INSTRUCTIONAL STRATEGIES FOR TEACHING CROSS-CULTURAL DESIGN: 
A Pedagogical Example Using Nigerian and South African Spatial Forms

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Abstract
This paper discusses instruction on Nigerian and South African spatial forms presented to a Design studio in a Southwestern US University. The goal was to increase students’ ability to synthesize design ideas for different cultural settings using design theories, their utilization of examples from non-Western perspectives as references for discussing design, and their ability to solve design problems in different cultural settings. The author presents these instructional strategies as a pedagogical model for design educators.

Keywords: Diversity and design; global design issues; cross-cultural design; non-Western design; design in cultural settings; instructional strategies

INTRODUCTION
This paper discusses instruction on Nigerian and South African spatial forms presented to a Design studio in a Southwestern US University. The instruction was developed using one facet of ACT-R learning theory (Anderson, 1995), anthropological methods (Creswell, 2009; Hall, 1966; Kingsolver, 1998; O’Reilly, 2005; Silverman, 2005), and Grant’s pedagogical approaches (Grant, 1991). The distinction between declarative and procedural knowledge was used to help students learn about Nigerian and South African spatial forms and how to apply those forms. Anthropological methods were used to elucidate information about Nigerian and South African design aesthetics. Grant’s (1991) pedagogical approach of introducing diversity in design education was embedded in the instruction using three steps: the inclusion, contribution, and transformational approaches.

LITERATURE REVIEW
A Case for Cross-Cultural Design from Nigeria and South Africa
Previous scholarship about cross-cultural design has included proposing international design education (Fairbrass & Harris, 1986; Guerin & Mason, 1993; Guerin & Thompson, 2004; Leigh & Tremblay, 2002), exploring design in a variety of diverse cultural settings (Asojo, 2001; Asojo, 2007; Grant, 1991), and virtual design charrettes and actual physical exchanges in Canada, the United States, and Mexico (Kucko, Prestwood, & Beacham, 2005). The discussion about internationalizing interior design education in the US began with the 1986 Interior Design Educators Council (IDEC) annual meeting. At that meeting, Fairbrass and Harris (1986) encouraged interior design educators to integrate international activities into their classrooms by exposing students to other cultures, histories, and lifestyles.

In another study, Guerin and Mason (1993) presented an experiential framework for internationalizing interior design education that studied characteristics of study-abroad programs. Similarly, the fall 1994 Futures roundtable in Chicago, Illinois which consisted of 16 participants representing interior design practice and education met to determine trends in the profession. The resulting list included areas such as technology, art and culture, education, the environment, and business. Global cooperation, business values, cultural diversity, and technology were noted as important areas to be addressed by the interior design profession (Hasell & Scott, 1996). The accreditation boards for interior design and architectural education have also both recognized the importance of integrating cultural diversity and global issues in design education.
For example, the 2009 Council for Interior Design Accreditation (CIDA) professional standard 2 requires "entry-level interior designers have a global view and weigh design decisions within the parameters of ecological, socio-economic, and cultural contexts" (p. 12). Similarly, the 2009 Conditions for accreditation from the National Architectural Accrediting Board (NAAB), Inc. standard 2.A.9 on historical traditions and global culture requires that students have an Understanding of parallel and divergent canons and traditions of architecture, landscape and urban design including examples of indigenous, vernacular, local, regional, national settings from the Eastern, Western, Northern, and South hemispheres in terms of their climatic, ecological, technological, socioeconomic, public health, and cultural factors. (p. 23).

Furthermore, on cultural diversity, the 2009 National Architectural Accrediting Board (NAAB), Inc. standard 2.A.10 recommends students understand "the diverse needs, values, behavioral norms, physical abilities, and social and spatial patterns that characterize different cultures and individuals and the implication of this diversity on the societal roles and responsibilities of architects" (p. 22). All the aforementioned authors and accreditation requirements suggest the increasing need to engage design students in the global design discourse. Thus, design educators are constantly being challenged to introduce global issues in design education and are responsible for integrating global design discourse into design curricula. In order to effectively design in today's world, design students have to understand the cultural, social, economic, and political circumstances of many cultures. While previous authors have discussed and illustrated the significance of integrating global issues, diversity issues in design curricula and designing in diverse cultural settings, none have actually proposed instructional approaches that use non-Western design forms that focus on sub-Saharan African countries.

In the study presented in this paper, I focused on Nigeria and South Africa, two very diverse and populous countries in Africa that offer numerous precedents for design. I chose Nigeria and South Africa because the entire African continent, with its complex history, will be very difficult to cover in one study. A unique commonality is that both countries exhibit Mazruli’s 1986 “triple heritage” with influences deeply rooted in the indigenous, Western, and Islamic cultures. This “triple heritage” is what Elleh (1997) also observed in the architecture of most African cities. African architecture is a product of cross-cultural encounters from indigenous, Western and Islamic cultures. The result is that African cities are different from any other part of the world. Therefore, Africa offers unique precedents for studying cross-cultural design.

Nigeria is the most populous country in Africa with a population of about 140 million. This population is made up of about 250 ethnic groups. Three of them, Hausa, Ibo, and Yoruba are the major groups and constitute more than 40 percent of the country’s population. Virtually all the indigenous populations of Africa are represented in Nigeria, hence the great diversity of her people and culture. It was in Nigeria that the Bantu and Semi Bantu, migrating from South and central Africa, intermingled with the Sudanese. Later, other groups such as Shuwa Arabs, the Tuaregs, and the Fulanis, all of whom are concentrated in the far north, entered northern Nigeria in migratory waves across the Sahara Desert. The earliest occupants of Nigeria settled in the forest belt and in the Niger Delta region (Embassy of the Federal Republic of Nigeria, 2009).

South Africa has a population of about 50 million people. The 2010 midyear population estimates indicates 79.4% are black Africans, 9.2% are White, 8.8% are colored and 2.6% are Indian or Asians. Major ethnic groups include the Zulu, Xhosa, Basotho, Venda, Tsonga, Swazi, Ndebele, Tswana, and Bapedi. The white population originates from many ethnic groups such as the Dutch, Flemish, Portuguese, Norwegian, German, Greek, French, English, Polish, Irish, Italian, Scottish, and Welsh.

Instructional Strategies for Cross-Cultural Design
Educators are constantly being challenged to integrate global and diversity issues in design curricula and there is a lack of instructional approaches that focus on sub-Saharan Africa.
Similarly, there is a lack of body of knowledge on cross-cultural design pedagogical approaches. An interdisciplinary approach using a facet of ACT-R learning theory (Anderson, 1995), Grant's pedagogical approaches (Grant, 1991), and anthropological methods informed the development of the instructional strategies presented in this paper. The distinction between declarative and procedural knowledge (Anderson, 1995) was used to help students learn about Nigerian and South African spatial forms and how to apply those forms. Anthropological methods such as phenomenology, comparative methods, life histories, ethnography, photography and proxemics were used to elucidate information about Nigerian and South African design aesthetics. Grant's (1991) pedagogical approach of introducing diversity in design education was embedded in the instruction in three steps: the inclusion approach; the contribution approach; and the transformational approach.

**Anderson’s Act Theory and its Implication for Instruction in Cross-Cultural Design**

ACT-R (Adaptive Control of Thought—Rational) was developed by John R. Anderson at Carnegie Mellon University (Anderson, 1995). The basic premise is that cognitive tasks humans perform consist of a series of separate actions and procedures. One main assumption of ACT-R is that knowledge can be classified as either declarative or procedural (Anderson, 1995). Anderson (1995) noted “declarative knowledge is explicit knowledge which we can report and of which we are consciously aware” (p. 284). Many Cognitivist theorists observed that declarative knowledge takes two forms: episodic memory and semantic memory (Bauer, 2006; S.K. Johnson & Anderson, 2004; Tulving, 1983, 1991, 1993; Ormrod, 2008). Episodic memory is a person’s memory of a personal life experience, while semantic memory is general knowledge about the world. Procedural knowledge, the second type of knowledge, involves knowing how to execute tasks (J.R. Anderson, 1983, 1995; Corno et. al., 2002). Anderson (1995) observed that “procedural knowledge is knowledge of how to do things, and it is often implicit” (p. 234-235).

Several cognitive and educational psychologists consider procedural knowledge, skills related to the performance of cognitive activities (Anderson, 1995; Ormrod, 2008). Anderson (1995) noted “human cognition is always purposeful, directed to achieving goals, and to removing obstacles to those goals” (p. 237). Therefore, a better understanding of procedural knowledge can be gained through problem-solving activities. It is pertinent to note that in the process employed by designers and architects, the goal is directly aimed at problem-solving and achieving goals, which are the client/user requirements for the space being designed. Three essential features of problem-solving activities identified by Anderson (1995) are goal directedness, sub-goal decomposition, and operator application. These three features are relevant to problem-solving in design. Initially, there is a goal by the designer to solve a problem. Next, the designer creates sub-goals for the problem. Finally, the designer puts these sub-goals together and performs tasks to achieve a solution to the design problem.

According to Anderson, procedural knowledge is acquired in three stages of skill development: cognitive, associative, and autonomous (Anderson, 1995). Anderson (1995) observed the first stage, the cognitive stage represents the phase in which “subjects develop a declarative encoding of the skill; that is; they commit to memory a set of facts relevant to the skill” (p. 273). The second stage, the associative stage results out of repeated practice. During this stage a person detects and corrects errors. As a result of which performance becomes smoother and more rapid. This stage fosters practice, thus leading to proceduralization. Eventually, as the procedure becomes more automated through practice, automaticity emerges in the autonomous stage. Anderson’s (1995) ACT-R has some general implications for teaching procedures that are relevant to the present study. They are:

1. Students must develop an accurate and elaborate declarative representation of the desired procedure (actions) and conditions under which it should be used;
2. Teaching can be accomplished using the expository or discovery methods. The expository method is teacher-centered instruction, while the discovery method occurs via discovery;
3. Feedback is an important component, because it fosters proceduralization; and,
4. Continued practice leads to automatization.

In this study, I used Anderson’s ACT-R general implications for teaching procedures to guide students through a cross-cultural design learning process. In the first step, I guided students through the development of accurate and elaborative representation of Nigerian and South African culture and design. Students learned aspects of the culture such as general information (location, population, climate, history, languages, government, culture, food, festivals, clothing and textiles, and technology), design philosophy, design elements, design principles, organizational principles, spatial relationships, spatial transitions, form and space, proportion and scale, horizontal elements, and environmental issues.

This information was developed using the expository method, which involved teacher-centered instruction, using interactive presentation lecture formats. Additionally, exercises where students learned by guided discovery were integrated. An example of a method built into this study where students learned by guided discovery is when they selected a Nigerian or South African ethnic group and developed conceptual ideas based on the traditional and contemporary design from that ethnic group. Students were asked to include the following in their conceptual ideas: location, brief history, philosophy, form and space, spatial organization, and material technology. Students also learned through discovery in the process of designing a restaurant to highlight Nigerian and South African cultures.

Images were used to provide information about the cultures, since design students generally possess high levels of visual literacy, because of their constant utilization of visual and graphic methods in the design process and design problem-solving. This process facilitated learning through discovery. Constant feedback was important to foster proceduralization and with constant practice the process was expected to become automatized and natural. In the study discussed in this paper, the hope was that the state of automatization was accomplished through the final design project, where the students designed a restaurant in an urban setting in Lagos, Nigeria or Johannesburg, South Africa to highlight each country's culture for tourists. Table 1 illustrates a chart of the steps in which I utilized the general implications of Anderson’s ACT-R for teaching to help students learn about Nigerian and South African designs.

**Grant's Pedagogical Approaches and its Implication for Instruction in Cross-Cultural Design**

Grant (1991) recommended three pedagogical approaches for introducing diversity in design education: the inclusion, contribution, and transformational approaches. The inclusion approach utilizes examples from non-western perspectives as references for discussing design ideas. The contribution approach selects invisible designers (non-western) and analyses the contributions they have made. Regarding the most comprehensive approach, the transformational approach, Grant (1991) noted:

*Attempts to significantly alter student experience and, therefore, learning. It injects perspectives, references, and content through cross-cultural experiences that shape students’ understanding of significant architectural theories while demonstrating alternative creative thinking and decision-making skills. To transform or change the existing singular context and its assumptions, a revised curriculum, cultural emphasis, and learning context are required.* (p. 161).

Grant used the inclusion and contribution pedagogical approaches in the development of transformational methods of introducing diversity in design theory through courses that explore design in a variety of cultural settings. In the study presented here, I build upon the existing body of knowledge by developing a pedagogical model of how diverse cross-cultural design perspectives are introduced in studio. Using Grant’s inclusion, contribution, and transformational approaches, design students explored design in Nigeria and South Africa. Grant used the inclusion and contribution pedagogical approaches in the development of transformational methods. He introduced diversity in design theory through courses that explore design in a variety of cultural settings.
Like Grant, the project in this study began by utilizing the inclusion and contribution approaches (Grant, 1991). I guided students through the study of Nigerian and South African design precedents and culture. The hope was that, in the process of designing a restaurant in an urban setting in Lagos, Nigeria or Johannesburg, South Africa to highlight the cultures of the countries, the students would develop a ‘critical and analytical eye’ which will enhance their appreciation of the importance of cross-cultural knowledge within design. The extent to which this occurred would determine the success of the instructional approach. Tables 2 and 3 illustrate a synopsis of design precedents from Nigerian and South African spaces using the inclusion and contribution approaches as references for discussing design ideas presented to the students.

**Anthropological Methods and their Implications for Instruction in Cross-Cultural Design**

Anthropological methodologies include research traditions such as phenomenology, participant observation, comparative method, life histories, genealogies, ethnography, photography, grounded theory and the study of proxemics. In this study, these research traditions were used to elucidate information about Nigerian and South African design aesthetics to participants. Phenomenological research is a qualitative method in which the researcher captures the individual’s experience of a phenomenon as described by the participant (O’Reilly, 2005). It often involves long interviews with about ten people. Participant-observations involve personal observations in which the researcher gains the trust of the community being studied by immersing herself or himself in the culture, so as to learn about significant aspects such as human interaction, human behavior, kinship patterns, aspects of ceremonialism, and spatial layout of the culture. Comparative methods involve the analysis of cultures to learn and explain patterns of similarities and differences.

Life history collection by the researcher is another anthropological field technique. The goal is to capture important information from the subjects. Genealogies help to highlight information about the group’s ancestry. Ethnography is another anthropological field technique, which O’Reilly (2005) defined as:

> An iterative inductive research, drawing on a family of methods, involving direct and sustained contact with human agents, within the context of daily lives, watching what happens, listening to what is said, asking questions, and producing a richly written account that respects the irreducibility of human experience, that acknowledges the role of theory, as well as the researcher’s own role, and that views humans as part object/part subject. (p. 3)

Photography involves taking and documenting images from the group being studied. Grounded theory involves the development of theory based on data collected in the field. Creswell (2009) defined grounded theory as "a qualitative strategy in which the researcher derives a general, abstract theory of a process, action, or interaction grounded in the views of participants in a study" (p. 229). It typically involves about twenty to thirty people.

Proxemics, a term coined by Edward T. Hall (1966), deals with human interaction and behavior in space and it is also used to understand how people perceive and use space. In his analysis of space, Hall (1966) delineated the following four distances:

1. Intimate distance, which is the space within 1.5 feet of a person. This correlates to how close people are for embracing or touching;
2. Personal distance, which is from 1.5 to 2.5 feet of a person. This is usually for interaction among friends and family;
3. Social distance, which is from 4 to 7 feet of a person. This is for interaction with acquaintances; and,
4. Public distance, which is from 12 to 25 feet. This is usually for public speeches.
Table 1
Anderson’s ACT-R General Implications for Teaching about Nigerian and South African Design

<table>
<thead>
<tr>
<th>Task</th>
<th>Process</th>
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</table>
| Develop accurate and elaborate declarative representation of Nigerian and South African designs | Examples of topics covered to help students develop an accurate and elaborate representation are the following:  
- General information about the Culture: Location, Population, Climate, History, languages, Government, Food, Festivals, Clothing and Textiles, Technology, etc.  
- Design Philosophy: Design theories/ideologies, Religious and Cultural values, natural elements (earth, water, air, fire, sky) and their importance.  
- Design Elements: Line, Form, Shape, Space, Texture, and Color  
- Design Principles: Balance, Rhythm, Emphasis, Proportion, Scale, and Unity/Harmony.  
- Organizational Principles: Centralized, Linear, Radial, Clustered and Grid planning styles.  
- Spatial Transitions: Circulation, Approach, Entrance, Importance of threshold changes, Path, Edges, Nodes, Corridors, Courtyards etc.  
- Articulation of form and space, Cultural Identity and Symbolic meaning, Proportion and scale, Role status and hierarchy in determining proportion and scale of the buildings and spaces.  
- Horizontal elements: Base planes, Depressed planes, Overhead planes  
- Vertical elements: Trees (discuss symbolic meaning), Columns, Arches, Vaults, Minarets, Walls, Niche.  
- Properties of enclosures and quality of space - Shape and Form, Proportion and Scale: volume, Light, View, Texture, Pattern, Surface and Color, Sound.  
- Environmental issues: Sustainability and Green Design issues.  
- Case studies: Examples of building types - Religious buildings, Residential buildings, Commercial buildings, Civic buildings, etc. |

Expository Methods (Teacher centered instruction) Using the expository methods involves teacher-centered instruction to help students develop declarative knowledge. The above-mentioned topics will be presented in PowerPoint and interactive presentation lecture format on Nigerian and South African design. Anthropological methods such as ethnographies, proxemics, and genealogies will be used to elucidate information about Nigerian and South African design aesthetics.

Discovery Methods The discovery method allows students to learn through discovery. Projects are assigned to enhance discovery. Examples of project types to foster discovery:  
**Task 1:** Assign students the task to pick a Nigerian or South African ethnic group and summarize the traditional and contemporary design or space from that culture. Ask students to include the following topics: location, brief history, philosophy, form and space, spatial organization, and material Technology.  
**Task 2:** Interior and lighting design of restaurant in Nigeria and South Africa in an urban setting in Lagos, Nigeria or Johannesburg, South Africa to highlight the country’s culture and food for tourists.

Feedback Component Feedback is an important component, because it fosters proceduralization. Feedback from the instructor is paramount. Any misconceptions and disequilibrium is corrected with feedback and constant critiques and input from instructor.

Automation Continued practice leads to automatization
Table 2

Design precedents from traditional Nigerian and South African spaces using the inclusion and contribution approaches as references for discussing design.

<table>
<thead>
<tr>
<th>Culture</th>
<th>Location</th>
<th>Spatial Organization</th>
<th>Artistic Expression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hausa-Fulani</td>
<td>Nigeria</td>
<td>Street patterns were radial in Hausa-Fulani cities, which had authoritarian communities. Spaces were sometimes based on rectilinear or curvilinear geometry or a juxtaposition of both. Buildings had dome or flat roofs sometimes on quadrangular or square forms. The center was important in Hausa-Fulani culture. Arches and vaults were predominant.</td>
<td>Wall decoration and painting was very predominant. Resurfacing of walls was an annual ritual. Hausa-Fulani specialized in ironwork, leather, pottery and goldsmithing. Arabic scripts and geometric patterns were sculptured on walls.</td>
</tr>
<tr>
<td>Igbo</td>
<td>Nigeria</td>
<td>Street patterns were based on winding labyrinths in Igbo societies, which had a more diffused authority structure.</td>
<td>Wall decoration and painting was very predominant and women painted the interiors and exteriors of the family Obi.</td>
</tr>
<tr>
<td>Benin</td>
<td>Nigeria</td>
<td>Street patterns based on a modified grid in Benin, which had authoritarian communities. Buildings were based on impluvium style with central courtyard.</td>
<td>Famous for ancient carvings and artistic work made of ivory that adorn many museums in the West.</td>
</tr>
<tr>
<td>Yoruba</td>
<td>Nigeria</td>
<td>Street patterns were radial in Yoruba cities, which had authoritarian communities. Buildings were based on impluvium style with central courtyard.</td>
<td>Woodcarvings, decorative patterns sculpted into walls, verandahs and columns. Human mythological and animal symbols were also sculpted on walls. Elaborately carved doors and Caryatids. Sculptures in lfe were made out of bronze and terracotta. Famous for aso-oke weaving.</td>
</tr>
<tr>
<td>Zulu</td>
<td>Present day South Africa</td>
<td>Cities or settlements were circular in form. Huts were domical or beehive in form.</td>
<td>Renowned for their basketry and beadwork. Zulu beadwork combined geometric shapes and colors. Zulu baskets were made by men and women and similar to their beadwork, they integrated some geometric patterns and colors.</td>
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<tr>
<td>Ndebele</td>
<td>Present day South Africa and Zimbabwe</td>
<td>Basic layouts were made up of rectangular walled compounds with a centrally located main house that was divided into the front and back. The courtyard served as an outdoor room. It was used for cooking, washing and socialization.</td>
<td>Renowned for the wall paintings and art by the women. Ndebele paintings were typically bold, brightly colored and predominantly made up of geometric designs with black outlines.</td>
</tr>
<tr>
<td>Basotho</td>
<td>Lesotho</td>
<td>Conical beehive roof with a cylindrical structure made of pliable materials.</td>
<td>Walls of huts were decorated with simple patterns that were hand drawn. Earth tone colors such red, yellow, cream and browns are used. Stone mosaics are also used as decorative elements on the exterior (Aston, 1952). Traditional Basotho straw hats were conical in shape similar to their huts. Men built the huts and women painted and maintained them.</td>
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</table>
Two other notions of human behavior in space that Hall (1966) defined are sociofugal and sociopetal spaces. Sociofugal spaces are arranged to discourage human interaction, while sociopetal spaces are arranged to encourage human interaction. An example of a sociofugal space is a classroom with rows of chairs facing the instructor, which clearly does not promote socialization among peers. Whereas, a sociopetal arrangement is one in which the spaces might be laid out in teams or groups of tables to promote teaming and interaction. Phenomenology, participant observation, comparative method, life histories, genealogies, ethnography, photography, grounded theory and proxemics from anthropology have numerous applications and implications for cross-cultural design. In a recent study, I used phenomenology to study hairdressing among the Yoruba, a major Nigerian ethnic group. The study highlighted the relationship of natural hairstyles to the built environment and architecture using fractal theory. Traditional settlements used fractals in spatial composition and these fractals are also seen in carvings, architecture, ornamentation, jewelry and hairstyles of the Yoruba.

Fractals are swirling patterns for modeling in biology, geology, and the natural sciences. The five components of fractal geometry are recursion, scaling, self-similarity, infinity, and fractional dimension. Fractals occur in a loop, the output for one step is the input for the next step. Fractals also consist of similar shapes in different scales. Ron Eglash (1999), in his book African Fractals: Modern Computing and Indigenous Design, noted “while fractal geometry can indeed take us into the far reaches of high science, its patterns are surprisingly common in traditional African designs, and some of its basic concepts are fundamental to African knowledge systems” (p. 3). Eglash found the self-similarity of fractals in what is characterized as ‘circles of

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<tr>
<td>Contemporary Nigeria</td>
<td>Nigeria</td>
<td>Round spatial planning, the sanctuary radiates around altar, serving as central focus and reinforcing the concept of community similar to traditional Africa societies. Existence of a gradual transition from outside to vestibule to the sanctuary and altar. Verandah around the sanctuary allows for a relationship with nature and cross ventilation, thus reinforcing simplicity.</td>
<td>Decorative elements, such as woodwork on altar, seats, carved columns recall traditional artistry. Simplicity of Dominican order matched in the use of natural materials (wood and stone) and warm earth tones. Use of brown and green tones. Materials left unfinished for simplicity.</td>
</tr>
<tr>
<td>Dominican Church Ibadan, Nigeria designed by Demas Nwoko</td>
<td>South Africa</td>
<td>Simple two-story, single-family housing planning style is rectilinear.</td>
<td>Mphahla's inspiration is from traditional South African architecture's use of local materials. He uses bags full of sand because of its abundance and the exterior is plastered. In many cases, members of the community gathered together to pack sand bags to be used for construction. This is a community-oriented process reminiscent of traditional societies.</td>
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Table 3
Design precedents from Nigerian and South African contemporary spaces using the inclusion and contribution approaches as references for discussing design.
circles of circular dwellings, rectangular walls enclosing smaller rectangles’ which were the basis of many Nigerian and South African ethnic groups. Fractals are often seen in carvings, architecture, ornamentation, jewelry and hairstyles in both Nigerian and South African cultures. Fractal geometries are present in Ndebele material culture (South Africa) and Hausa, wall paintings (Nigeria), as well as, in Zulu (South Africa) and Yoruba (Nigeria) spatial organizations. Phenomenology can be used to study the phenomena of carving, jewelry making, ornamentation, fabric making, and building construction to understand more about Nigeria and South Africa.

Biographies of notable figures from a culture can help elucidate important aspects from the culture’s past. For example, in this design pedagogy, I highlighted biographies of past leaders and public figures during the pre-colonial, colonial and post-colonial periods to help students better understand the culture. Queen Amina of Zaria (Nigeria), Shaka Zulu (South Africa), Kings of Benin and Ife (Nigeria), and Nelson Mandela are some notable figures that were used to highlight some historical factors in the built environment in both Nigeria and South Africa. Their biographies contributed to learning general information about Nigeria and South Africa and political influences on the patterns of settlement, architecture, and space planning.

Participant-observation is important to highlight aspects such as human behavior and interaction, ceremonialism and spatial layout. I have observed ceremonies in West African environments and some of these can be used to teach the concept of the “triple heritage” by Mazrui (1986) and Elleh (1997) in history and the built environment of Africa to design students. Mazrui (1986) noted that African culture is deeply rooted in the “triple heritage”: the indigenous, Western, and Islamic influences. This heritage is what Elleh (1997) also observed in the architecture of most African cities. These elements combine to form the built environment in African cities and make them different from any cities elsewhere in the world. Elleh (1997) observed “traditional religion, regardless of Islam and Christianity, plays a significant role in the life of the people and affects the building tradition” (p. 299). Participant-observation of spaces, ceremonies, festivals, etc., can be powerful tools to inform design pedagogy and highlight concepts such as the ‘triple heritage’ in Nigeria and South Africa. Life histories and genealogies can capture important information to help design students understand aspects of the group’s ancestry and culture. In a recent exercise, I documented a genealogical chart for a man of Yoruba descent in the US and the chart further reinforced the notion of how ‘triple heritage’ is prevalent among West Africans.

When one observes how spaces are planned in indigenous Nigerian and South African settings using Hall’s (1966) notion of proxemics, an extended family or the King’s palace (in societies with monarchical systems) lived within the confines of compounds. This implies they were within intimate, personal and social distances depending on the activities they engaged in. For example, families were within intimate and personal distances of each other and guests were kept within social distances in large courtyards or at personal distances in festival times. Settlement patterns among the Yoruba, Igbos, Hausa, Benin, and Zulu were often arranged around open spaces such as courtyards or greenery, and human interaction was important, therefore they were sociopetal in form. The fact that both Nigerian and South Africa compounds often were made up of extended family members indicated that constant interaction was important. Thus, the design of spaces was done to promote this interaction, thereby, reinforcing sociopetal forms.

THE STUDY: IMPLEMENTATION OF THE CROSS-CULTURAL INSTRUCTION
The instructional strategies discussed in the preceding section were implemented in a study at a Southwestern University. The goal of the study, which was to develop and test the instruction on Nigerian and South African spatial forms in an Interior Design studio (N=17). The research questions focused on how students respond to the instructional program, their ability to synthesize design ideas for different cultural settings using design theories, their utilization of examples from non-Western perspectives as references for discussing design, and their ability to solve design problems in different cultural settings. The design project, which was the context for
this study, was a six-week interior and lighting design group project of a restaurant in Nigeria or South Africa. The requirement of the project was to design the interior and lighting of a restaurant in an urban setting in Lagos, Nigeria or Johannesburg, South Africa to highlight the country’s culture and food for tourists. The interior space of the restaurant was required to portray energy, kinetic movement, cultural flavor, color and entertainment. The study occurred in five distinct stages. Stage 1 was the development of the instruction that integrated Anderson’s ACT-R theory, Grant’s pedagogical approaches, and anthropological methods. Stage 2 was the design of the study, delivery of instruction, and inception of data collection. Stage 3 involved the evaluation of participants work post instruction. Stage 4 involved interviews of participants. Stage 5 was the analysis and interpretation of the themes and findings in terms of the research questions. The data sources in this study were the pre- and post-test questionnaires, observational data, video recordings, actual design projects (Figures 1 and 2) developed by participants, and interview data. Like Hurtado (2001) and Denison and Chang (2009) after the instruction, my goal was to test how students’ assess their learning, their development of design critical thinking skills after instruction, and their ability to design in Nigerian and South African contexts. The hope was that the extent to which their skills improve will significantly prepare them for solving design problems in different cultural settings, a tool necessary in a diverse and global society.

FINDINGS AND DISCUSSION FROM IMPLEMENTATION OF THE CROSS-CULTURAL INSTRUCTIONAL STRATEGIES

The findings in this study indicated that students’ skills improved significantly after the instruction and the restaurant design project in a Nigerian and South African cultural setting. After the study, students reported richer descriptions of design elements and principles, spatial relationships, spatial organizations, environmental issues, and aspects of culture, religion, history, and government from Nigeria and South Africa. A cultural framework of five theme emerged from the data. They are social dynamics, juxtaposition of traditional and contemporary culture, visual and performance arts, elements and principles of design, and sustainability (Figure 3). Social dynamics and juxtaposition of traditional and contemporary culture were abstract themes, while visual and performance arts; elements and principles of design; and sustainability were concrete themes (Tables 4 and 5). Multiple data sources indicated the instructional design process was successful in helping students’ problem-solve in a cultural setting. There was evidence that participants gained civic benefit after the study, because participants noted that the cross-cultural experience was important, particularly because of the diverse and global societies in which we live. They reported transferring the knowledge gained in this process to other design projects in different cultural settings that they undertook in subsequent courses. There were numerous benefits from developing the instruction from an interdisciplinary perspective, particularly because the design field lacks a diverse body of knowledge on non-Western issues. The instruction was developed using one facet of ACT-R learning theory (Anderson, 1995), anthropological methods (Creswell, 2009; Hall, 1966; Kingsolver, 1998; Silverman, 2005), and Grant’s pedagogical approaches (Grant, 1991).

ACT-R theory’s (Anderson, 1995) general implication for teaching procedural knowledge that was used to organize the instruction into the distinct parts was found to be very systematic and helpful in promoting learning and leading students to higher-level thinking. The distinct parts into which the instruction and study were organized were teacher-centered and discovery-centered information. I used significant amounts of feedback to foster automatization. The results highlight the importance of helping students with the development of declarative knowledge on Nigeria and South Africa and that teacher-centered and discovery methods, and that feedback fosters a state of automatization. Participants reported achieving some level of automatization at the end of the study, since they noted being comfortable problem-solving in a different cultural setting and exhibiting the ability to transfer the knowledge when posed with similar design problems. During the interviews after the study, participants noted applying the knowledge gained in this study while designing in a different cultural setting in another design class.
Figure 1: Student Concept board and Perspectives for Durojaiye Café, Lagos, Nigeria. (Source: Asojo, 2011).

Figure 2: Perspectives for Swaziburg, Johannesburg, South Africa. (Source: Asojo, 2011).
Figure 3: A Cultural Framework illustrating five themes developed from the data: Social Dynamics, Juxtaposition of traditional and contemporary culture; Visual and Performance arts; Elements and Principles of Design; and Sustainability. (Source: Asojo, 2011).

<table>
<thead>
<tr>
<th>Group</th>
<th>Culture(s)/Country</th>
<th>Data sources</th>
<th>Abstract Theme 1</th>
<th>Abstract Theme 2</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Social Dynamics</td>
<td>Juxtaposition of traditional and contemporary culture</td>
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<tr>
<td>A</td>
<td>Yoruba, Igbo, and Hausa, Nigeria</td>
<td>Observation, Interviews &amp; Posttest short essay question.</td>
<td>The idea of Lagos as a melting pot and a multicultural metropolis led to this group using three cultures, one from Southwest, Southeast, and North. Creating spaces to foster social interaction and reinforcing the importance of community were prominent notions to this group.</td>
<td>The notion of Western and Islamic influences impacting Nigeria architecture along with the indigenous influences. Emphasis placed on influences from Mosque architecture.</td>
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<tr>
<td>B</td>
<td>Swazi, South Africa</td>
<td>Observation &amp; Interviews</td>
<td>Idea of emphasis on family and community. Balance between spiritual, cultural, artistic and family life. Nelson Mandela as an iconic person to South African culture.</td>
<td>The idea that contemporary buildings still reflects culture.</td>
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<tr>
<td>C</td>
<td>Yoruba, Nigeria</td>
<td>Observation &amp; Interviews</td>
<td>Design inspiration derived from the artwork of Jumoh Buraimo, an iconic Yoruba artist.</td>
<td>An emphasis on developing a contemporary solution based on Yoruba Culture.</td>
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<tr>
<td>D</td>
<td>Yoruba, Nigeria</td>
<td>Observation, Interviews &amp; Posttest short essay question</td>
<td>Design inspiration derived from the mythology and philosophy of the Yoruba. Oshudiuwa, the spiritual leader of the Yoruba as an iconic person.</td>
<td>The idea that government whether democratic or imperial was reflected in city, urban planning and architecture.</td>
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<tr>
<td>E</td>
<td>Zulu, South Africa</td>
<td>Observation &amp; Interviews</td>
<td>Derived inspiration from Shaka Zulu, a prominent Zulu prince and Zulu philosophical beliefs. Community and social interaction were major design determinants.</td>
<td>The idea of creating a contemporary expression of Zulu design in their design solution.</td>
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Grant's (1991) three-step pedagogical approach of introducing diversity in design education was also found to be very systematic and helpful to promote learning and lead students to higher-level thinking. The process of guiding students through the study of Nigerian and South African design precedents and culture using the inclusion and contribution approaches was successful as indicated by the data sources. The success of the transformational approach was evident in the process of designing a restaurant in urban settings in Nigeria and South Africa to highlight the cultures of the countries. Findings from the study illustrated that students developed a ‘critical and analytical eye’ in their understanding of design theories in cultural settings and an appreciation for the importance of cross-cultural knowledge in design.

Based on the qualitative and quantitative data, the anthropological methods used to elucidate information about Nigerian and South African cultures were successful instructional tools. They provided a model to participants on how to conduct research about non-Western
cultures in design related fields that lack a diverse body of knowledge on non-Western design. Ethnographies, biographies, the comparative method, phenomenology, the study of proxemics, and other methods and concepts from anthropology served as a body of knowledge participants could draw from. Multiple data sources indicated the instructional design process was successful in helping students’ problem-solve in a different cultural setting.

CONCLUSION
Overall, there was good evidence from the study that students gained both disciplinary and civic benefits that will allow them to view the world from multiple perspectives and equip them with skills to be actively engaged in a diverse society. Given that we live in an increasingly diverse and global environment, this study provides educators a model to help them integrate cross-cultural issues in design pedagogy. Findings in the present study illustrate how this process might be a starting point for design educators interested in cross-cultural design pedagogy and may integrate exercises in existing curriculum.

In order for cross-cultural pedagogy to become routinized in design education, processes like the one in this study can be expanded to semester long required courses. Design educators must also welcome the idea of taking an inclusive approach to teaching studio to integrate cultural diversity and global issues into the curriculum. One recommendation is for design programs to introduce global design studio courses, where the emphasis is designing in non-Western settings. I have described one intensive course, but design educators have to go beyond one course to make this approach more routinized in design curriculum. Pedagogical experiences like these will better prepare design students for designing in global settings. In fall 2012, in a fourth year interior design studio, the cultural framework from this study was used by the author’s students to problem-solve for a Native-American community college library design. Future studies will address how educators can transfer this approach to other non-Western cultures.

REFERENCES


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