Sustainable Courtyards: Practical Experience Potentials

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Abstract. A courtyard is an architectural design element traditionally and commonly applied in UAE vernacular architecture for its environmental and social potentials. This research highlights a real project that won a national award for excellence in Sustainability education, where the project involved Interior Architecture students in creating their own courtyards external outdoor furniture to be a hub for social communication in the College of Fine Arts & Design at the University of Sharjah. The research will explore the social potentials in the courtyards as an architectural element used to recognize the traditional architecture in Arab countries. Where about four courtyards in the College were redesigned with recycled outdoor furniture collaborating with waste management institute Bee’ah in Sharjah, where volunteering students started the project from concepts’ statements that inspired by the UAE nature to be abstracted in two dimensional drawing and developed to create three-dimensional outdoor pieces of furniture. The Sustainable Courtyard Project is a practical application of the theoretical principles of sustainability as one of the UAE visions 2050 to preserve the environment and spread awareness of its importance for future generations. Spreading awareness among students of the value of environmental and social sustainability, where the designs were inspired by the heritage of the UAE in various forms and using recycled materials.

1. Introduction

“Yet, to the Arab countries especially, the courtyard is more than just an architecture device for obtaining privacy and protection. It is, like the dome, part of a microcosm that parallels the order of the universe itself.” Hassan Fathy inspired many architects by these words giving the courtyard a special deep recognition to the Arab world architecture [1]. Courtyards as a prototype plan has two basic concepts to respect and follow, the first one is the climate that considered the environmental aspect of sustainability, as the major function for the courtyard is to control the internal environment and afford a suitable weather to the humans interior spaces, as well creating inner environment, that provide privacy and isolation environment that assure the second aspect which is the social one that includes Islamic and cultural fundamentals that have to be considered, and reflect the social aspect of sustainability [2]. The Sustainable courtyards project is a voluntary practical project applied to the theoretical principles of sustainability as one of the UAE's most valuable visions in preserving the environment and spreading awareness of its importance to future generations. The main goal of this project is to activate the courtyards of the College of Fine Arts and Design at the University of Sharjah and to provide students with the opportunity of using these courtyards as a great potential for social communication between students. Activate the existing courtyards suits the practical nature of the college in addition to applying the principles of sustainability in practice, which enhances the strategy of applied practice in the
educational process. The students of the Department of Applied Design have designed and implemented the external spaces of the courtyards of the college buildings to benefit the rest of the students positively in order to raise awareness among their peers with the value of environmental and social sustainability, where they got their inspirations by the heritage of the UAE in different forms and using recycled materials friendly to the environment. In addition to emphasizing the value of community involvement in this process, community service and teamwork, the project was carried out within the workshop of the College of Fine Arts and Design at University of Sharjah.

2. Sustainable Yards Authentic Initiative
The concept of the project inspired by the existing courtyards inside the building of the College of Fine Arts and Design at University of Sharjah, where these courtyards were long time ago dusty, closed, unused, and store dissonant, although the design of these yards came for natural ventilation and natural lighting for the college corridors and to be a gathering place for Students to socialize, spend their breaks between lectures or carry out their design projects. Believing in the importance of the courtyard as an element of architectural design that has been widely used through the traditional architecture in the UAE. Because of its environmental and social potential as energy-saving systems and a place for social networking, the need to activate and redesign the yards of the Faculty of Fine Arts and Design, at University of Sharjah has been confirmed and redesigned to be an attractive environment for students to reuse an important resource of the faculty's unused resources.

![Figure 1. The existing unused courtyard surrounded by glass doors.](image1)

![Figure 2. Dusty, closed, unused, and store dissonant courtyard, an example for unused potential.](image2)

3. Project Goals and Indicators
This project was chosen specifically because it was aimed at reusing the unused resource in the building of the Faculty of Fine Arts and Design, in addition to tackling the problem of the presence of students in open spaces within the college building. The project was designed and fully implemented by the students of interior design and architecture and within the college workshop with the support of one of the governmental waste management institutes by providing recycled materials to carry out external seating area in the courtyards. Besides emphasizing the scientific research required by the project before practical implementation, that reflected ideas inspired by the UAE social and environmental environment. Thus, the project targeting the achievement of the practical learning methodology and spreading the awareness of sustainability emphasising the importance of preserving the natural environment and instilling the values of loyalty and belonging to students through their service to the University community and positive communication with governmental institutions in fruitful cooperation.
Table 1. Sustainable Yards Goals and KPI’s

| Goal                                      | Determined and Measurable                                                                 | University Goals                                                                 |
|-------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Enhance Creativity levels with evaluation criteria | Assess the designed courtyards external elements with assessing creativity level         | Achieve the creativity learning and design goals for the university strategic goals. |
| Reuse unused facility                     | Four unused courtyards in the College building or used as a storage space.                | Ensure the maximum use of the University facilities.                              |
| Raise Sustainability Awareness            | Involve the students in different majors using the same space to spread the concept.      | Achieve the strategic goals of the university when adopting sustainability.         |
| Improve Learning Process                  | Involve the students in the implementation process that guarantee practical experiences.  | Raise the level of students learning capability.                                   |

3.1. Activating unused facility in the University. The first goal for this project is to align the university goals when ensuring the maximum use of the university facility. In this goal, the exact number and location of the college’s yards are defined and a questionnaire is conducted for students and users on the importance of these yards and the extent to which they are used (measurable and specific) in a specified period of time. This goal was measured by quantitative indicators in which the number of yards and the number of users and questionnaires were counted and exited by specific figures as shown in figure 3.

3.2. Governmental Institutes Engagement. In this project, it was very valuable to engage one of the most active waste management institutes in Sharjah Emirate, where one of the major success factors in the project is to use the waste and recycled material to be the main source for outdoor furniture production. The project team had several site visits to the Waste recovery facility, where they introduced to the recycling process and the waste segregation facility with different waste materials. The main focus for selection waste materials were on the wood waste and old trees parts, where the team could manufacture these materials in the available wood workshop in the College. With emphasis on the role of the governmental institutes towards the community and the environment as well, where the announced objective is creating a sustainable future, through creative and resourceful solutions. That shall be achieved by pushing the boundaries of environmental innovation and crossing remarkable milestones, to become a force for change, across the region. The uniqueness of this approach and consistent drive towards excellence has helped the institute to make rapid progress towards its goal of elevating Sharjah, to the position of Environmental Capital of the Middle East. Through revolutionary environmental management practices, systematic waste management, sustainability strategies for key resources and
utilization of renewable energy sources, as well as community engagement initiatives, seeking to set a benchmark for sustainability, for cities and communities everywhere.

3.3. Aspects of Creativity and Innovation. There are many definitions for creativity by many researchers, but the adopted one in this paper is for Sarkar and Chakrabarti’s (2008) definition, ‘Creativity occurs through a process by which an agent uses its ability to generate ideas, solutions or products that are novel and valuable.’ Value, in the context of technical or designed products, take on the meaning of utility, or usefulness. Similar views of creativity have also been expressed by other researchers [3]. This paper argues that based on the previous creativity definition the core components of creativity are ‘novelty’ and ‘usefulness’, a direct measure of creativity should be in terms of measures of both product novelty and product usefulness. That was the direct measurement for the students’ project Implementation criteria. Inspiration has an Important and recognizable role in the design process and affect the level of creativity that relate the product design to novelty [4]. This paper will explore some of the project features that have clear creative Inspiration and successful concept generated from the local culture social and natural environment. What gives this project a high level of novelty is the Inspiration uniqueness and its connectivity to the local environment, a clear examples for the Inspiration application In the design process one of the outdoor furniture designed for the courtyard was inspired by Al Reem deer, which considered one of the dominant animals In the Arab Emirates, where the designer abstracted the horns as a recognizable element for the deer in progressive sketches and reached a designed bench out of the waste wood material.
4. Implementation Plan Challenges and Potentials
The procedural plan consisted of specific steps that began with the formation of the Committee of Sustainable Yards and the identification of the college yards where the project will be implemented, and then the committee distributed the roles and tasks among the team members, where each member started detailed research looking for inspirational ideas from the environment of UAE. The following step was how to apply theoretical sustainability approach to the project, with deep investigation on waste materials should be selected for implementation. The evaluation step was needed in two categories, the first one is the creativity assessing for the project in total and for each piece produced as it has different unique concept connected to the local environment, and the second one was the evaluation for the level of success for the applicable part of the project that measured the social interaction of the users who are the project targeted to activate the social role of the courtyards.

4.1. Workshop Practical Challenges. All the team members participating in the project are students rolled in the department of interior design and architecture that gave them the potentials of design and drawing with some challenges in using waste materials or upcycling some old wooden pieces that needed extra treatment before machinery use. Another challenge were in the need to extra treatment for the pieces to be ready to use in the hot humid climate of Sharjah to last long which was a very critical environmental concern.

![Figure 7. The team challenges during project practical step in the wood workshop](image)

4.2. Social sustainability Levels of Engagement. Social sustainability is the practice of creating a diverse and equitable society that successfully meets the basic social needs of users. Reviews of the general social sustainability literature have shown the need for further development of the social dimension of sustainability and that social sustainability is often considered the least developed dimension of sustainability [5]. Culture is the spirit of a nation and the mark of its identity. It is an essential pillar in the founding of nations and their progress. Every nation has its own culture from which it derives its elements, components and attributes, by which it is characterized and to which it belongs. and in the case of this project located In Sharjah, United Arab Emirates, social sustainability has to get a higher rate as respecting the local social culture Is not an option any more. The project emphasizes the social aspect of sustainability when reflect each product of the outdoor furniture to a local social inspiration either inspired by the social cultural heritage or inspired by the natural environment of the UAE.

5. Post Occupation Evaluation
The team implemented the executive plan according to the timeline plan, following the detailed steps in order to achieve the objectives of the project in a distinct way, where the executive plan achieved the main goal when reused of an unused facility in the college building which are the courtyards outdoor spaces, tackled the problem of an undesirable space closed and dusty yards, at the same time targeting spreading the awareness of importance of preserving the environment and ensure to maximize spaces for socialization, promoting positive communication with governmental institutions, emphasizing the need for creative and innovative designed spaces, and improving learning through practical application in addition to achieving extracurricular activities that support the personality of students pioneering. The figure 8 shows the project process and the existing different courtyards before and after occupation.
5.1. Users Evaluation Analysis. The team of the project conducted a questionnaire explaining the post-occupancy assessment of sustainable yards and analyzing the results of the survey to realize the satisfaction of students and users about the design of the courtyards and external sessions and the extent to which the project encourages users to communicate positively through the project.

![Figure 8](image8.png) The figure shows different courtyards before the project and after users occupation, where the left column states the courtyards before the project.

![Figure 9](image9.png) The graph shows the students numbers from different majors using different courtyards to socialize with their peers.
5.2. Project Achievements on the Community Level. The most important benefits achieved by this project are the confidence gained by students in their ability to support the community and create a sustainable environment and promote the entrepreneurial personality that emerged through the students team and spread the thought of sustainability not only within the university community but the Sharjah community as a whole through various social media shared their ideas and convictions on the need to preserve the environment and the right of future generations to live in a sustainable environment. In addition to activating the role of the governmental institutes that should share the responsibility of sustaining a more clean environment.

6. References

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