

2006-601: TEACHING DYNAMICS OF CULTURAL DIMENSIONS IN DESIGN TO CREATE SUSTAINABLE ENVIRONMENT: A CROSS-CULTURAL COMPARISON OF ARCHITECTURE

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Teaching Dynamics of Cultural Dimensions In Design To Create Sustainable Environment: A Cross-Cultural Comparison Of Architecture

Abstract

Sustainable design is the concept that recognizes human civilization as an integral part of the natural world, and that nature must be preserved if the human community itself is to survive. Cultural dimensions of design are the tangible and intangible aspects of cultural systems that are valued by or representative of, a given culture and reflected in the built environment [12]. There was no existing course in our curriculum to cover the topic of culture and design. Therefore, it is necessary to develop a new course to fill this gap. The author was awarded a Summer Instructional Development Grant in summer 2005 to develop INTR330 – Culture and Design: A Cross-cultural comparison of Architecture. This course is designed as an interior design elective course as well as a general education course in Area IV Humanistic Thoughts to fulfill the diversity requirement on campus. It has been approved as general education course. The goal of this course is to provide an opportunity for students to have an exposure to diverse cultures through a cross-cultural comparison of Western and Eastern architecture. This course emphasizes the interactive and complex relationship between human beings and their built environment. It also emphasizes the creation of sustainable environment by encouraging meaningful cultural reflections. The inter-relationship of architecture and culture is examined through design theories and philosophy expressed by means of architecture digital photos and DVDs. It is expected that students will better understand the dynamics of cultural dimensions of design in the creation of a sustainable environment.

This paper presents the innovative teaching methods with technology and non-traditional class activities for educating our students to understand the dynamics of cultural dimensions in design to create sustainable environment. As the second objective of this paper, it presents the proposed assessment methodology, data collection and analysis methods to assess the learning outcomes. It is anticipated that the results of assessment will be used for future course improvement and cross-culture studies.

Introduction

This course covers a wide range of subject matters from cultural impact on human behaviors to space perceptions and designs. The comparisons are focused on several topics such as palace architecture, houses, gardens, temples/churches, city planning of the Eastern and the Western. The comparisons were between same types of buildings that were built during the same time period. Since it is very hard to find a textbook, which covers all subject matters in this course, writing a student manual becomes the first task. The student's manual was developed based on the course syllabus total about sixty pages. Each part of the manual covers one subject matter, which will be introduced to students. Followed each part, there is class activities and assignments for students to use. Since interior design or architectural design is a profession, which expresses its final products by means of visual images, Microsoft PowerPoint presentation

is used in this course to combine visual images or video graphics to achieve a dynamic result in the learning process. Therefore, the second goal of course development is to collect digital photos from the internet or books and develop the PowerPoint presentations. Not only interactive multimedia presentations are facilitated for the lectures, but also non-traditional class activities, such as presentations and show plays, group studies and cross-cultural comparison notebooks are required for this course. The course syllabus has been developed accordingly. All suggested reading books have been chosen for this new course.

Course Contents

This course was designed as a general education course for a group of variety audience. Among this variety audience, some students have never taken any design related course before. In order to meet this special group student's need, the basic design terminologies and design principles will be introduced first. In addition, culture concept is introduced in this course. The kind of culture concept will be addressed in this course is not at all the kind of thing one refers to as been educated with the knowledge or possessing the appreciation of opera or modern art. It is something that people can not really see, but which, if people don't understand what it is and how it works, can seriously affect the way of interaction with people who have different cultural background. Furthermore, another important concept will be introduced to students is personal space. Different people with different cultural background will have different perceptions of personal space. Human behaviors are affected by cultural factors. Because of these reasons, the concept of personal space will be used when the comparison is given to the class.

The following are the course contents, which are outlined in the student manual:

- I. Culture: The Hidden Dimension
- II. Personal Space
- III. Architecture: Form, Space and Order
- IV. Languages and Vocabularies of Western Classical Architecture
- V. The Character and Meaning of Classical Chinese Architecture
- VI. Chinese Palace Architecture and Western Classical Architecture
- VII. Traditional Chinese Houses and Japanese Houses and Western houses
- VIII. Chinese and Japanese Gardens and European Gardens
- IX. Modern Eastern Architecture and Modern Western Architecture
- X. Expression Culture

Special Needs Fund from the University Library

In addition to the development of student manual and PowerPoint presentations, the author has applied and was awarded a Special Needs Fund (\$3000) from the university library to support this course. It is the author's intention to expose students to real architectural examples when design theory and design principles are taught. However, it is very hard to arrange field trips for students to visit those masterpieces. Therefore, a video presentation becomes a very feasible and convenient way to provide students with visual images of masterpiece in the classroom. It will provide the author with a lot of flexibilities to arrange materials in lectures. This Special Needs fund is for the video core collections.

Course Objectives

In the course development process, the course objectives were defined first. The first objective of this course is for students to develop a concept of the socio-cultural, historical, and environmental factors that influence the structure and meaning of architecture. The second objective of this course is for students to understand that architecture as the physical expression of ideas can reflect political, economical and cultural aspects of society. The third objective of this course is for students develop a concept of cultural diversity through meaningful comparisons between Western culture that has shaped them and Eastern culture, which is different from theirs. The last objective is to address the importance of cultural reflections in design. The emphasis will be placed on the dynamics of cultural dimensions in design and the built environment.

Course Format and Cross-cultural Comparison of Architecture

Course Format

Instead of using traditional course format, which is facilitated with the lectures by the instructor, an innovative approach has been explored. The innovative teaching methods for this course are facilitated by interactive visual images through PowerPoint presentations. Class activities include non-traditional class activities, such as dialogue discussion group, group activities, presentations and field trips. Student projects include cross-cultural comparison notebooks, papers and presentations.

Cross-Cultural Comparison of Architecture

Examples of Cross-Culture Comparisons of Architecture in this course are highlighted as followings:

- Chinese Palace Architecture & Ancient Western Temples and Churches

In the history of world architecture, politics and religion are always the main forces in developing grand architecture. The example used for Chinese Palace Architecture is Forbidden City in Beijing, China (Figure 2). The example used for Ancient Western Churches is The Vatican City and St. Peter's in Rome, Italy (Figure 1). Both were built in the period of early Renaissance. China has about five thousand years history and Rome has been an ancient city for three thousand years. There are some similarities for these two building complexes, such as central axis and symmetry to present a powerful, dominating and regulating architecture. The narratives for these two complexes are in Appendix A.



Figure 1: Vatican City and St. Peter's in Rome, Italy (www.images.google.com)



Figure 2: Forbidden City in Beijing, China (www.images.google.com)

- Traditional Chinese Houses: Chinese Quadrangle – Siheyuan & Ancient Roman Houses: House of Vettii in Pompeii

The example used for Chinese houses is traditional Chinese Quadrangle – Siheyuan (Figure 4, Figure 6). The example of Western houses is Ancient Roman house in Pompeii (Figure 3, Figure 5). Both houses consist of a courtyard and are surrounded by bedrooms, kitchens, dining rooms and other rooms with different functions.



Figure 3: Ancient Roman House in Pompeii (www.images.google.com)



Figure 4: Traditional Chinese Quadrangle House – Siheyuan (www.images.google.com)



Figure 5: Ancient Roman House in Pompeii (www.images.google.com)

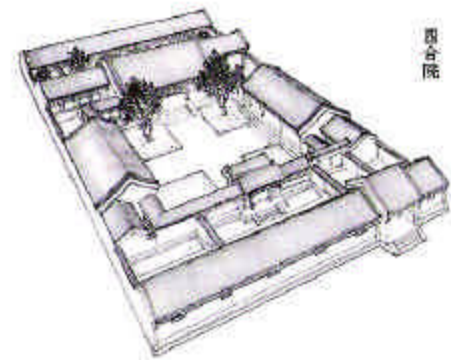


Figure 6: Traditional Chinese Quadrangle House – Siheyuan (www.images.google.com)

In addition to these two comparisons above, the following comparisons will be introduced in this course. The narratives for each comparison can be found in Appendix A.

- Chinese Gardens and Japanese Gardens & European Garden
- Modern Chinese Architecture & Modern American Architecture

Since lots of modern Chinese architecture is inspired by Chinese garden design principles, Chinese garden design will be introduced in this course. There are five design elements in Chinese Garden Design: 1) Rock, 2) Water, 3) Plants, 4) Architecture, 5) Borrowed view. The following photos (Figure 7, Figure 8, Figure 9 and Figure 10) present these five design elements and design principles in Chinese garden design.



Figure 7: Example of Chinese Private Garden: Rock, Water, Plants, Architecture and Borrowed View (Liu, 1989)



Figure 8: Lattice Pattern Window (Liu, 1989)



Figure 9: Private Garden Zang Yuan (Liu, 1989)



Figure 10: Liu Yuan dragon wall (Liu, 1989)

Sustainable Environment

Sustainable design is another defined course content. In order to educate students understand the concept that cultural reflection is another perspective of sustainable environment, successful case studies are important components in this course. The following key pointers are addressed:

- Expression of Culture

- Meaningful cultural reflection in built environment
- Case Studies

Fragrant Hill Hotel (Figure 11 - Figure 16) designed by famous Chinese – American architect I. M. Pei in Beijing, China is a successful example of sustainable design with the cultural reflections for a modern architecture. Pei’s vision of the future is to look to the past to preserve the subtle characteristics of Chinese architecture. It will be analyzed in this course as a case study. Pei got the inspirations from classical Chinese garden design and utilized Chinese garden design principles in this hotel design, such as borrowed views, rocks, water and bamboos in the atrium as well as the sense of endless and changing views when following the architecture sequence. The off-white stucco on the exterior wall, gray tiles on the roof, and geometric shapes of the windows are clearly reminiscent of the classical Chinese gardens. Figure 13 and Figure 14 clearly show these characters. The narratives of sustainable design case study can be found in Appendix A.



Figure 11: Bird-eye view of Fragrant Hill Hotel (www.images.google.com)



Figure 12: Atrium of Fragrant Hill Hotel (www.images.google.com)



Figure 13: Exterior of Fragrant Hill Hotel (www.images.google.com)



Figure 14: White Stucco on Exterior wall (www.images.google.com)



Figure 15: Borrowed view in Fragrant Hill Hotel (Atrium with rocks and plants) (www.pcfandp.com)



Figure 16: Borrowed view in Fragrant Hill Hotel (Atrium with rocks and water) (www.pcfandp.com)

Description of Class Activities and Assignments

Innovative Teaching Methods

The innovative teaching methods have been utilized in this course. As mentioned before, visual images are means of expressions for interior design and architectural design final products. PowerPoint presentation will be used in this course to combine visual images and video graphics to enhance learning process. Not only are interactive multimedia presentations facilitated for the lecture, but also non-traditional class activities, such as presentations and show plays, group studies and cross-cultural comparison notebooks are required for this course.

During the course development process, the original goal was just to collect photos for different building types to develop the Power Point presentation with some handouts. However, in the process of collecting digital images, author found it is necessary to develop a student's manual for students because it is very hard to find a textbook, which covers all subject matters in this course. When class activities were designed, author tried to increase instructor – student interaction and student-student interaction.

The innovative approach can be described as following:

1. Use multimedia presentations by PowerPoint
2. Use simulations – show play
3. Use film clips for comparisons and discussions
4. Use case studies
5. Student-Student interactions and group activities
6. Cross-cultural Comparison Notebook with graphic images

In general, this course was carefully crafted with enthusiasm and will be taught from heart. It is author's intention to encourage a student-centered learning. This approach can be demonstrated in class activities and will be assessed after the course is offered in Fall 2006. Figure 17 shows the innovative teaching elements have been integrated into this newly developed course.

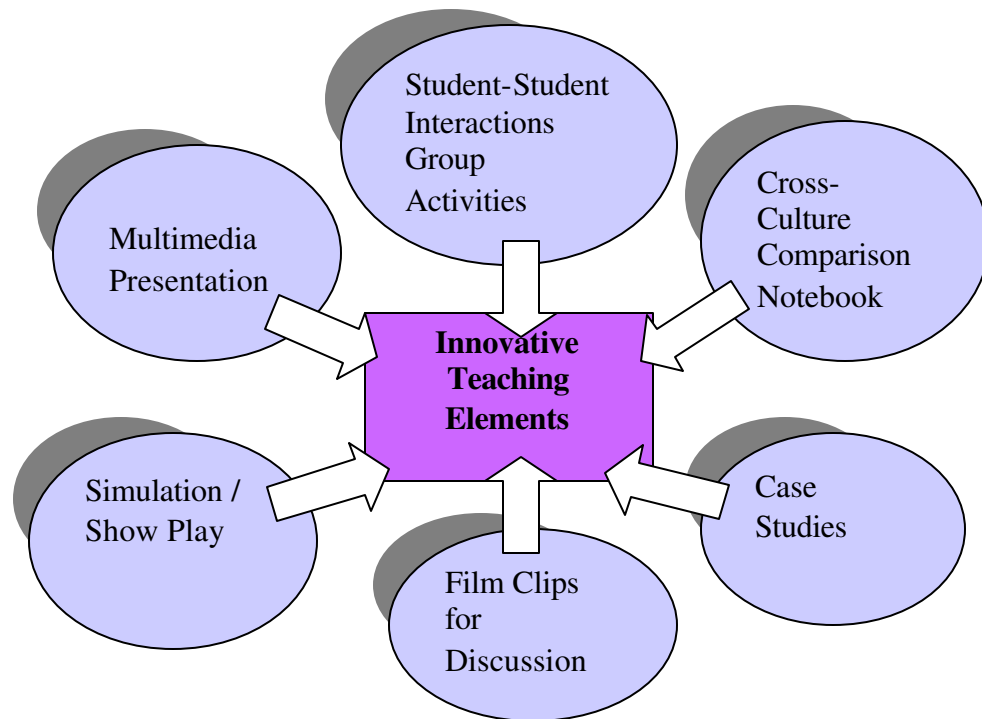


Figure 17: Innovative Teaching Elements Model

Students Projects and Class Activities

Cross-Cultural Comparison Notebook - The Cross-Cultural Comparison Note Book is the final project of INTR330. It is required that students to analyze the Eastern and the Western architecture and develop a Cross-Cultural Comparison note book with graphic images. These images can be collected from books or websites. There are four different comparisons need to be included in the note book. They are comparison of the Eastern Temples / Palace architecture and the Western Temples or churches; comparison of Eastern houses and Western houses; comparison of the Eastern gardens and the Western gardens as well as modern eastern architecture and modern western architecture. The Rubrics for each comparison are listed as the following shown in Figure 18. The final comparison notebook should be professional looking and be in a three ring binder format. (Sample sheet of comparison notebook will be available for student reference). Figure 18 shows the rubrics for each comparison.

Identifying Personal Space - when the concept of personal space is introduced, students are expected to determine how big their own personal space is for friends. Have a friend stand a few feet away, and watch the friend's neck (to avoid looking in the eye) while he or she slowly walks toward the student. The friend should not smile, laugh, or look the student in the eye, just move slowly towards the student. Tell your friend to stop when you feel uncomfortable, and mark the distance. Students can repeat this activity to find out if they have a different 'comfort zone' for the opposite sex, for parents or for teachers.

Culture Shock Show Play – Another non-traditional class activity is when culture concept is introduced; students are required to give an example of cultural shock they have experienced in panel discussion. To increase student-student interaction, each panel of students is expected to organize a small show based on each student’s experience and play the show for each panel. Two judges will give points for each show.

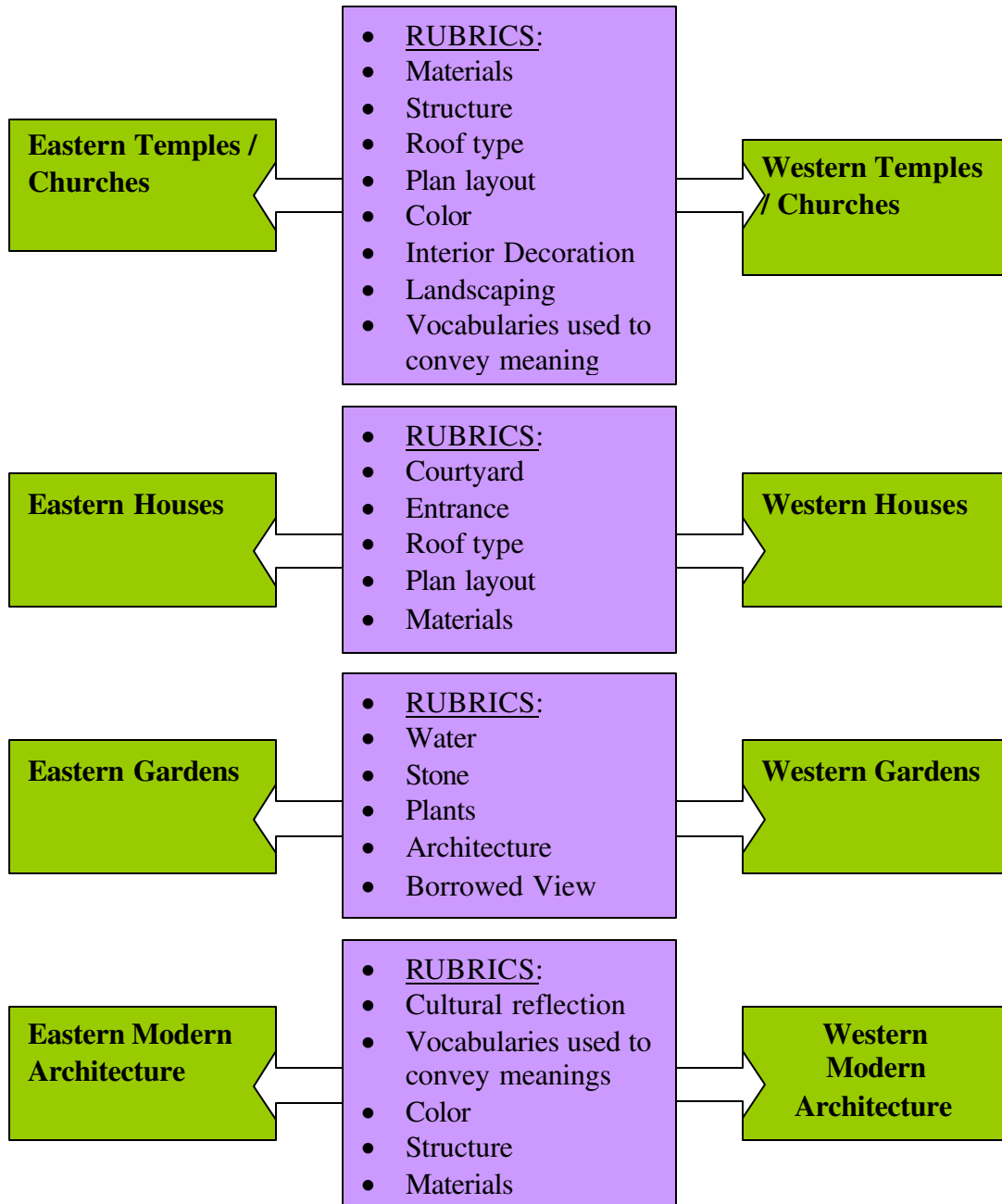


Figure 18: Rubrics for Cross-Cultural comparison Notebook

Expected Learning Outcomes

Expected Learning Outcomes

The expected learning outcomes can be described as the followings:

- Students learn and become familiar with the Eastern architectural design principles and design philosophies such as Chinese architectural design philosophies. Through the meaningful comparison of the Eastern and the Western architecture, students are exposed to different cultures. In the meantime, students understand that architecture as a physical form can express different cultural meanings.
- The course provides the opportunity for students to explore culture difference between the Eastern and the Western cultures through comparison of architecture. When giving Western and Eastern architecture comparisons, not only similarities and differences are compared, but also the reasons caused these similarities and differences are analyzed, which are the cultural factors.
- This learning experience will provide a positive impact to students for their future life and profession. After taking this course, it is expected that students understand cultural influence in their daily life. Culture as an intangible factor affects human behaviors and the perception of environment.
- Students understand the sustainable design which is encouraging meaningful cultural reflections in the built environment. Through case studies of successful architectural designs, which reflect cultural meanings, students will appreciate cultural heritages more than before.

Assessment Methodology

Student responses towards course content are important factors in the assessment of student learning. An extensive survey was developed and will be conducted in Fall 2006 to assess the student response towards learning outcomes. The four expected learning outcomes are measured by the questionnaire. To measure each learning outcome, there are five statements both favorable and unfavorable. Students are expected to choose one answer from five choices (Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree). The proposed questionnaire is in the Appendix B. The following list of statements indicates measurements for each learning outcome.

*** Learning Outcome #1: Have explored cultural difference between Eastern and Western and understand architecture as a physical form can reflect cultural meanings**

1. Architectural design reflect cultural influence
2. Culture is reflected by design philosophy
3. Design is a means of culture expression
4. Culture and design are totally different concept and you can not see any cultural inference from design
5. Architectural design has nothing to do with culture.

***Learning Outcome #2: Have learned and become familiar with Eastern architectural design principles and philosophies**

6. Western architectural design principles and philosophies are more subtle than Eastern architectural design principles
7. Subtle and magnificent, delicate and grandiose, flexible and standardized, full of symbolic meanings, these are the main characteristics of classical Chinese architecture.
8. Because of the difference of the Eastern and the Western cultures, it reflects different meanings on architecture.
9. Because of the difference of life style and philosophy of the Western and the Eastern, it reflects on the architectural forms and configurations.
10. The meaning and the symbolism of the Eastern architecture are the reflections of cultural, philosophical, and religious influences and life style of people.

*** Learning Outcome #3: This learning experience will provide a positive impact for students for their future life and profession.**

11. After taking this course, I understand that culture will influence the interactions with people who have different culture background
12. I don't think cultural influence is important and it won't affect my interaction with people with different cultural background.
13. I don't think cultural influence will affect human behaviors
14. People with different cultural background have different perception to built environment.
15. This learning will affect my future daily life or my profession in a positive way.

*** Learning Outcome #4: Students understand the sustainable design which is encouraging meaningful cultural reflections in the built environment.**

16. Cultural dimensions are important in sustainable design
17. The architectural style, landscape design, and construction materials of new developments should reflect the cultural heritage of the locality or region.
18. Cultural resource treatment and maintenance methods should be both environmentally and culturally sensitive and sustainable over the long term.
19. All site and facility designs should incorporate methods for protecting and preserving significant cultural resources over the long term.

20. Proposed development sites should be surveyed for cultural resources, and the significance, integrity, and tangible and intangible qualities of those resources determined.

Open end questions:

1. Your suggestions to make it a better learning process
2. What do you enjoy the most about this course?

The survey will be anonymous and no attempt will be made to correlate response to student project outcomes in the course. The survey will be voluntary and there is no obligation for students. A percentage scale will be used for all survey items except open-end questions.

Data Collection and Analysis Methods

The questionnaire will be refined when this course is offered. Both the mean score and the administration of results will employ the Likert scoring system. Each favorite statement would be followed by five degrees of agreement (strongly agree, agree, undecided, disagree, strongly disagree), which would be scored 5, 4, 3, 2, and 1, respectively. The same procedure would be done with unfavorable statements except that these would be scored in the reverse direction (1, 2, 3, 4, and 5 respectively). The questionnaires will be distributed to students who have taken this course. The data will be collected and analyzed. The analysis methods will be basic statistical calculation (mean and percentage), and may include some Chi-square distributions for group comparison purpose.

Four learning outcomes will be measured. Question No.1 – No.5 measures learning outcome #1. Same questions were asked regarding students understanding of architecture as a physical form can reflect cultural meanings. Question No.6 – No.10 measures learning outcome #2, which is becoming familiar with Eastern architectural design principles and philosophies. To measure this learning outcome, same questions will be asked both in favorite statement and unfavorable statement. Question No.11 – No.15 measured learning outcome of #3, which is this course will have a positive impact on students' daily life and profession. Question No. 16 – No. 20 measure learning outcome #4 of understanding cultural dimension is another perspective in sustainable design.

In addition to measure four different learning outcomes, there are two hypothesis will be tested in this questionnaire. These two hypotheses are for cross-culture studies.

Hypothesis #1: People have the experience of interaction with people with different culture background and people without such experience have same judgment about culture perception after taking this course

Hypothesis #2 People have the experience of interaction with people with different culture background and people without such experience have same level of appreciation of different culture after taking this course.

Therefore, the questionnaire was designed for two different testing subjects. One is for the subject who has the experience of interaction with people who have different cultural background. The other group of subject never had any experience of interaction with different culture. After data are collected, Chi-square comparison method will be used for analysis to test these two hypotheses. A detail data analysis will be presented in a future article after all data are gathered and analyzed.

Summary

There are many other innovative teaching methods for teaching cultural dynamics in sustainable design. This carefully crafted cross-cultural comparison of architecture course only explored some of these methods as described above. The questionnaire is an important mechanism to assess the learning outcomes and teaching methods. The results will provide suggestions for future course improvement.

In sum, the key pointers of developing this diversity course are described as followings:

- Connect thinking and personal experience to the issues addressed in class
- Encourage and welcome contradictions and get students to think on the edge of their comfort zone
- Emphasize critical thinking and invite new thinking
- Teach culture diversity in a new way which is through cross-cultural comparison of architecture
- Use visual images to enhance the dynamics of learning process
- Pause for reflection with learning outcome assessment

In addition to the course contents described above, the followings are important attributes that can be addressed in cross-culture course, as well as sustainability design course in the future:

- Approach architecture from interdisciplinary, such as anthropology and psychology.
- Highlight historic preservation and heritage issues regarding the sustainable environment
- Consider technology, economy, politics, settings, and meaningful cultural reflections regarding the sustainable design
- Examine society's influence on architecture as well as the impact of architecture on society. This leads to the analysis and understanding of certain culture.
- Culture dimension is important in built environment design. It is another perspective in sustainable design besides energy conservation, waster water treatment, and green design and so on.

In conclusion, teaching diversity course is challenging. However, cross-cultural comparison of architecture with the innovative teaching methods and non-traditional class activities makes this course more interesting. This course is not only designed as a course to teach the culture diversity, but also it is a course that teaches the sustainable design by encouraging meaningful cultural reflections in the built environment. This course will be the introduction for students to understand the importance of preserving the past to build a sustainable future. It is expected that students will understand that cultural dimension is another perspective of sustainable design. By exploring tangible and visible aspects as well as intangible and invisible aspects in the built environment, students can understand the

meaning of the space and what are the various ways it can be organized. Valuing the past and valuing the culture become the theme of this course in order to achieve the goals of appreciation the difference in life styles / living patterns across time and space, as well as the nurture an appreciation of cross cultural comparison of architecture. Students will learn a great deal from this freshly new and carefully crafted course.

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- [10] <http://www.glnckman.com/pei.htm>
- [11] http://www.hcs.harvard.edu/~hapr/summer97_culture/roots.html
- [12] <http://www.nps.gov/dsc/dsgncnstr/gpsd/ch4.html>

Figure 1: Vatican City and St. Peter's in Rome Italy

<http://images.google.com/images?q=st.+peter%27s&hl=en&btnG=Search+Images>

Figure 2: Forbidden City in Beijing China

<http://images.google.com/images?q=forbidden+city&svnum=10&hl=en&lr=&start=20&sa=N>

Figure 3: Ancient Roman House in Pompeii

<http://images.google.com/images?q=house+in+pompeii&svnum=10&hl=en&lr=&start=20&sa=N>

Figure 4: Traditional Chinese Quadrangle house

<http://images.google.com/images?q=photo+of++siheyuan&svnum=10&hl=en&lr=&start=80&sa=N>

Figure 5: Isometric View of ancient Roman house in Pompeii

<http://images.google.com/images?svnum=10&hl=en&q=drawing+of+house+of+pompeii&spell=1>

Figure 6: Isometric view of Chinese traditional house Siheyuan

<http://images.google.com/images?svnum=10&hl=en&q=photo+of+siheyuan&spell=1>

Figure 7: Example of Chinese Private Garden: Rock, Water, Plants, Architecture and Borrowed View (Liu, 1989)

Figure 8: Example of Borrowed view (Liu, 1989)

Figure 9: Private Garden Zan Yuan in Nanjing, China (Liu, 1989)

Figure 10: Liu Yuan dragon wall in Suzhou, China (Liu, 1989)

Figure 11: Bird-sys view of Fragrant Hill Hotel

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Figure 12: Atrium of Fragrant Hill Hotel

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Figure 13: Exterior view of Fragrant Hill Hotel

<http://images.google.com/images?svnum=10&hl=en&lr=&q=fragrant+hill+hotel&btnG=Search>

Figure 14: Exterior view of Fragrant Hill Hotel

<http://images.google.com/images?q=fragrant+hill+hotel&svnum=10&hl=en&lr=&start=20&sa=N>

Figure 15: Borrowed view in Fragrant Hill Hotel

<http://www.pcfandp.com/a/p/7905/s.html>

Figure 16: Borrowed view in Fragrant Hill Hotel

<http://www.pcfandp.com/a/p/7905/s.html>

Appendix A

Narratives for Cross-Cultural Comparison of Architecture and Sustainable Design Case Studies:

- Chinese Palace Architecture & Ancient Western Temples and Churches

The example used for Chinese Palace Architecture is Forbidden City in Beijing, China. The example used for Ancient Western Churches is The Vatican City and St. Peter's in Rome, Italy. The Forbidden City located on city Beijing's north-south axis. It is a walled section within the inner city, built in the 15th century and containing the Imperial Palace and other buildings of the imperial government of China. It was so named because it was formerly closed to the public [1]. This is because the emperor wanted to be isolated from ordinary people and to symbolize his power and domination over the people.

Chinese palaces are different from their European counterparts where all court activities are confined to a single building. In China a palace is in effect a group of buildings, with each activities taking place under a separate roof [1]. This can be seen from the layout of the complex of Forbidden City, which consists different buildings connected by courtyards and verandas. The architecture sequence changes continually by changing views. The Aesthetic quality of the layout can be appreciated only if one follows the sequence as planned.

The square of the Vatican City is a work of art created by the artist Bernini for Pope Alexander VII over the span of two years (1656-1657); the "square" is actually elliptical in shape and contains a colonnade decorated with elegant statues. A large obelisk surrounded by fountains sits in the middle of the square, and an enormous marble platform leads from the square to St. Peter's Basilica from which the Pope delivers his weekly blessing [9].

The Forbidden City was built for the emperors and The Vatican City and St. Peter's were built for pops. However, both were built for their important ceremonies to pass their religion and politics to ordinary people. There are several differences because of cultural difference, such as color and materials. Other differences and similarities will be compared and analyzed from the culture point of view

- Traditional Chinese Houses: Chinese Quadrangle – Siheyuan & Ancient Roman Houses: House of Vettii in Pompeii

The Chinese Quadrangle house admits light and ventilation into the spaces directly from the courtyard. Consequently, there is no need for exterior windows. The entrances are usually placed along the South wall, with a preference towards the Northeast corner [11]. The placement of house entrance openings and their orientations are based on the consideration of the Feng-Shui principles. The courtyard

is a central element in Chinese Quadrangle house with auxiliary functions. Usually there are verandahs on all three sides in the courtyard and they provide the transition between courtyard and the rooms. The verandahs also serve as extensions of the live in rooms. The courtyard usually contains a water source, an oven and accommodated outdoor cooking, washing, recreation and socialization [11]. If a large number of rooms are needed, additional “courtyard-units” are built either from central axis or on the sides of the initial courtyard-unit. Occupancy of each courtyard-unit is governed by the internal hierarchy in the family. The courtyard-unit’s position has to be with the respect to the overall hierarchy of the entire layout.

Traditional Roman houses typically were organized about an atrium open to the sky and surrounded by a roof structure supported at the corners by four columns [1]. The main entrance to the house faces to the street, and consists of a double-door. On passing through the door you would walk through a short passageway and enter into the atrium. The atrium is the most important part in the house. This is where guests were greeted. The atrium was also high ceiling and often consisted of a few furnishings to give the effect of a lot of space. In modern architecture, an atrium is often used as greetings center with a fountain in the middle just the same as it was during the Roman Empire. In the center of the ceiling there was a square opening. The roof was slanted slightly towards the opening so that rain water could come in. Directly below the square opening in ceiling, there was often a shallow rectangular pool lined with marble to gather rainwater. Surrounding the atrium there were the master's families main rooms, bedrooms, study, and dining-room arranged lined the atrium. Only two objects were present in the atrium. One is a small bronze box that stored precious family items and a small shrine to their household gods [9].

The courtyard is the common design element in both Chinese Quadrangle house and ancient Roman house. Both have landscaping and decorative ornaments as well as other practical functions. The differences between traditional Chinese house and ancient Roman house are structures, materials and the plan layout. All these differences can be explained by different culture and different building construction technology during the period of these buildings were built.

- Chinese Gardens and Japanese Gardens & European Garden

Compared with the European or American garden, which is primarily horticultural -- flowers, trees and lawns -- sometimes with rockery and occasionally ponds, the Chinese garden exhibits different priorities [8]. Rocks and water come first, then architecture. Trees are essential in Chinese garden, especially bamboo. Flowers play a minor and temporary role, if any, and the lawn is entirely absent.

Rocks and water symbolize the basic elements of nature, yang and yin, the fundamentals from which life is derived. Water represents the vital spirit of the earth and its life-breath. Rockery symbolizes the active and creative forces of the universe. In the past thousand years, the creation of abstract garden rocks became China's

primary sculptural form, and Chinese most greatly appreciated rocks which were complex and penetrated by open holes, structured like bones. In Chinese garden the best rocks were highlighted and often set in a sculptural assemblage. Architecture in the Chinese garden is no different from that found outside of the garden, but each building is adapted to the garden site and takes on different functions than found in an ordinary setting [8]. Often, main buildings have no solid walls but instead are surrounded by open latticework, to permit an excellent view of the garden. There is always an elegant main hall, placed on an elevated terrace beside the garden pond, a primary gathering place with the best view of the garden, and a focal point when viewed from afar. In contrast to this, many small, rustic pavilions often dot the entire garden, placed alongside pathways which appear and disappear from view, showing from afar where excellent vantage points are located [8].

No Chinese garden is really a garden. Every garden is actually many gardens. The space is broken by walls, covered corridors, and buildings in a sequence of spaces, differentiated so as to produce a series of contrasting experiences [8]. It is in this way that the Chinese garden, whether set on an urban half-acre site or on a rural hillside, can convey the sense of the ongoing, the endless, and the infinite -- which is what a Chinese garden is all about, a microcosm symbolizing a whole universe in one's backyard. The walls thus play an essential role in the Chinese garden, complemented by the doorways and windows which provide physical or visual access through the walls, which is called borrowed view. The lattice patterns of the garden windows are a focal point of appreciation, and in many gardens, no two patterns are alike in the entire garden [8] (Figure 8). The twists and turns of Chinese gardens make you never see the end, which is one of the major characters of Chinese garden design. In a Chinese garden, you make a turn, and then you pause, you see something, and you turn again, and you see something different. This concept can be seen from much modern architecture in China.

- Sustainable Environment – Case Studies

Fragrant Hill hotel stands in a public park within the former Imperial Hunting Grounds outside Beijing, not far from the Summer Palace and other key historic sites. Balancing symmetry and asymmetry, the 325 guest rooms zigzag out from a central skylight space to preserve the site's ancient trees. The hotel complex layout integrates with the natural environment. Each guest room opens onto a courtyard through a shaped "window picture" that frames the landscape and brings the outdoors inside – a borrowed view. Building and gardens merge inseparably in an intimate reciprocal relationship [11]. The lobby forms a traditional courtyard, and rooms extend along a hillside. Each has a balcony overlooking the park.

By the inspiration of Chinese garden design principles and with the goal of preserving the past in mind, a construction strategy was formulated. The strategy to build this project is to provide a new way that advanced Western technology is grafted onto the essence of Chinese vernacular architecture without literal imitation [11]. The skylight was the only major imported component; everything else was

constructed by local craftsmen using age-old techniques and materials. This is the exact way that a sustainable design project should be designed and constructed. Fragrant Hill thus draws from the living roots of tradition to sow the seed of a new, distinctly Chinese form of modern architecture that can be adapted, not merely adopted, for diverse building types [11].

Although a high-rise hotel in central Beijing was originally requested, the architect declined in order to preserve the Forbidden City from skyscraper intrusion. Shortly after Fragrant Hill was commissioned, Beijing's unique legacy was acknowledged as strict height regulations were established for new buildings within critical distances and sight lines of the historic site. Therefore, the Fragrant Hill Hotel is an excellent example to showcase the sustainable design by preserving the past.

Appendix B

Questionnaire:

Please answer the following questions. Your participation is appreciated.

Your experience of interaction with people who have different cultural background

Yes _____ No _____

1. Architectural design reflects cultural influence.

1. Strongly Disagree, 2. Disagree, 3. Undecided, 4. Agree, 5. Strongly Agree

2. Culture is reflected by design philosophy.

1. Strongly Disagree, 2. Disagree, 3. Undecided, 4. Agree, 5. Strongly Agree

3. Design is a means of culture expression.

1. Strongly Disagree, 2. Disagree, 3. Undecided, 4. Agree, 5. Strongly Agree

4. Culture and design are totally different concept and you can not see any cultural influence from design.

1. Strongly Agree, 2. Agree, 3. Undecided, 4. Disagree, 5. Strongly Disagree

5. Architectural design has nothing to do with culture.

1. Strongly Agree, 2. Agree, 3. Undecided, 4. Disagree, 5. Strongly Disagree

6. The Western architectural design principles and philosophies are subtler than the Eastern architectural design principles.

1. Strongly Agree, 2. Agree, 3. Undecided, 4. Disagree, 5. Strongly disagree

7. Subtle and magnificent, delicate and grandiose, flexible and standardized, full of symbolic meanings, these are the main characteristics of classical Chinese architecture.

1. Strongly Disagree, 2. Disagree, 3. Undecided, 4. Agree, 5. Strongly Agree

8. Because of the difference of the Eastern and the Western culture, it reflects different meanings on architecture.

1. Strongly Disagree, 2. Disagree, 3. Undecided, 4. Agree, 5. Strongly Agree

9. Because of the difference of life style and philosophy of the Western and the Eastern, it reflects on the architectural forms and configurations.

1. Strongly Disagree, 2. Disagree, 3. Undecided, 4. Agree, 5. Strongly Agree

10. The meaning and the symbolism of the Eastern architecture are the reflections of cultural, philosophical, and religious influences and life style of people.

1. Strongly Disagree, 2. Disagree, 3. Undecided, 4. Agree, 5. Strongly Agree

11. After taking this course, I understand that cultures will influent the interactions with people with different culture.

1. Strongly Disagree, 2. Disagree, 3. Undecided, 4. Agree, 5. Strongly Agree

12. I don't think cultural influence is important and it won't affect my interaction with people with different cultural background.

1. Strongly Agree, 2. Agree, 3. Undecided, 4. Disagree, 5. Strongly Disagree

13. I don't think cultural influence will affect human behaviors.

1. Strongly Agree, 2. Agree, 3. Undecided, 4. Disagree, 5. Strongly Disagree

14. People with different cultural background have same perception to built environment.

1. Strongly Agree, 2. Agree, 3. Undecided, 4. Disagree, 5. Strongly Disagree

15. This learning will affect my future daily life or my profession in a positive way.

1. Strongly Disagree, 2. Disagree, 3. Undecided, 4. Agree, 5. Strongly Agree

16. Cultural dimensions are important in sustainable design.

1. Strongly Disagree, 2. Disagree, 3. Undecided, 4. Agree, 5. Strongly Agree

17. The architectural style, landscape design, and construction materials of new developments should reflect the cultural heritage of the locality or region.

1. Strongly Disagree, 2. Disagree, 3. Undecided, 4. Agree, 5. Strongly Agree

18. Cultural resource treatment and maintenance methods should be both environmentally and culturally sensitive and sustainable over the long term.

1. Strongly Disagree, 2. Disagree, 3. Undecided, 4. Agree, 5. Strongly Agree

19. All site and facility designs should not incorporate methods for protecting and preserving significant cultural resources over the long term.

1. Strongly Agree, 2. Agree, 3. Undecided, 4. Disagree, 5. Strongly Disagree

20. Proposed development sites should be surveyed for cultural resources, and the significance, integrity, and tangible and intangible qualities of those resources determined.

1. Strongly Disagree, 2. Disagree, 3. Undecided, 4. Agree, 5. Strongly Agree

Open ended questions:

1. Your suggestions to make it a better learning process

2. What do you enjoy the most about this course?