



## Environmental Sustainability and General Education in UAE

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### ABSTRACT

*The theme of sustainability has received attention and support from various academic and non-academic organizations due to the environmental issues that have escalated recently. Hence the need arises in educating today's youth about sustaining the environment. This study emphasizes the importance of sustainability in moulding undergraduate students in the UAE to become responsible and committed individuals by integrating environmental sustainability in the general education program. Questionnaires were distributed to 200 first year students (Emiratis and expatriates) of Abu Dhabi University. Descriptive statistics was used to analyse the data. The findings indicate that majority of the students support integration of sustainability into general education and that more awareness about sustainability can provide solutions to the environmental problems in the UAE.*

**KEYWORDS : Sustainability, environment, general education**

### 1. Introduction

In recent years the term sustainability has garnered a lot of focus and attention globally. The United States Environmental Agency defined sustainability as a way that creates and maintains the conditions under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic and other requirements of present and future generations. [1] Academics and non-academics have worked towards a sustainable future in various disciplines and governments have called for a serious action in sustaining the resources of the earth. Today's youngsters need to realize that sustainability is not a buzz word but is a way of living. So the need arises to educate our youngsters about environmental sustainability so they can realize its importance in their lives. As the academic field has the freedom to express new ideas and transform fields of study, and higher education reaches masses of people, the university setting is a prime place to engage in sustainable educational programs across the disciplines (Cortese, 2003) [2]. Because general education provides the opportunity of a multifaceted curriculum, it will enable students to learn about sustainability in a holistic way. The main objective of this paper is to highlight the need of implementing environmental sustainability in general education programs in UAE and to discuss the effectiveness of such a cohesive curriculum in educating undergraduate students to become sustainable and self-reliant members of communities and the society.

### 2. The need for awareness of sustainability in the UAE

**Matson (2009) stated,**

One of the greatest challenges confronting humanity in the 21<sup>st</sup> century is sustainability: how to meet the basic needs of people for food, energy, water, shelter without degrading the planet's life support infrastructure, its atmosphere and water resources, the climate system, and species and ecosystems on land and in the oceans on which we and future generations will rely. [3]

In spite being one of the richest nations in the world, UAE still has to face this challenge of sustaining the resources of the earth. The Middle East nations have been rated as the world's top most food wasters. In 2012, the Dubai Municipality estimated that in Ramadan, around 55% of household waste (or approximately 1,850 tons is thrown away every day. [4] Drastic changes in the population size, housing, agriculture, forestry has adversely affected the environment in UAE leading to global warming. [5] To avoid such calamities educators need to integrate sustainable practices into education so that youngsters would realize its importance and apply them in their lives.

### 3. Environmental sustainability education in the UAE

Presently, UAE focuses on sustainability education at two levels: School level and the university level.

### 3.1 School Level

UAE is ranked as one of the topmost 5 countries to provide environmental sustainability education by incorporating sustainable practices in the curriculum. In its endeavour to create awareness about environmental sustainability among the Emirati youth, the Emirates Foundation in collaboration with Ministry of Education of UAE is striving to integrate sustainable development issues in the teaching curriculum of public schools. This project would focus on integrating subjects such as environment, food security, energy, as a part of the curriculum to enhance the students' awareness of the environment and to create responsible citizens. [6].

In addition to this initiative, the UAE government is also emphasizing the concept of 'ECO schools' in the region. Eco-Schools is an international initiative designed to encourage whole-school action for the environment. It is an environmental management tool, learning resource and recognised award scheme. [7] This project is done by linking the activities from the Eco schools process into the existing curriculum of numerous interested schools. The amount of linking would entirely depend on the school community. Awards are then given at an international level to the best schools which have effectively implemented this project in their curriculum. Dubai International Academy, Dubai, Delhi Private School, Sharjah, Our Own English High School, Sharjah, Al Halaa for Basic Education, Fujairah are some of the schools that have been awarded globally for their efforts.

### 3.2 University Level

When it comes to higher education, universities in the UAE offer specific undergraduate courses such as Bachelor of Environmental Science and Masters in their curriculums. These courses emphasize the importance of contemporary issues related to water and environmental engineering, development of technologies systems to meet the desired needs of the society ( Masdar University) [8]; centres on ecology & conservation, water and solid waste management (Zayed University) [9]; analyses the consequences of human actions on the physical and biological and cultural world, impart requirements for environmental conservation for a sustainable society (Abu Dhabi University) [10]; and help students to identify and understand environmental issues and devise solutions. (American University of Sharjah) [11]. In addition to the regular courses, universities like Masdar university which is a part of the Masdar city (one of the sustainable cities in the world) encourage seminars and conferences on environmental sustainability issues. As these undergraduate courses are environment oriented courses, only a specific group of students who are interested in environmental sustainability would benefit from such a curriculum. Students belonging to different fields other than the above mentioned courses will have no opportunities to learn about the need of sustaining the environment.

For example, climate change is one of the key issues that we face today. Anderson and Strecker( 2012) brings to our attention that “As a key causative factor, climate change has already changed the magnitude and frequency of some extreme weather, increasing the length, frequency, and intensity of heat waves, flooding, droughts, intense tropical cyclones, rising sea levels, and loss of biodiversity. These hazards increase vulnerability to disasters and result in widespread human, material, economic, and environmental losses”[12]. If students are not educated consistently about these after effects, then they are likely to forget the seriousness of the situation. The need of safeguarding the environment should be one of the topmost priorities in their student lives.

This is the juncture where the importance of integrating environmental sustainability in the curriculum of general education comes in. Those students who have gained their secondary education from regular schools and not the ECO schools would be completely ignorant about this issue. Moreover youngsters who are educated in an ECO school lose their level of interest in environmental sustainability when they leave school for the university to pursue their respective fields of education. This leads to a huge gap in the sustainability education between school and the university levels. The general education programme becomes the bridge between these two levels.

**4. General Education- A Platform for Sustainability Awareness**

A general or liberal education has been defined as a curriculum (or part of a curriculum) aimed at imparting general knowledge and developing general intellectual capacities in contrast to a professional, vocational or a technical curriculum. [13] An individual requires elementary knowledge in fields like sciences, math, language and humanities to understand the basic rudiments of life and this is provided by the general education program. In 1945 in the Harvard Red book, general education was described as “that part of a students’ whole education which looks first of all to his life as a citizen and a responsible human being”. [14] Hence this is a great platform where environmental sustainability awareness can be inculcated in the undergraduate students before they pursue their specialized field. Environmental science and management problems are generally thought to be interdisciplinary or trans disciplinary. Ceulemans and Prins (2010) [15] stated that sustainability education should be horizontally integrated across all disciplines. The general education curriculum in the UAE offers undergraduate students a variety of courses in the fields of language, mathematics, sciences and humanities. This inter-disciplinary nature of general education will guide students to apply environmental principles in their respective specializations. To highlight this point, this study will examine the following hypothesis:

- University students in the UAE are interested in environmental sustainability
- It is advisable to include environmental sustainability in General Education Program
- Environmental Sustainability is in the hands of the youth of UAE

**5. Research Design**

*Sample:* Questionnaires were distributed to 200 first year university students from Abu Dhabi University, Abu Dhabi. The population for study consisted of Emirati and expatriate male and female students from different nationalities. The classification is taken based on this criterion.

*Tools for data collection:* A 5 point awareness scale having 15 items was constructed to collect data regarding the students’ awareness and interest about sustainability. The survey instrument was developed by the researcher after the review of literature and the scales that were used in different educational backgrounds were guided by the theoretical base of the study. Each item of the scale was related to the awareness of students’ about sustainability and their interest to incorporate sustainability in general education program.

Primary data has been collected using a standard questionnaire which was distributed after a detailed explanation. The secondary data has been obtained from secondary sources as journal articles, research books and internet. The random sampling method is used to collect the data.

**6. Analysis and Interpretation:**

Descriptive statistics was used to analyse and interpret the data to understand the relationship between student’s awareness and interest towards sustainability. The data was analysed in three sessions. The first session included the demography of the sample population and is presented in the following table.

**Table 1: Demographic Data**

Gender			Important theme of Sustainability			
	F	%		F	%	
Male	75	38	Environmental	160	80	
Female	125	63	Social	18	9	
			Economic	14	7	
Age			All the above	8	4	
	F	%	Sustainability is			
18 - 20	134	67		F	%	
21 - 23	43	22	Reduce Pollution	15	7.5	
24+	23	12	Proper Waste management	5	2.5	
			Avoid food Waste	5	2.5	
Major			Use of renewable energy	16	8	
	F	%	All the above	159	79.5	
Engineering	114	57	Attended sustainability Workshop/Seminars:			
Business	45	23		F	%	
Arts and Science	29	15	Yes	57	28.5	
Other ( Aviation)	12	6	No	143	71.5	
Nationality			Attend Sustainability campaigns			
	F	%		F	%	
Emirati	42	21	Yes	32	16	
Expatriate	158	79	No	168	84	

From table 1 the gender distribution shows the male participation in the survey is 37.5% and the female participation is 62.5%. Mostly girls were interested in the environmental sustainability and they were interested in integrating sustainability in general education program.

As the population consisted of 1<sup>st</sup> year students of Abu Dhabi University, 67% of the students belonged to the age group of 18 to 20, 21.5% to the age group of 21 to 23 and 11.5% belonged to the group of 24 years and above.

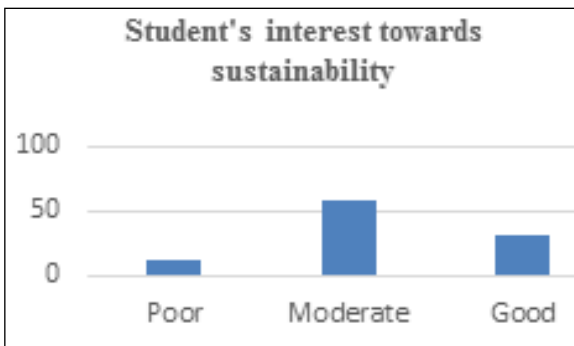
The above table shows that 57% of the students have Engineering as their major, 22.5% were Business students, 14.5% of the students were from Arts and Science and 6% were from Aviation. This actually shows the representation of the ADU population.

The survey aims to get the opinion based on the nationality and from the above table it shows 21% of the students are Emirati and 79% of students are expatriates. As ADU is a private institution, the samples actually represent the exact proportion of the population.

From above table, 80% of the students consider environmental sustainability as the important pillar of sustainability, 9% of the students give importance to social sustainability, 7% goes with economical sustainability and 4% believe that all the three are equally important.

79.5% believe that environmental sustainability will reduce pollution, manage waste and make it possible to use renewable energy. Minorities goes with single elements.

71.5% of the students did not attend any sustainability workshops or seminars whereas only 28.5% attended it. This shows the need of including sustainability in various courses in general education program. 84% of the students have never participated in any sustainability campaigns where as 16% participated in them. This graph shows the opinion and awareness of students towards sustainability.



(Poor 0 – 45, Moderate 45 – 60 and Good 60 above) As shown in the graph, 11.5 % of students were not interested in environmental sustainability, 58% were moderately interested and 30.5% were very much interested and were ready to take it as a commitment towards the society and intended to take a course on sustainability.

**Table 2: Response summary (Frequency with percentage)**

Statement	Disagree	Neutral	Agree
	F (%)	F (%)	F (%)
<b>Awareness</b>			
The term sustainability is widely known.	46(23)	75(37.5)	79(38.5)
The terms reduce, reuse and recycle (three R's) are very popular.	32(16)	38(19)	130(65)
"Go Green" is widely discussed nowadays.	28(14)	41(20.5)	131(65.5)
Through education programs people will be more aware of the importance of sustainability.	20(10)	25(12.5)	155(77.5)
The core of sustainability is to provide a safe and beautiful environment to the future generation.	19(9.5)	22(11)	159(79.5)
Sustainability is the only solution for the existing environmental problems.	42(21)	49(24.5)	109(54.5)
A sustainable world is everyone's right.	17(8.5)	25(12.5)	158(79)
<b>General Education Program</b>			
Sustainability should be incorporated in general education programs.	27(13.5)	50(25)	123(61.5)
Sustainability should be an individual course in general education program.	41(20.5)	53(26.5)	106(53)
Sustainability should be integrated with different courses in general education programs.	34(17)	47(23.5)	119(59.5)
Special credits should be given to the students who work for sustainability.	21(10.5)	40(20)	139(69.5)
<b>Challenges</b>			
It's a challenging job to include sustainability in education programs.	39(19.5)	54(27)	107(53.5)
The instructor who teaches sustainability should be more committed.	17(8.5)	36(18)	147(73.5)
Sustainability should aim to develop a disciplined youth.	20(10)	53(26.5)	127(63.5)
Through Government grants only sustainability can achieve its real goal.	49(24.5)	59(29.5)	92(46)

Table 2 shows the summary of findings using 15 items. This gives evidence to the fact that university students are interested in environmental sustainability. 61.5% of the students support the idea of introducing sustainability in general education program, but majority of them want it to be incorporated with different courses rather than introduce it as a separate course. However, students fear that if such courses are integrated in the general education program, it might lead to a delay in graduation.

**Table 3: ANOVA between Mean awareness and Gender, Age, Major, Nationality, Important theme of sustainability, Sustainability is, Attended sustainability workshop and Attended sustainability campaigns.**

Variable	n	Mean	SD	Std. Error	F-Stat	P-value
<b>Gender</b>						
Male	75	55.65	7.55	0.872	0.098	0.7544
Female	125	56.06	9.73	0.87		
<b>Age</b>						
18 - 20	134	55.75	8.78	0.759	0.184	0.8323
21 - 23	43	56.63	8.27	1.261		
24+	23	55.48	11.28	2.352		
<b>Major</b>						
Engineering	114	55.55	9.11	0.853	0.535	0.6587
Business	45	55.6	8.99	1.341		
Arts and Science	29	57.86	7.19	1.335		
Other ( Aviation)	12	55.75	11.5	3.319		
<b>Nationality</b>						
Emirati	42	55.36	9.91	1.53	0.202	0.6538
Expatriate	158	56.06	8.71	0.693		
<b>Sustainability Theme</b>						
Environmental	160	55.95	9.35	0.739	0.143	0.9338
Social	18	55.06	8.48	1.999		
Economic	14	57	6.13	1.637		
All the above	8	55.13	6.85	2.423		
<b>Sustainability Is</b>						
Reduce Pollution	15	57.07	6.5	1.677	1.231	0.2992
Proper Waste management	5	49.6	5.46	2.441		
Avoid food Waste	5	50.2	11.34	5.073		
Use of renewable energy	16	56	8.36	2.09		
All the above	159	56.17	9.17	0.728		
<b>Attend Workshops</b>						
Yes	57	57.54	7.89	1.045	2.675	0.1035
No	143	55.26	9.29	0.777		
<b>Sustainability Campaigns</b>						
Yes	32	58.84	7.5268	1.3306	4.152	0.0429
No	168	55.35	9.1161	0.7033		

One way analysis of variance was conducted to evaluate the relationship between the interest and awareness about environmental sustainability of male and female university students. The ANOVA results (F = 0.098 and P = 0.7544) indicate that both male and female students are equally interested in environmental sustainability and believe it is very important to take initiative in environmental sustainability.

ANOVA was done to evaluate the relationship between students' attitude towards sustainability and their age. The results (F = 0.184 and P = 0.8323) show that all the age group students believe that it is right time to think about environmental sustainability and need to take some positive steps to maintain environmental sustainability. But the current study indicates that the 24+ age group students have a more favourable attitude towards sustainability integration.

The test of ANOVA indicated that the students from every discipline are in favour of the idea of including sustainability awareness in general education program. But almost all the aviation students showed more interest towards sustainability.

ANOVA test was used to evaluate the relationship between the nationality (expatriates and Emiratis) and the interest in environmental sustainability program. The result (F- 0.202 and P = 0.6538) shows

that both category were interested in sustainability program. The Emiratis expressed more interest and they are willing to participate in any of the programs such as including it as a course in the general education program or including this topic in any of the existing courses in the university.

From ANOVA results ( $F = 0.143$  and  $P = 0.9338$ ) it is very clear that almost all the students consider environmental sustainability as the major pillar of the sustainability theme. Most of them were not very aware of the social and economic sustainability and few of them believe that those three supplements each other and all of them are important.

ANOVA test shows ( $F = 1.231$  and  $P = 0.2992$ ) that majority of the students believe that environmental sustainability can be achieved by reducing pollution, managing proper waste, avoiding food waste and by using renewable energy.

ANOVA test ( $F = 2.675$  and  $P = 0.1035$ ) reveals that the students of Abu Dhabi University did not get much of exposure in attending workshops related to sustainability. Majority of them did not attend any workshops. This leads to the necessity of including sustainability as a part of the general education program.

The ANOVA test result ( $F = 4.152$  and  $P = 0.0429$ ) indicates that Abu Dhabi University students did not get a chance to be part of the sustainability campaigns. UAE government initiates many such campaigns but still students were not encouraged to participate in such campaigns.

## 7. Conclusion

From the above interpretation and analysis of the quantitative data, it is evident that undergraduate students in the UAE are familiar with environmental sustainability and their interest shows that they would like to understand the theme of sustainability in its entirety. They believe that more awareness about sustainability would provide solutions to pollution, wastage of different resources and other environmental problems. Different researches emphasize that sustainability can be taught in an effective way through general education as it is inter-disciplinary. It is very clear from the above discussion (Table 2) that students are really interested in including environmental sustainability in general education program.

### The present research was limited in certain areas:

- 1) Due to the lack of time, the research could not focus on the qualitative method such as interviews with subject experts.
- 2) The research also did not emphasize on the external funding which would be required for various activities like Clean up campaigns, seminars and conferences.

## 8. Recommendations

This study recommends certain strategies that educators can implement in integrating the topic of sustainability in general education curriculum.

- Previous researches call for a holistic kind of sustainability education and one of the ways to implement it is by connecting with the students on an emotional level to extract their strong commitment towards sustainability practices. Rios (2010) [16] mentions that emotional connectivity can be achieved by teaching to all senses and learning. By taking the students' learning style into consideration, and by providing hands-on experiential learning through community service, field trips, role playing, by conducting environmental workshops and by employing critical reflection in their course work, one can achieve that strong sense of commitment towards sustainable practices.
- Secondly, educators can also apply the concept of the Writing across the Curriculum to the general education program. Writing across the Curriculum (WAC) is a program designed to help the faculty in incorporating writing elements in different courses taught throughout the curriculum. "Created to reinforce writing skills in classes outside of English composition, this academic movement engages students directly in the subject matter of the course through a variety of activities that focus on writing as a means of learning"[17] in order to develop the students' skill of writing. The practice of revising and editing their course work through the WAC would help in improving the writing skills of students in their university lives. In a similar manner, if the courses in the general education program do have an "environmental component" in their curriculum then students will be constantly be reminded about need for protecting the environment. This concept can be taught in diverse subjects in the following manner:

### English:

- Writing argumentative essays about pollution, waste management and other environmental problems. [18]

### Statistics:

- By collecting data related to environmental issues, analysing and writing research projects on improving waste management, pollution control methods and so on.

### Natural Sciences:

- Raising awareness about the resources of the earth and the environmental issues caused by the behaviour of humans, about different kinds of natural materials which can be used in daily lives and how technology can help in sustaining the future [18]

### Humanities:

- By writing research projects on the effects of human behaviour; the societal connection with environment and so on.

### IT:

- By using computer to write and publish reports; create power point presentations based on environmental issues and so on. [18]

Further research in employing teaching methods in environmental sustainability education in the general education program can be explored. In addition, the possibility of extending sustainability education to other major technical fields cannot be overlooked.

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