ORIGINAL ARTICLE

Knowledge, Attitude and Practice towards Sustainable Consumption among University Students in Egypt.

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ABSTRACT

Background: The prime principle of sustainable consumption is to enhance the quality of life without environmental degradation and securing the needs of the future generation. The world nowadays is facing unsustainable consumption. It threatens the environment and leads to depletion of resources. It is a challenge facing the sustainable development. The aim of this study is to assess knowledge, attitude and practice of the university students towards sustainable consumption and to determine the impact of socio-demographic characteristics on their practice. **Methods** Cross-sectional study included (n=403) university students completed an online questionnaire consisting of demographic variables, and items assessing sustainable consumption Knowledge, attitude and practice **Results:** Ninety eight percent of the students had high knowledge, 94% had moderate attitude and 74.7% had poor sustainable consumption behavior. Mean score was significantly higher among females, rural residents, high parents' educational level and monthly family income below5000LE (p<0.01). **Conclusions:** The students had sustainable consumption knowledge and favorable attitude yet irresponsible practice. This will be counteracting obstacle for the sustainable development. It highlights the needs for policy and decision makers for considering sustainable consumption.

Key words: Environmental degradation, Resources efficiency, Sustainable consumption.

INTRODUCTION

Sustainable development is the development that meets the needs of the present without compromising the ability of future generations. In September 2015 the United Nations General Assembly established a worldwide agenda for sustainable development until 2030. It sets 17 interlinked global Sustainable Development Goals [SDGs]. These goals were designed to be a blueprint for peace, prosperity, achieving a better and more sustainable future for all [1].

Sustainable Consumption is listed as a goal 12 under the 2030 agenda for Sustainable Development. It is about increasing the gain from economic activities, supply the basic needs, and ensuring a better quality of life. That is accompanied by efficient use of resources, reduction of utilization of toxic materials as well as emissions of waste and pollutants. It points to environmental sustainability [2].

Environmental sustainability is threatened and availability of the resources for the future generation has become a challenging issue [3]. The current growing industrialization with the production of non-environmental friendly products, rising energy use, and the irrational population consumption pattern are prime concerns for environmental degradation and depletion of resources [4]. This has been shown to detrimentally

affect health, quality of life, equity, and empowerment. It has reflected on economic impairment and widening the rich - poverty gap especially in limited resources developing countries [4, 5].

Egypt shows rapid population growth with increased demand, irrational consumption, and resources diminishing threat. The availability of energy is limited and its production has been declined [6]. Egypt is facing a scarcity of water resources and series of threats to water supply [7]. So, commitment and long-term efforts are crucial for the enhancement of population consumption patterns and behavior. This has led to the development of conservation behavior initiatives. They were public policy initiatives, entrepreneur and startup solutions, and efforts encouraging urban and rural citizens for efficient use of resources and improve consumption behavior [8].

It is highly important to understand the needs and drivers of sustainable consumption behavior. That will support policymakers and program planners to perform cost-effective tailored interventions. It can aid marketers to formulate market strategies and enhance the production of energy-efficient products. This will be reflected in improving the quality of life, decreasing environmental burden, promoting resource efficiency, and guaranteeing future needs [9].

The literature reflects fragmented results in explaining sustainable consumption behavior and its drives. Most of the previous studies addressed sustainable purchases rather than conservation behaviors. Few studies were conducted in Egypt investigated mainly sustainable purchase-behaviors [10]. Studies on environmental conservation were done in a qualitative, non-conclusive manner. It did not provide generalizable findings [11, 12].

The current study objectives were measuring the knowledge, attitude, and practice of the university students towards sustainable consumption and to determine the impact of sociodemographic characteristics on their practice.

METHODS

This study was conducted in a governmental university in Cairo, Egypt. The university included 20 faculties and a total of approximately 270000 undergraduate students.

The study was a cross-sectional non-probabilistic study, web-based survey using convenient sampling method. The study took nine months starting from April till December 2020.

The survey included questions on socio-demographic characteristics of the students. They were asked to self-report age, gender, academic year, parents' education level, parents' employment, residence, and monthly income on average.

The questionnaire used in the study was adapted from valid and reliable questionnaires used in previous studies [13]. There were a total of 12 items measuring students' knowledge of sustainable consumption, the answers were in the form of yes or no. The items were arranged where every three items represent one of the four constituents of sustainable consumption, namely improving quality of life, ensuring environmental protection, efficient resource utilization, and meeting the needs of the future generation.

The questionnaire included 7 items for measuring sustainable consumption attitude. The responses were in the form of five-point Likert scale answers ranging from 5 "strongly agree" to 1" strongly disagree. Negative items were included in this section to determine how far the students will give agreement to them, also to verify their sincerity in answering the questions. The scores have been reversed accordingly during data entry.

Twenty-six items were measuring sustainable consumption and conservation practice. It included items related to the students' decisions in goods consumptions and services, for example, dealing with waste products and in compromising conservation practices in making purchases and in daily routines. The responses were in the form of always, sometimes, seldom, and never.

The Cronbach's alpha calculated for all items were 0.72, 0.825, and 0.812 for Knowledge, Attitude, and Practice of sustainable consumptions items respectively. This confirms that the items are cohesive enough to represent adequately a single concept.

The questionnaire was translated into Arabic language and retranslated into English to ensure validity. The survey link was distributed by different mechanisms aiming to widely reach the students. It was sent via emails to 49654 students through the students' affairs office and youth care office at the university. The email invited students to participate in the study. The survey link was posted on different selected university students' Facebook groups and different undergraduate students' classes.

The sample size was calculated as 384 students based on the Raosoft sample size calculator of an online survey [14], with a 5% margin of error, 95% confidence level, and 50 % response distribution. An additional 5% of the sample size was added reaching 420 students to balance incomplete questionnaires. All completed questionnaires (403) were included in the data analysis.

The online survey was open for 4 months until the sample size was completed. Prior to the implementation, pilot testing of the survey was done

with a sample of 20 students. The pilot testing aimed to determine the readability and relevance of the questions to the college population check the clarity of the questions, estimate the time needed to be completed, detect any difficulty as well as the effectiveness of the survey delivery method. The results of the pilot test were only used for further development of the questionnaires as regards the simplicity and clarity and were not included in the results. Feedback from public health experts was taken into consideration regarding the validity of the adaptation of the survey questions.

A total score was calculated for each participant. The percent score of satisfaction was calculated as following equation: (Total score X100 / Maximum possible score). The total score for Knowledge attitude and practice were 12, 35 and104 points respectively.

The total students' percent score of Knowledge, attitude, and practice were categorized as poor for scores less than 60%, moderate for scores between 60% to 80% and high for scores more than 80% to 100% [13]. The scoring systems of Knowledge, attitude and practice in number is illustrated in **table 1**

The study was approved by the ethical committee of the faculty of medicine at, Cairo University. The survey contained information about the purpose of the research, time taken for completion of the survey which was around 20 minutes, and a statement that the agreement is voluntary. Responses were both anonymous and confidential.

STATISTICAL ANALYSIS

Data were analyzed using the SPSS for Windows software package, version 22.0 (SPSS Inc., Chicago, IL, USA). It was described by percentage and mean± SD. The correlation between continuous variables was measured with the Pearson correlation coefficient. The differences between the two values of continuous variables in two groups were examined using an independent sample t-test and analysis of variance ANOVA in more than one group.   The reliabilities of   the   variables were checked against   Nunnally's   recommended standards [Cronbach's alpha ≥ 0.70] to make sure that they are reliable indicators of the constructs **[15].** The level of statistical significance for all the tests carried out within the study was defined as $p \leq 0.05$.

RESULTS

The mean age of the students was 22.3±5.67. Out of 403 students More than half (56.8%) were males. Most of the students, (66.5%) were urban residents. Parents' education showed that fathers who had university degrees or further studies were (74.4%) and that was higher than mothers where (41.7%) of them were university graduates or had higher

education. Most of the students (60%) their monthly family income was above 5000LE. Socio-demographic characteristics are illustrated in **Table 2**

Table 3 represents the frequencies and percentages of sustainable consumption knowledge. The mean knowledge score was 11.5 ± 1.7. It was shown that almost all of the students had high knowledge. All of them answered correctly 2 items representing the quality of life and only 8 students didn't know that access to natural resources [e.g. fossil fuels, natural vegetation, water, minerals] is an essential aspect of quality of life. Regarding environmental protection, all of them gave correct answers for the need to protect water resources from pollution. From the items of meeting the future needs, all the students knew that uncontrolled use of the natural resources will reduce their availability for the future generation. As for resource efficiency, (98.3%) gave the correct answer to the item that energy-efficient products are one of the innovative ways to ensure minimal resource utilization.

When the students were asked about their sources of environmental knowledge, it was shown that social media and web sites were the most common source that was reported by (72%.) Other sources as television, friends, and journals made a minimal contribution (17%, 9 % and 2%) respectively (**Figure 1**).

As shown in **Table 4** all the students in general, showed a favorable attitude towards sustainable consumption. The mean attitude score was 19.5±2.2. Nearly all of them (98.3%) gave a high-level attitude and were ready to reuse plastics, bottles, and paper. The majority (94 %) were highly concerned with the care of environmental quality. Only a minority (21.6%) agreed that it is inconvenient to bring reusable bags.

Table 5 shows the frequencies and percentage of sustainable consumption practices according to the items representing the quality of life, environmental protection, meeting future needs, and resource efficiency**.** The mean practice score was 63.1±7.2. The highest item practiced was purchasing energy-saving appliances as it was practiced by (75%) of the students. The majority (92.3%) didn't attend seminars, workshops, conferences, or exhibitions concerning the environment and (90.1%) never participated in environmental activities. Regarding water conservation, more than one-third (37.5%) never close the tap while brushing their teeth, and nearly half 49.4% never lock faucets from the sink or shower when using soap. Only a minority (15.4 %) responsibly dispose waste. Most of the students (62%) never turn off fans or lights in empty rooms. As shown in **table 6** nearly all the students 98% fall into the high knowledge category. The largest

percentage of students (94%) falls in the moderate attitude category. Meanwhile the majority of the students (74.7%) fall in the poor practice category. There were identified significant weak positive correlations between practice score with knowledge score [r=0.327] and attitude [r= 0.294] score p <0.01 as shown in **table 7**

Table 8 shows that there were statistically significant differences in practice scores between students according to the socio-demographic characteristics. The mean knowledge score was significantly higher among females, rural residents, students' whose father and mother had high educational levels, whose monthly family income below 5000L and students in practical faculties.

Table1: Scoring system for knowledge attitude and practice

	Knowledge	Attitude	Practice
Poor	≤4.2	≤21	≤62.3
Moderate	>4.2 to<5.6	>21 to <28.03	>62.3 to <83.3
High	≥5.6	≥28.035	≥83.3

Table 2: Socio-demographic characteristics of the studied university students (n=403)

Demographic characteristics		NO	%
Gender	Male	229	56.8
	Female	174	43.2
Residence	Urban	268	66.5
	Rural	135	33.5
Father education	High education	300	74.4
	Moderate or low education	103	25.6
Mother education	High education	168	41.7
	Moderate or low education	235	58.3
Monthly family income	More than 5000 LE	242	60.0
	Below 5000 LE	161	40.0
Type of faculty	Practical	192	47.6
	Theoretical	211	52.4

Table 3: Frequency distribution of the studied university students regarding knowledge of sustainable consumption (n=403)

Item	True		False	
	No	**%**	**No**	**%**
1-The quality of local environment has a direct impact on human health	403	100	0	0.0
2-Access to natural resources (e.g. fossil fuels, natural vegetation, water, minerals) is an essential aspect of quality of life	395	98.0	8	2.0
3-Ecosystem services (e.g. air purification, flood regulation, water cycle) are highly affected by human practice	403	100	0	0.0
4-We need to safeguard water resources from pollution	403	100	0	0.0
5-The use of plastic is being reduced as they are harmful to the environment	336	83.4	67	16.6
6-The 3Rs (recycling, reusing and reducing) can significantly reduce waste generation	389	96.5	14	3.5
7-Natural resources (e.g. fossil fuels, natural vegetation, water, minerals) of the Earth are limited	373	92.6	30	7.4
8-Natural resources (e.g. fossil fuels, natural vegetation, water, minerals) should be preserved for the future generation	389	96.5	14	3.5
9-The uncontrolled use of non-renewable resources now reduces the stock available in the future	403	100	0	0.0

Item	True		False	
	No	%	No	%
10-There is a pressing concern to look into renewable resources as natural resources are depleting	351	87.1	52	12.9
11-Energy efficient products are among the innovative ways to ensure minimal resource utilization	396	98.3	7	1.7
12-Carrying out the 3Rs are one of the ways to cut down our resource utilization	380	94.3	23	5.7

Table 4: Frequency distribution of the studied university students regarding attitude towards sustainable consumption (n=403)

Items	Strongly agree and agree		Not Sure		Strongly disagree and disagree	
	NO	%	NO	%	NO	%
1-I am ready to reuse items such as plastics, bottles and paper	396	98.3	0	0.0	7	1.7
2-Recycling is difficult to do	210	52.13	16	4.0	193	47.9
3-The use of renewable energy sources should be increased	214	53.0	32.2	8.0	157	39.0
4-I am willing to be involved in any programs to look after the environment	242	60.1	8	2.0	153	38.0
5-Bringing reusable bags is inconvenient	87	21.6	0	0.0	316	78.4
6-I favor environmental friendly products (e.g. products made from recycled materials)	349	86.6	0	0.0	54	13.4
7-I care for our environmental quality as nature provides our basic needs (e.g. water, clean air, land, forests)	379	94.0	0	0.0	24	6.0

*Negative items and scores have been reversed.

Table (5): Frequency distribution of the studied university students regarding their practice of sustainable consumption (n=403)

Item	Always		Some times		Seldom		Never	
	No	%	No	%	No	%	No	%
1-I bring my own water tumbler to class	11	2.7	36	8.9	234	58.0	122	30.3
2-I find bringing my own grocery bag when shopping inconvenient	200	50.0	171	42.0	26	6.5	6	1.5
3-I reuse grocery bags	47	12.0	39	9.7	141	35.0	176	43.7
4-When buying I look for items with less packaging	3	0.7	9	2.2	65	16.0	326	80.9
5-I prefer to have food bought wrapped in paper than in polystyrene	25	6.2	76	19.0	95	24.0	207	51.4
6-I reuse gift wrappers for rewrapping or other uses	10	2.5	28	6.9	183	45.0	182	45.2
7-I donate my unused items	11	2.7	37	9.2	239	59.0	116	28.8
8-I throw rubbish according to types in the designated recycle bins whenever I can	31	7.7	31	7.7	179	44.0	162	40.2
9-I purchase energy-savings appliances whenever possible	168	42.0	133	33.0	61	15.0	41	10.2
10-I turn off the tap whenever I brush the teeth	40	9.9	119	30.0	93	23.0	151	37.5
11-I lock faucets from the sink or shower when I am using soap.	4	1.0	26	6.5	174	43.0	199	49.4

12-I buy refillable detergents or soaps and refill the bottles when empty	33	8.2	31	7.7	173	43.0	166	41.2
13-I turn off fans & lights in empty rooms whenever I see them switched on	49	12.0	45	11.0	59	15.0	250	62.0
14-I put off devices like television and computer when I'm not using them.	71	18.0	74	18.0	111	28.0	147	36.5
15-I do not mind paying high price for a good as long as it last long	15	3.7	50	12.0	149	37.0	189	46.9
16-I keep potted plants in my household	54	13.0	23	5.7	99	25.0	227	56.3
17-I attend seminars, workshops, conferences or exhibitions concerning the environment	12	3.0	4	1.0	15	3.7	372	92.3
18-I participate in environmental activities organized by institutions or organizations	15	3.7	5	1.2	20	5.0	363	90.1
19-I use less polluting modes of transport (e.g. public transportation)	77	19.0	39	9.7	101	25.0	186	46.2
20-I make decisions more consciously in effort to avoid over consumption	8	2.0	49	12.0	24	6.0	322	79.9
21-I advise others (i.e. family, friends) to reduce consumption of resources (e.g. water, electricity)	8	2.0	40	9.9	93	23.0	262	65.0
22-I try to avoid printing whenever I can	5	1.2	30	7.4	192	48.0	176	43.7
23-I make use of both sides of papers when writing or printing whenever possible	149	37.0	188	47.0	50	12.0	16	4.0
24-I try to fix things instead of throwing them away.	9	2.2	42	10.0	74	18.0	278	69.0
25-I'm looking for ways to reuse objects.	23	5.7	39	9.7	98	24.0	243	60.3
26-I utilize things they can be used another time	8	2.0	21	5.2	128	32.0	246	61.0

Table 6 : Frequency distribution of the studied university students regarding Levels of Knowledge, attitude and practice towards sustainable consumption (n=403)

Level	Knowledge		Attitude		Practice	
	No.	%	No.	%	No.	%
Poor	0	0.0	8	2.0	301	74.7
Moderate	7	1.7	379	94.0	79	19.6
High	396	98.3	16	4.0	23	5.7

Table 7: Correlation between practice with knowledge and attitude of the studied university students (n=403)

		Knowledge	Attitude
Practice	r	0.327	0.294
	P value	<0.01	<0.01

Table 8: The relation between mean practice score and socio-demographic characteristics of the studied university students (n=403)

Socio-demographic characteristics		Mean practice score	SD	P value*
Gender	Male	62.1	7.36	<0.01
	Female	74.4	6.4	
Residence	Urban	69.8	7.5	<0.01
	Rural	79.6	7.8	
	High education	82.9	5.4	<0.01

Socio-demographic characteristics		Mean practice score	SD	P value*
Father education	Moderate or low education	66.3	6.1	
Mother education	High education	79.1	6.7	<0.01
	Moderate or low education	71.1	8.2	
Family income	More than 5000 LE	63.3	8.5	<0.01
	Below 5000 LE	74.1	8.9	
Type of faculty	Practical	76.8	8.3	<0.01
	Theoretical	64.2	7.6	

* Independent sample t-test.
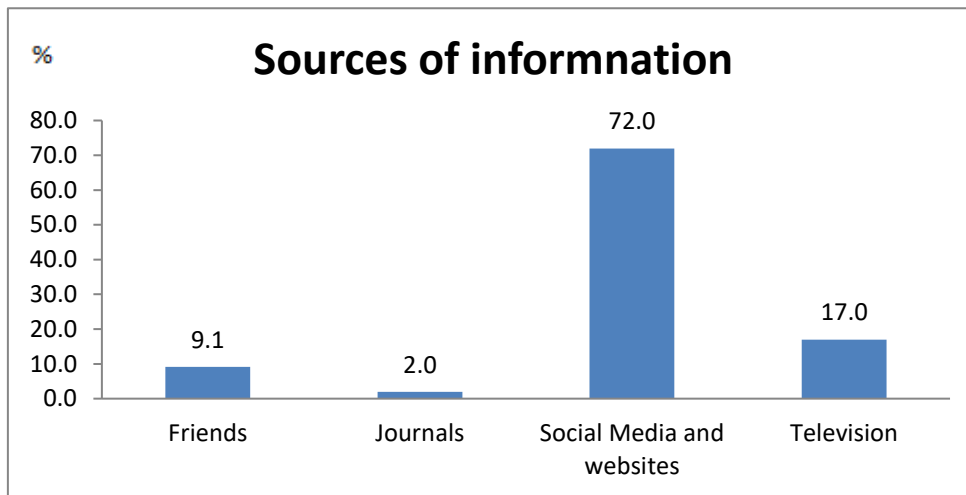
Figure 1: Frequency distribution of the studied university students regarding sources of knowledge of sustainable consumption.

DISCUSSION

The unsustainable consumption which the world is facing nowadays is considered a crucial challenge for sustainable development. It leads to exhaustion of resources, environmental pollution, and changes in the climate. The fundamental principle of sustainable consumption is to enhance the quality of life without environmental degradation by securing the needs of the future generation [4].

This study examines knowledge attitude and practices toward sustainable consumption among Cairo university students. It was depicted that students had high knowledge. The majority gave correct answers for the Sustainable consumption items representing the quality of life, ensuring environmental protection, efficient resource utilization, and meeting the needs of the future generation. The students were asked to report their source of getting environmental information; it was shown that social media and websites were their primary sources. Similarly, a study done in Malaysia found that social media was the primary source of environmental information among the quarter of the participated students [16]. This points to the important role of the internet among millennials. It is one of the leading platforms for

spreading information to the public [17]. This may reflect the high level of knowledge among the students as a result of easy access to the internet including through their phones [16].

It was found that the students had a favorable attitude towards sustainable consumption. They were concerned with the environmental quality and had an intention for saving the environment. These findings support other studies that depicted that environmental knowledge is certainly accompanied by approving attitude and they are highly connected [18, 19]. The majority of the students are willing to reuse bottles, plastics paper and also bring reusable bags. That favorable attitude can prevent an increase in the usage of plastics which harms the environment. That contradicts a study done in Malaysia that found that more than half of the students had an unfavorable attitude to bring reusable bags. **Asmuni and his colleagues** [20] found that 71.3% of the consumers do not bring their bags to the stores. Moreover, **Nor Azizah and Zanaton** [21] found that the level of students' readiness to engage in solving environmental issues was low. Meanwhile, it was observed in the study that more than half of the students agreed that Recycling is difficult to do.

That may be related to inconvenient recycling services and bins this can be overcome by their provision at convenient locations as suggested by **Moh and manaf** [22].

Despite the students had high knowledge, and had a favorable attitude towards sustainable consumption that unfortunately wasn't reflected in their practice. The students showed irresponsible behavior toward the environment. They had no water conservation practices which can lead to the waste of an immense amount of water. Their choice for the purchased items can increase waste generation. Most of them didn't through waste in an appropriate manner and had limited energy conservation behavior. Similarly, it was found in another study that students' high level of sustainable consumption knowledge and attitude were not translated into practice and that may be related to the social status of the family [23]. Other studies depicted unsatisfactory and poor environmental conservative behavior among the students despite their knowledge and favorable attitude [24- 26]

The study showed a positive significant correlation between practice with knowledge and attitude similar to the study findings **of Azizi and his colleagues** [27]. Another study found a positive correlation between environmental knowledge and environmental behavior levels (r=0.526).

The current study has shown a significant difference in sustainable consumption practice when it comes to socio-demographic characteristics. Female students had a higher mean percent practice score compared to males. Similarly, other studies showed that there is a significant difference in sustainability practices based on gender [28-30]. Women were more sensitive to the environment and had a better attitude compared with men. As a result of the natural consciousness existing in women, they tend to perform more energy conservation practices than men [31]. On the contrary, other studies didn't find any difference in the conservation behavior between male and female students. That related to the natural feelings that formulate the favorable behavior among them [32].

Regarding residence, the mean score was significantly higher among rural resident students, which was similar to the study of **Asmuni et al.** [16] who found that students from rural areas had more energy conservation, water conservation and some waste recycling practice than urban residents. **Hori and his colleagues** [33] reported that rural residents had significantly higher sustainable consumption behavior and more likely to remain settled with their traditional lifestyle than urban residents. On the contrary, other studies found that urban residents were more concerned about the environment; they make more sustainable purchases, and have lower energy utilization levels than rural residents [34-36].

Another socio-demographic characteristic is the educational level of the students' parents. Education affects knowledge, orientation, perception, preferences of items, and purchasing decisions. It was shown in the present study that parents' educational level can positively impact the consumption practice of their children. The mean sustainable consumption practice score was higher among the students whose father and mother had high educational levels or had post-graduate studies. That was similar to the findings **Asmuni and his colleagues** [16] who showed that parents' educational level significantly affects students' conservation practice by using designated recycle bins, buying less packaging products, and purchasing energy-saving appliances. Another study reported that the parents' level of education, especially the mothers, affected the environmental sensitivity and behaviors of students positively. Students whose mothers were university graduates had a more environmentally friendly conservative attitude and practice when compared to students whose mothers were primary school graduates [37].

Concerning family income, it was shown in the study that the mean practice score was significantly higher among students whose monthly family income was below 5000LE. This may be explained that as a result of the increase in the prices; the lower-income level consumers seemed to engage in conservation behaviors rather than careless consumption [6]. Other studies found a linear relationship between income and environmental concerns and there were inconsistent findings from other studies that are far from being conclusive. They have found income to be negatively, positively, or insignificantly related [38, 39].

Since the sustainability of the environment is now a mainstream concern the university not only form competent professionals, but also transverse competences that impact change in the consumption and production practices. Faculties have a crucial importance in changing mentalities, enhance students' empowerment, and place more responsibility on the students. It was found in the present study that students in practical faculties had significantly higher mean practice score than the students in theoretical faculties. That may be related to their practical life and analytical thinking [40].

CONCLUSION

Findings from the current study provide insights about of the sustainable consumption performance

of the university students. It is concluded that the students had sustainable consumption knowledge and favorable attitude yet irresponsible practice. That will lead to degradation of resources, environmental pollutions and climate change. This will be counteracting obstacle for the sustainable development and highly needed to be addressed. The study highlights the need for cost-effective national interventions, programs environmental awareness campaigns, competitions, recycling events, workshops and conferences. We have to find ways to increase practices not increasing knowledge

The advantage of social media and websites as a primary source of information can be taken as a channel for transmission of environmental motivational practice messages, for example conservation of resources, recycling, water and energy conservation, and utilization of environmentally friendly products. It is recommended to integrate the sustainable consumption in the curriculum of primary school years that will help in incorporating the practice in their daily living and become permanent habits. Adding green section in the school newsletter and newspaper where the students are encouraged to put their waste reduction suggestions, lower energy use, sustainable practices, and share their success. Targeting parents and teaching staff with training on sustainable consumption practice. Set legalizations that support sustainability consumption. Ensure the market availability of sustainability products to make sound easy choices.

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