Journal of Critical Reviews

ISSN- 2394-5125 Vol 7, Issue 8, 2020

ETQAN: TECHNICAL INSTITUTE FOR WOMEN

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Received: 25.04.2020 *Revised: 30.05.2020* *Accepted: 20.06.2020*

Abstract

Technical Institute provides specialized training in a specific career field. The courses of the Technical College take at least two to three years to complete, and usually award certificates, diplomas or associate's degrees. Unlike many community colleges and four-year universities that require students to complete a general education course before studying a major, students entering technical schools usually take major-related courses during the first semester. Technical schools focus on practical training and provide internship experience in relevant work environments. There is no technical school for woman in Saudi Arabia, Jeddah that offers a technical degree for them at the moment. The proposed space program of Technical Institute for Women consists of learning, retails and social, public and services, administration, storages, and students residence. The selected site is located at AlMadinaALMounawra Rd, Al Naeem district based on the site evaluation criteria of site capacity, shape/ proportional, access/ traffic, noise levels, security and safety, image/ visual quality, visibility, future development plans, demographic patterns, surrounding, and views. This project provides effective lifelong education and workforce development world-class programs to qualify students for employment to achieve the 2030 vision goals.

Keywords -- Technical Institute, Women, Training, Workforce Development, Employment

DOI: http://dx.doi.org/10.31838/jcr.07.08.147

INTRODUCTION

Vocational education provides students with practical experience and prepares them for employment. In 1823, the London Institute of Mechanical Engineering was the first foundation established by George Birkbeck [1]. His goal is to provide physical and chemical tutoring for various craftsmen and mechanics. By 1826, there were 100 mechanical colleges, and by 1841, there were more than 300, and they doubled to 700 colleges [2]. However, most colleges forget their origins and are taken over by the middle class as themselves or as the cultural center of the institution.

In the middle of this century, the state began to promote technical education in national institutions centered in London. In 1917, the Smith Hughes Act became the first law authorizing federal funding for vocational education programs in American schools [3]. It establishes vocational education to provide acceptable training for certain future professionals who do not require a bachelor's degree to complete their work (such as plumbers, mechanics, and factory workers). They completed training in key vocational courses related to high school.

There were a limited number of vocational schools in the Arab world [4-6]. In the KSA 2030 vision, "*We will close the gap between the outputs of higher education and the requirements of the job market. We will also help our students make careful career decisions, while at the same time training them and facilitating their transition between different educational pathways. In the year 2030, we aim to have at least five Saudi universities among the top 200 universities in international rankings. We shall help our students achieve results above international averages in global education indicators.*" [7].

In such a competitive world, everyone must have a good education. Higher education is increasingly important for finding suitable jobs and positions [8-10]. Proper education has created many methods for future development. By increasing their knowledge and technical skills, it makes students psychologically, socially and intellectually powerful. Each student has his own dream to live a different life. Young students are full of energy; they are curious to learn new things and prepare to explore the world. Youth are the hope of tomorrow, they are one of the most energetic segments of the nation, and there are high expectations from them. With the right mind-set and ability, the youth can contribute towards the development of the nation and take it forward.

However, many youth who lack job opportunities, are not able to fulfil their basic needs, such as food, clothing, shelter and medical facilities. The aim of this project is to solve unemployment problem and encourage youth for technical learning by designing a school with technical programs.

CASE STUDIES

Three case studies with similar concept from Denmark, Norway and Australia were chosen for understand the components of the project. Each case study has a different way of merging indoor spaces with outdoor spaces to motivate students to learn more. The selected case studies are special design to fulfil their own objectives and they are:

a) Herningsholm Vocational School, Herning, Denmark
b) Faerder Technical High School, Tonsberg, Norway
c) Monash University Logan Hall, Australia

Herningsholm Vocational School, Herning, Denmark

Herningsholm Vocational School is an independent building in the existing education park was designed by C.F. Moller (Figure 1) [11]. The design of the school is from the inside out, focusing on creating the best learning and learning environment, and from the inside out, related to the surrounding environment. Here, the enthusiastic urban space provides the possibility for outdoor work and teaching. The building believes that human behavior and thinking are affected by the physical environment.

The formal structure of the learning environment will have a significant impact on the students 'daily learning process, so it is designed according to modern democratic principles.

Faerder Technical High School, Tonsberg, Norway

Faerder Technical High School is a new secondary education vocational college located in the oldest village in Tonsberg, Norway designed by White Arkitekter (Figure 2) [12]. The plan combines the three existing schools of the college into one, creating a ultra-modern campus for academic education, design and architecture, automotive machinery and engineering. The open access policy of the new facility allows 750 university students to interact with and integrate into the local community [12]. The Faerder Technical High School Create vibrant interactions between schools, towns and businesses in the area; not only allow, but also invite non-student crowds to gather to share newly created spaces.

Monash University Logan Hall, Australia

Monash University Logan Hall is designed by McBride Charles Ryan (Figure 3). The 250 tenant buildings on the 6th floor of the Monash University Clayton campus are used for student accommodation, combining living and public areas with the purpose of increasing communication with other tenants [13]. The spacious and effectively designed public areas are particularly conducive to the idea of students working together. Monash University truly reflects the traditional sandstone campus, where buildings as objects and micro-mega structures (extraordinary and ordinary) are scattered throughout the natural landscape. In addition, the project was designed as a sustainable building through various energy-saving strategies, including no air conditioning, thermal stacking, natural ventilation, window / wall shading, and high-performance glass.

Figure 1. Herningsholm Vocational School, Herning, Denmark [11]

Figure 2. Faerder Technical High School, Tonsberg, Norway [12]

Figure 3. Monash University Logan Hall, Australia [13]

SPACE PROGRAM

Based on the case studies the number of workshop is 20 rooms with 20 students each, which means total are 400 students. So, the decision that was taken is to divide the 200 students on three department of the school (workshop of textile, metal, and wood), which means each department has 133 students approximately. The proposed space program which tabulated in Table 1 consists of several main zones namely learning, retails and social, public and services, administration, storages, and students residence. Besides that, the overall site component is tabulated in Table 2 and the total land area is about 16155.86 m².

Table 1. Space Program

Zone	Percentage Use (%)	Net Area (m²)	GFA (m²)	Floors (n)	Foot Print (m²)
Learning	25	3651	4381.2	2	2190.6
Retails and Social	22	3210	3852	1	3852
Public and Services	8	1172	1406.4	2	703.2
Administration	3	405	486	1	486
Storages	2	238	285	1	285
Students Residence	40	5669	6802.8	5	1360.56
Total	**100**	**14345**	**17213.4**		**8877.36**

Table 2. Site Component

Components	Area (m²)
Building Foot Print	8877.36
Outdoor Activity	320
Landscape and Parking	6958.5
Total Land Area	**16155.86**

The design criteria and guidelines are the workshops need a good natural and mechanical ventilation to prevent excessive heat and humidity within the spaces. Next, the workshop should provide central storage to serve the products of each department. The workshops should however be shaded from direct sunlight to prevent glare. The practice area should be designed in close proximity in order to facilitate a direct relationship. The loading deck should be close from the service access for easy accessibility.

SITE SELECTION AND ANALYSIS

Three site locations from Jeddah, Saudi Arabia were proposed for site selection. Figure 4 shows site 1 is located at AlMadinaALMounawra Rd, Al Naeem district, with site area of 24000 sqm. Figure 5 and Figure 6 demonstrate the site 2 and site 3 located at AlMadinaALMounawra Rd, AlHamraa district and Palestine Rd, Almishrifah district with site area of 18544 sqm and 17000 sqm respectively.

Figure 4. Site 1 [14]

Figure 5. Site 2 [15]

Figure 6. Site 3 [16]

Accordingly, the location of the project should be within a live area or educational community to be access from anywhere easily. Several site evaluation criteria were outlined in order to determine the most appropriate site for the project and the criteria are site capacity, shape/ proportional, access/ traffic, noise levels, security and safety, image/ visual quality, visibility, future development plans, demographic patterns, surrounding, and views. Each of the criterions will be given a value called weighting factors (WF), which will be using a multiple factor in evaluating the selected. Number 1, number 2 and number 3 represent as not very important, somewhat important, and very important respectively. The site evaluation result is tabulated in Table 3.

The site capacity is the usable area of the land that should be less than the total site area. The consideration should be given to special restrictions such as setbacks and vegetative buffers around the perimeter of the site, land for parking, land for landscaping, also the empty space in the land for future expansions. The rectangular shape land usually easily for project to design and develop. As a very general rule-of-thumb, a functional plan can be done on a rectangular site with dimensions in a ratio of approximately 3:6.The site should have effective traffic speed and intensity to the project access. The site should be far away from high speed cars traffic especially trucks and buses and noisy industrial or commercial areas. In term of security and safety, site lighting should be installed for safety at night. The site is recommended to provide security room in the gate to control the area. Also, avoiding the site located near social hazards neighbourhood, such as areas with high incidence of crime or drug. The site should be located in an area with a good identity and compatible with surrounding land uses, both existing and proposed. The location should be visible clearly to attract many people. In addition to highly visible site a long major street with easy accessibility is consider ideal location. If the site involves other buildings, it should be oriented in the portion of the site with highest visibility. The site which is capable is for future development plans has good potential. The site should have a good demographic pattern, where people can easily reach it. Also, It should be a place where people naturally gathering. The surrounding of the site should have a relation with the main function the project. So, the project will blend with the surrounding and help to achieving the objectives of the project. Excellence view form the site must more preferable.

Table 3. Site Evaluation

Criteria	Weighting Factors	Site 1	Site 2	Site 3
Site Capacity	3	15	15	5
Shape/ Proportional	2	10	10	10
Access/ Traffic	3	15	5	10
Noise Levels	1	5	10	15
Security and Safety	3	15	15	15
Image/ Visual Quality	2	10	15	10
Visibility	2	10	10	15
Future Development Plans	3	15	5	5
Demographic Patterns	2	10	5	5
Surrounding	2	10	15	10
Views	1	10	15	15
Total		**125**	**120**	**115**

The chosen site for the project is site 1, which marks the highest score among the others. Figure 7 shows that the selected site is accessible through Prince Sultan Road and Al Amal Street. Besides that, the site surrounding are occupied by commercial, restaurants, bank and residential which show in Figure 8. Regarding the climate analysis of the selected site, the annual relative humidity ranges from 30% to 89%. The annual precipitation is low but increases on September. Jeddah expects its more prevailing wind from northern west direction with maximum wind speed of 20-25 km/h.

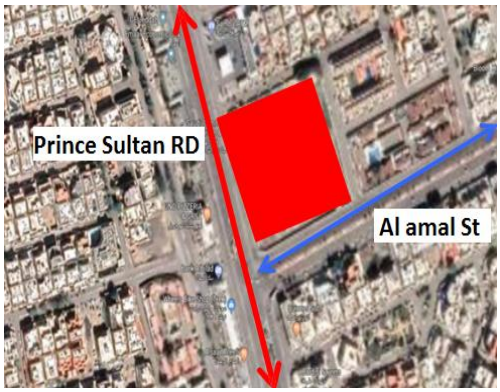

Figure 7. Site accessibility analysis

Figure 8. Site neighbourhood's lands analysis

ZONING AND PROJECT DESIGN

The project creates a community and learning environment that can inspire and actively enable all students to master rigorous technical courses to encourage all women who desire to realize their dreams in the Kingdom of Saudi Arabia. The most suitable site for the project is not near residential areas. The project will have indoor and outdoor areas that will be connected with glass bridges that allow the daylight to enter the buildings. Figure 9 and Figure 10 demonstrate the final site zoning and site master plan of the project. The main perspective view of the project is shown in Figure 11.

Figure 9. Final Site Zoning

Figure 10. Site Master Plan

Figure 11. Main Perspective View of the Project

CONCLUSION

This is an educational institution that specializes in the technical science studies for women. The curriculum is considered the first women academic integrated and specialized in Saudi Arabia to qualify students to work in technical fields. The proposed space program consists of learning, retails and social, public and services, administration, storages, and students residence. The evaluation criteria such as site capacity, shape/ proportional, access/ traffic, noise levels, security and safety, image/ visual quality, visibility, future development plans, demographic patterns, surrounding, and views were used to determine the suitable site for the project which is located at AlMadinaALMounawra Rd, Al Naeem district. This project delivers focused vocational education that is international, flexible, accessible, and affordable for our diverse community.

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