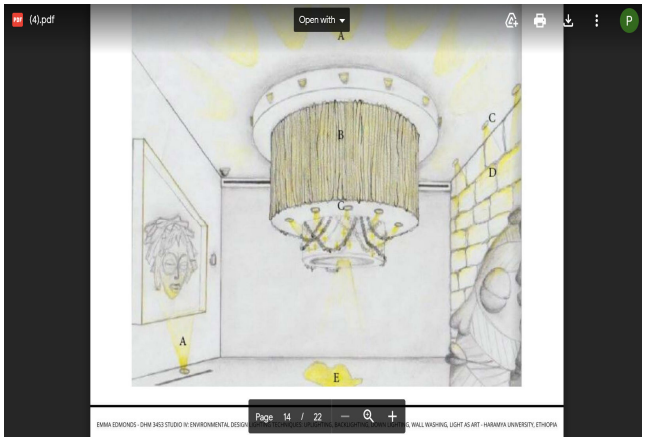


Figure 6 Student's hand-drawn, light-mapping perspective using yellow pencil for Ethiopian Museum Design project posted on online learning platform.

Figure 7 Student's hand-drawn, light-mapping perspective for Ethiopian Museum Design Project using yellow pencil and lighting techniques indicated.

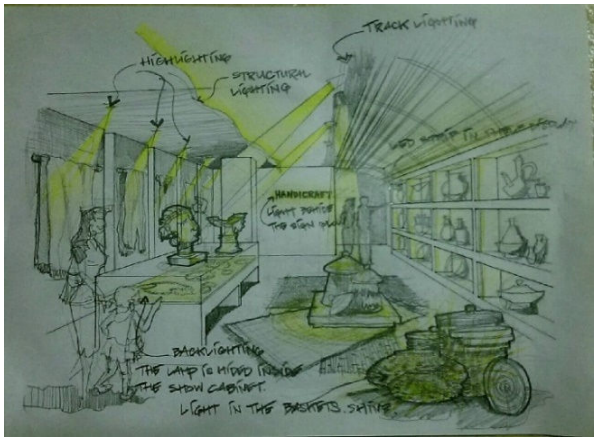


Figure 8 Student's hand-drawn, light-mapping perspective for Ethiopian Museum Design project using yellow pencil and lighting techniques indicated.

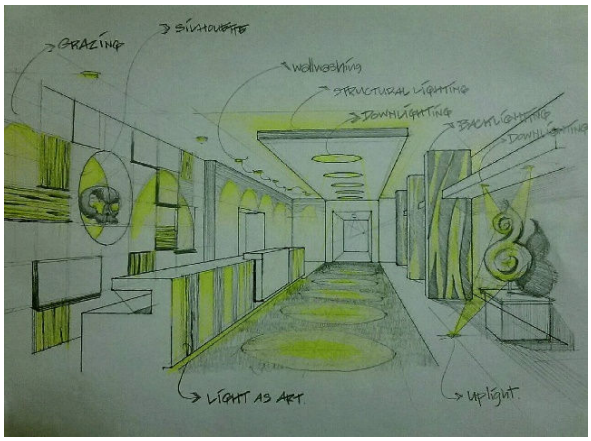
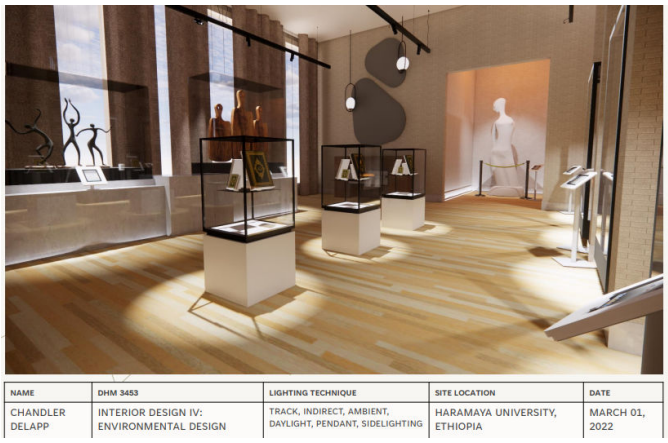


Figure 9 Student's hand-drawn light-mapping perspective using yellow pencil for Ethiopian Museum Design project with lighting techniques indicated.



NAME	DHM 3453	LIGHTING TECHNIQUE	SITE LOCATION	DATE
CHANDLER DELAPP	INTERIOR DESIGN IV: ENVIRONMENTAL DESIGN	TRACK, INDIRECT, AMBIENT, DAYLIGHT, PENDANT, SIDELIGHTING	HARAMAYA UNIVERSITY, ETHIOPIA	MARCH 01, 2022

Figure 10 Student's light-mapping perspective using Enscape and SketchUp for the Ethiopian Museum Design project.

3.2.4 CIDA "Standard 15. Construction

"Interior designers understand…systems." Of the ten opportunities within Standard 15., there were two instances (20%) of key evidence found of Construction in the Ethiopian Museum Design project. Refer to Table 6. Two were found under evidence of "student work" and (0, 0 %) evidence was found under "program expectations".

c) Student work demonstrates understanding that design solutions affect and are impacted by interior systems, construction, and installation methods" [1] p. II-29.

"DHM 3453 Studio IV Environmental Design – Key Evidence: This course focuses on environmental systems including lighting systems, plumbing systems and HVAC systems. Project 1 Ethiopian Museum Design, requires students to show security systems in 3D interior drawings and select components."

f) Student work demonstrates understanding that design solutions affect and are impacted by monitoring systems pertaining to energy, security, and building controls systems" [1] II-29.

"DHM 3453 Studio IV Environmental Design – Key Evidence: Textbook addresses monitoring of lighting systems. In Project 1 Ethiopian Museum Design, students select security system components."

Appropriate environmental interventions included luminaires, humidity controls and/or data loggers, temperature controls and/or data loggers, and security devices were specified [18].

4. Conclusions and Discussion

The Ethiopian Museum Design project was presented as part of the interior design program's accreditation-required evidence of student work [8]. CIDA restricted the allowed number of reported instances of evidence of "key" compliance for each standard and indicator. Faculty members produced the CIDA reports for their respective courses. Faculty members were required to be strategic regarding the "key" evidence that they reported to CIDA for particular projects in particular courses. After faculty deliberations during a review of all faculty-submitted course evidence, some instances of evidence were removed from reporting. In some cases, the Ethiopian Museum Design project met other compliance requirements as well as those reported, but this was not noted as such in the key evidence submitted to CIDA or in the current research study. (In those cases, evidence of other student outputs from a different course was utilized instead.) For the purposes of the current research study, the evidence examples not considered to be "key" were indicated as 0 compliance for the Ethiopian Museum Design project. Further, in

some instances the course, DHM 3453, may have generated some evidence of compliance with other standards and indicators. However, that evidence may have occurred in different student outputs rather than in the Ethiopian Museum Design project (i.e. quizzes, other student projects) and was therefore not counted/included in the current research study.

In other accreditation-seeking efforts occurring on campus, The University Art Museum, coincidentally and simultaneously, was undergoing initial accreditation for their program. The interior design and University Art Museum partnership had continued to grow during the pandemic semesters, with the Ethiopian Museum Design project in the DHM 3453 course relying on the University Art Museum, and its resources. In 2021, the design course instructor participated, by invitation, in a zoom panel meeting with University Art Museum accreditation site visitors. Their site visit was moved online only due to the pandemic. Virtual site visitors expressed surprise and pleasure about the interior design program and University Art Museum partnership as manifested in the Ethiopian Museum Design project.

Several students also included their DHM 3453 project, especially their light-mapping sketches, in their digital portfolios which they used for job interviews. Several academic presentations have been made regarding various aspects of the Ethiopian Museum Design project which provided the instructor with feedback from peers.

The interior design program and University Art Museum partnership appeared to be functional and mutually beneficial. The Ethiopian Museum Design project, which included several inputs from the University Art Museum, contributed to a successful interior design program accreditation effort because it provided key evidence of compliance with multiple standards' indicators. The interior design program, via the Ethiopian Museum Design project, also indirectly supported University Art Museum's first-time accreditation.

Although some student work on the Ethiopian Museum Design project and all accreditation site visit review happened virtually, due to the global pandemic, the project and accreditation efforts were still successful. The American University's Interior Design Program was notified in 2021 that they had received re-accreditation by CIDA. The current study fills a gap in the literature since previously, no previously published examples of interior design students' museum projects compliance with interior design standards were found.

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