



Green Business via Green and Clean Technology- An awareness among 1 degree Business and Commerce students of Selected Bangalore City Colleges

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Abstract: In recent years Environmental and Energy conservation issues has shifted the social and economic consciousness of the Business Community. Green Marketing and Green Business Via Clean And Green Technology awareness is essential for undergraduate students to know the Concept of Green Business, Clean Technology and the need in the present Global Scenario.

The Business and Commerce under graduate students have to study Environmental Sciences (EVS) as one of the subjects in their Degree Course. In the present Study the Awareness about Green Business, Green Marketing and Clean technology was monitored through a Questionnaire. The results were Statically Analyzed by Chi Square method and two Hypotheses were tested.

Key Words: Green Business, Green Marketing, Green Business Management BMP, Green Products, Green House Gases GHGs, Environmental Awareness, Climate Change, Inter-Governmental Panel on Climate Change (IPCC), Renewable Technologies, Green and Clean Technology, Environmental Sciences EVS

Introduction:

Increasing concern exists today about the preservation of our Ecological system. In the recent years Environmental and Energy conservation issues have taken Central theme in Global Business arena. Hence, the Business community is now in search of Eco-friendly Business Model. The Institute for Green Business Certification IGBC enables Business

To achieve "Green Business Certification" by working collaboratively. One of the First Accrediting Organization of its kind, IGBC is the fore front of certifying Business on World Wide Scale in the United States with the Branches in Canada and in the Middle East.

In order to Implant Green Technology the ACS GCI (American Chemical Society Green Chemistry Research Institute) has launched a new initiative to reach out the Business School.

To create a Scholarly net work that links Business and Green Chemistry communication (1-2).

A key Global Challenge in the 21st Century is how to address the Climate Change and reduce Green House Gas Emission GHGs emissions. Government regulatory bodies and consumer pressure groups have aggressively lobbied for Business to adopt Green practices.

As a result, polices that focus on the protection of the Environment are being continually World Wide.

Business can assist in protecting the environment by becoming Green Business, in other words sustainable Business (3).

Green Marketing is related to all activities designed to generate and facilitate any exchange intended to satisfy human needs or wants with minimal determinable impact on the natural environment. The aim of the programme, called the clean energy Investment Initiative, is to help wealthy investors mobilize \$ 2 Billion Dollars in New Clean Technology Investment.

Pope Francis in his recent visit to USA has appealed the people to help the poor to combat the Climate Change. Much before the Clubs of Rome, Gandhi Ji had issued a similar warning ; that Nature can meet all the needs of Humanity but it cannot satisfy its Greed .In his daily life he embodied India's civilization message of "Simple living and high thinking "It is with this Philosophy that the Government should adopt and promote if we were to tackle the Climate change Challenge starting with Paris in Second week of Dec.2015.For example we should stop promoting private Vehicles for transportation and adopt Public transportation..Can India adopt such a radically different Strategy and be a shining Model to avoid Climate Change Catastrophe (4)

Despite the growing number of well heeled Clean –Tech investors making a dent in Climate Change remains a steep Challenge. Some of the big Clean Technology guns are Tom Styler, John Grantham, Andre Heinz, Nat Simons and Bill Gates. Andre Heinz is cofounder and Investment Director for Sustainability Technology funds. Andre has focused heavily on Clean Technology investing since 2004 and is a Founder of Sustainable Technologies Management Ltd (STM) which in turn manages the Sustainable Technologies Fund. The Fund primarily works on Nordic Countries investing in renewable Energy Sources, Energy Efficiency and Sustainable Materials.

Recently few months back it was reported that Bill Gates has announced that he will invest \$ 2 Billion Dollars in Renewable Technologies initiatives, but rejected calls to divest from the fossil fuel companies that are burning Carbon at a rate that ignores International agreement to limit Global warming.

According to the inter-Governmental Panel of Climate Change (IPCC), without significant reduction in GHGs emissions, the Global mean surface temperature is expected to increase to catastrophic levels of 3.7 to 4.8 °C, before the end of the Century. Under the United Nations Climate Convention, governments have agreed to stabilize warming below 2 °C, Compared to the Pre-industrial base, to avoid damage to sustained food production and Ecosystems services.

To have a reasonable Chance of limiting warming below the 2 °C, threshold, the long term atmospheric GHG concentration should not exceed the range of 450 to 500 parts per million (ppm).However, towards the end of 2014 ,the GHG concentrations in the atmosphere had already crossed 481ppm.Thus the Earth is already on the verge of this dangerous threshold and limiting GHG emissions to safe levels will be a Challenge.

In Environmental Circles all over the World ,there is much excitement ,despondency and Cynicism as the Government of 195 Countries prepare for the Paris Climate talk in Dec.2015.There is excitement because there is a great deal of Optimism that there Would be a legally binding agreement on the parts of the Governments to reduce Green House Gas (GHGs) emissions.(5) Several major countries have already submitted their Intended Nationally determined Contributions (INDCs) targets, few weeks back India also submitted its INDC.

During the first Fortnight of December this year 2015,194 countries will be converging in Paris to negotiate a new International Climate Agreement, with the aim of finding ways to limiting warming at safe levels.

A Clean Energy Project by Edinburgh University researchers have developed Clean Energy access for people in Sub-Saharan Africa and South Asian Countries including India which can avert the death of over 30 million people due to smoke –related diseases by 2030. The Project, Project Innovation System for Clean Energy Security (PISCES) has developed Clean energy access for 250,000 people across countries like India, Kenya, Sri Lanka and Tanzania.

“Projects like PISCES allow us to translate our research into Impact around the World” said Professor James Smith, the University’s Vice-Principal International (6)

The Field of “Green Technology” incompesously evolving group of methods and materials, from technologies for generating energy to non-toxic Cleaner products.

Green Marketing assumes even more importance and relevance in developing Countries like India. The need for Green Marketing in India and its emerging Opportunities and Challenges has been reported(7). Green Computing is considered as a Gate Way to Green Business (8). Green Cloud Computing and Environmental Sustainability has been reported by Melbourne.

University of Australia (9).

A study of Green Marketing and its relationship to Purchase decision has been reported from King Abdul Aziz University, Saudi Arabia (10). The University Malaysia, Sabah has carried out an investigation of Green Awareness effects on consumers’ purchasing decision and reported some Insights(11).

Materials and Method:

To assess the awareness in Green Business for sustainable growth. Few good colleges of Bangalore with good Grades from NAAC (National Assessment & Accreditation Committee) were selected under the following categories:

- (1) Deemed Universities. (2) Autonomous Colleges (3) Private Aided Colleges
- (4) Private Unaided Colleges (5) Government Colleges

Table-1 Sample size –No of Students under different Categories

SL No	Name of the category	Name of the Institution	NO of Students	Total No of Students
1	Deem University	Jain University	52	745
2	Deem University	Dyananda Sagar	21	
3	Deem University	Christ University	51	
4	Autonomous	NMKRV College	57	
5	Autonomous	National College	55	
6	Autonomous	Mount Carmel	67	
7	Autonomous	St.Joesph’s College	71	
8	Pvt.Aided	Vijaya College	60	
9	Pvt.Unaided	BHS College	50	
10	Pvt.Unaided	Surana College	76	
11	Pvt.Unaided	VET College	53	
12	Pvt.Unaided	Baldwin’s College	64	
13	Government	Maha rani’s College	20	
14	Government	Govt.Arts College	48	

In order to obtain full and relevant information from the students from the above mentioned Institutions a Questionnaire was prepared by the investigator. The Questionnaire consisted of 35 questions and being a multiple choice had four answers for each question. The students were provided with OMR sheets to circle their correct answers. Before giving the Questionnaire to the students, a brief presentation about Green Business and Clean Technology for sustainability was made by the Investigator to explain the basic principles of Green Business the students. The Questionnaire was designed in such a way that it covered all the fundamentals and Basic Questions needed for the awareness of Green Business and marketing via clean a technology.

Sample Size: The sample consisted of the students from different categories as mentioned above. The number of students in each category is shown in Table -1.

The above table shows that a total number of Seven hundred and forty five(745) students answered the Questionnaire.

Experimental Investigations

The Green Business awareness results obtained from the students of various Institutions were assessed Depending upon the number of correct answers from the OMR answer sheets of students. These results are shown in Table-2.

Table-2 Awareness Levels among Students

Well Aware	Fairly Aware	Partly Aware	Poorly Aware
38	165	465	177

Well aware level: Students who obtained percentage between 100-80% by getting 35-28 correct answers from the questionnaire.

2. Fairly aware level: Students who obtained percentage between 77-60% by getting 27-21 correct answers correct from the questionnaire

3. Partly aware level: Students who obtained percentage between 57-33% by getting 20-12 correct answers from the questionnaire

4. Poorly aware level : Students who obtained percentage between 31-20% by getting 11-7 correct answers from the questionnaire.

The percentage of each level of awareness of the various institutional categories was calculated and is tabulated in Table-3 and graphically represented by FIG-1

Table-3 Percentage of awareness of the various institutional categories

Name of the Institutions	Well Aware	Fairly Aware	Partly Aware	Poorly Aware	Total Students
Jain Deemed University	19%	21%	60%	0.0%	52
Dyananda Sagar University	19%	33%	48%	0.0%	21
Christ Deemed University	8.0 %	47%	45%	0.0%	51
Autonomous NMKRV Mount Carmel,St.Joesph's	7.0%	30%	58%	5.0%	250
Pvt.Aided Vijaya College,BHS	1.0%	17%	72%	10%	110
Pvt.Unaided Surana,Baldwin,VET	3.0%	12%	66%	19%	193
Govt. Maharani's ,Govt.Arts	3.0%	10%	74%	13%	68

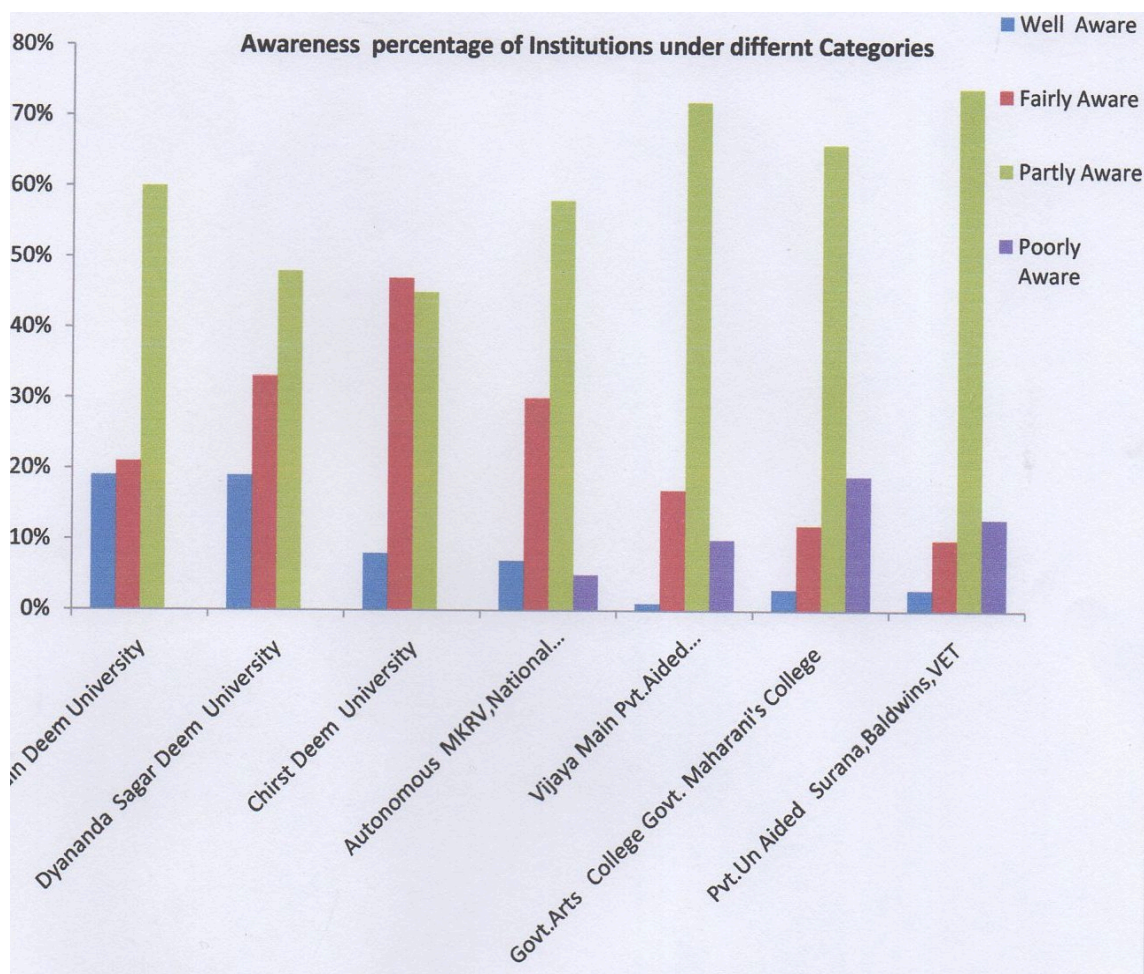


Fig-1 Graphical representation of awareness % of Institutions under different Categories.

It can be seen from Table -3 that Jain University and Dyananda Sagar University show the highest well aware percentage being 19%. Chirst Deemed University shows 8% of Well awareness level the reason being they don't have the Environmental Science course (EVS) for the whole semester as the Jain University and Dyananda Sagar University and other Institutions ,instead they conduct one Day Work Shop for EVS course. Thus the percentage 8% is good of Christ University. The Autonomous Institution show 7% of Well Aware level. The Pvt.Unaided and Govt Institutions show 3% of well aware level and Pvt.aided Institutions only 1% of Well aware level is seen.

The percentages of other Awareness levels of various categories can be seen from the Table-3.

It is observed from the Table-3 that in institutions of different categories the Percentage of

Partly Aware level is higher compared to other levels of awareness.

The graphical representation of the above mentioned results of various institutional categories can be seen from Fig-1.

Table-4 Percentage awareness of Various Institutions

SL No	Name of the Institution	WELL Aware	Fairly Aware	Partly Aware	Poorly Aware	Total Students
1	Jain Deem University	19%	21%	59%	0%	52
2	Dyananda Sagar University	19%	33%	48%	0%	21
3	Chirst University	8.0%	47%	45%	0%	51
4	NMKRV Autonomous	0.0%	16%	74%	10%	57
5	National Autonomous	9.0%	14%	75%	2.0%	55
6	Mount Carmel Autonomous	9.0%	57%	34%	0.0%	67
7	St.Joesph College Autonomous	10%	27%	53%	10%	71
8	Vijaya Main Pvt.Aided	0.0%	12%	80%	8%	60
9	BHS Pvt.Aided	2.0%	24%	64%	10%	50
10	Surana Pvt.Un Aided	8%	14%	58%	20%	76
11	VET Pvt.Un Aided	0.0%	9%	68%	23%	53
12	Baldwin Pvt.Un Aided	0.0%	11%	73%	16%	64
13	Govt.Maharani's College	10%	35%	50%	5.0%	20
14	Govt.Arts College	0.0%	0.0%	83%	17%	48

Table-4 shows clearly the percentages of different levels of awareness of various Institutions which were investigated in the present study.

The graphical representation of the above mentioned institutions results shown in Figure -2.

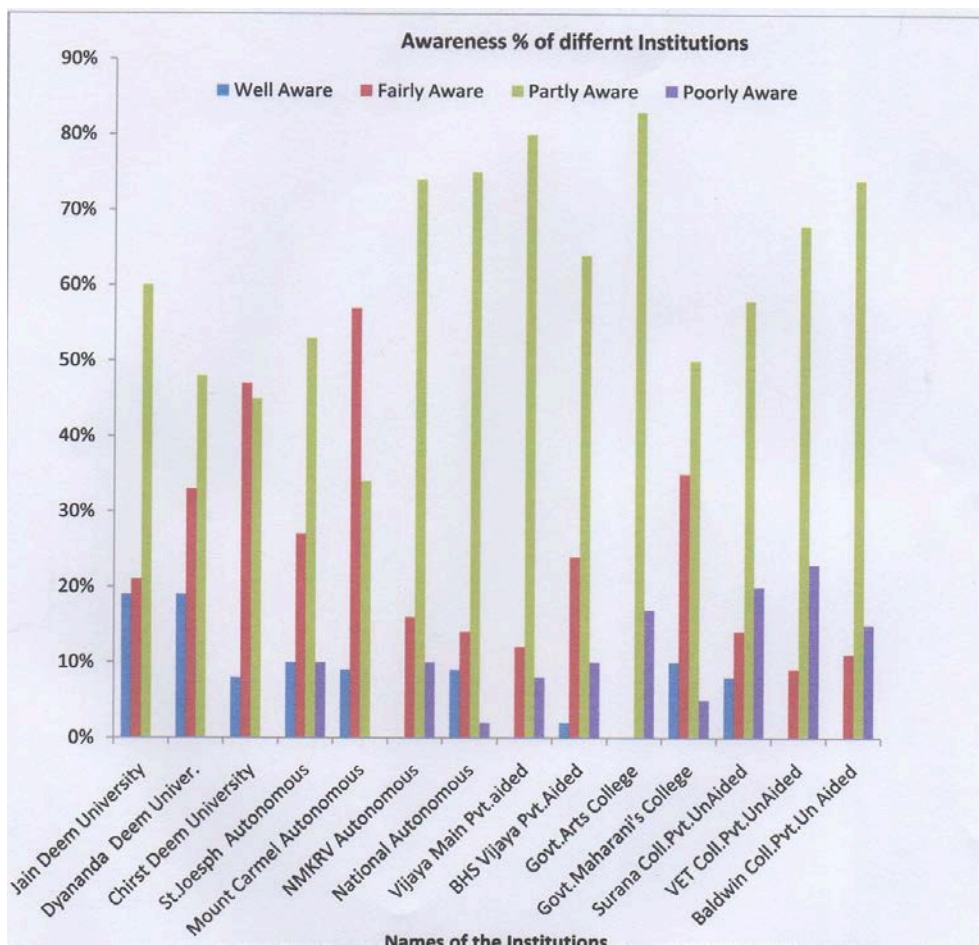


Fig-2 Awareness percentage of different Institutions

The above figure-2 clearly shows the percentages of the various levels of awareness among different Institutions studied.

The overall percentage of different awareness levels is shown in table -5 and represented graphically by Pi graph in fig-3. It can be seen that partly aware level has highest percentage.

Table-5 Over all Awareness Percentage of the total students (745)

Awareness Result	Well Aware	Fairly Aware	Partly Aware	Poorly Aware	Total no of Students
Percentage	5%	22%	63%	10%	745
No of Students	38	165	465	77	

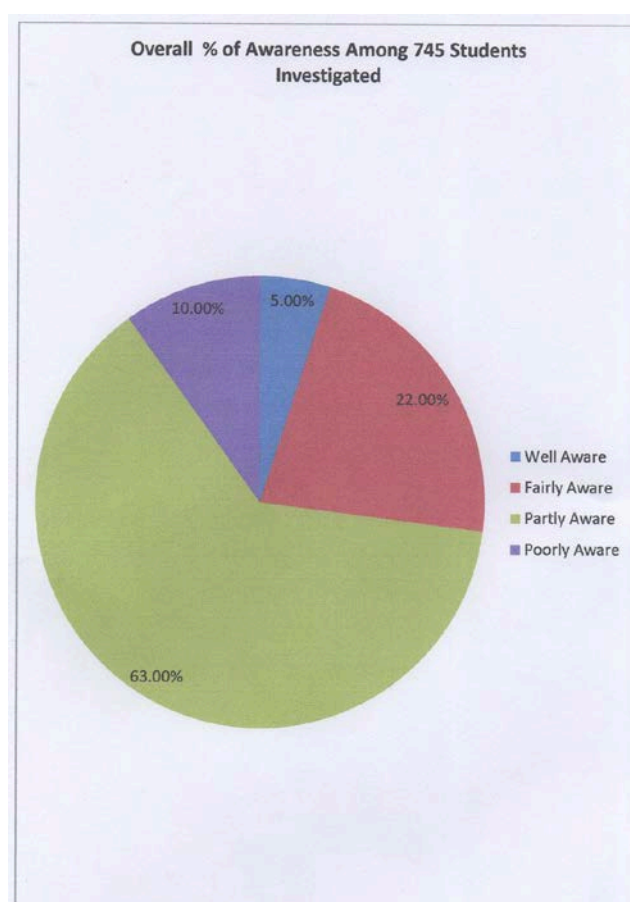


Fig-3 Overall % of Awareness among 745 Sample Students

Results and Discussions:

Statistical Computations by Chi-Square Test have been used for the results analysis

Chi-Square(X^2) measures the difference between the observed (O) and Expected (E) of the nominal variables in which subjects are grouped in categories or Cells. The Chi-Square uses the formula as Shown: $X^2 = \sum (O-E)^2/E$. Where O represents the observed frequency, the actual count in the cell. The letter E represents the Expected frequency; a theoretical count for that cell. The value must be computed. The more E differs from O, the larger the X^2 is. When X^2 exceeds the appropriate critical value, it is declared significant.

The Chi-Square Tests can be used on actual numbers and not on percentages. The results of number of Students, Female and Male of the various institutions in the present study was calculated and tabulated in Table-5 as follows:

Table-5 Number of Female (F) and Male (M) Students of various Institutions

SL NO	Name of the Institution	Well Aware	Fairly Aware	Partly Aware	Poorly Aware	No of Students
1	Jain Deemed University	F 7,M3	F 4,M7	F16,M15	F0,M0	52
2	Dyananda Sagar University	F0,M4	F1,M6	F2,M8	F0,M0	21
3	Christ Deemed University	F2,M2	F9,M15	F8,M15	F0,M0	51
4	NMKRV Autonomous	F0,M0	F9,M0	F42,M0	F6,M0	57
5	National Autonomous	F4,M1	F3,M5	F7,M34	F0,M1	55
6	Mount Autonomous	F6,M0	F38,M0	F23,M0	F0,M0	67
7	St.Joesph's Autonomous	F1,M6	F8,M11	F6,M32	F0,M7	71
8	Vijaya Main Pvt.Aided	F0,M0	F1,M6	F23,M25	F1,M4	60
9	BHS Pvt.Aided	F1,M0	F6,M6	F24,M8	F0,M5	50
10	Surana Pvt.Un Aided	F0,M6	F1,M10	F23,M21	F7,M8	76
11	VET Pvt.Un Aided	F0,M0	F5,M0	F21,M15	F3,M9	53
12	Baldwin Pvt.Un Aided	F0,M0	F2,M5	F3,M44	F1,M9	64
13	Govt.Maharani's College	F2,M0	F7,M0	F10,M0	F1,M0	20
14	Govt.Arts College	F0,M0	F0,M0	F12,M28	F1,M7	48

The above table shows the number of **female** (F) and **male** (M) students in various awareness levels of different institutions.

The data tabulated in the above **Table-5** was subjected for carrying out the **Chi-Square Test** for testing two Hypotheses.

Hypthesis -1 : There is no association between levels of awareness and type of Institutions.

Hypthesis-2: There is no significant difference in awareness levels among Female and Male students.

The computation of X^2 test statics data obtained for testing the Hypothesis -1 and Hypothesis -2 are tabulated in Table-6 and 7 respectively as follows:

Table-6 : Association of type of institution and level of awareness among 1st Degree Business and Commerce Students

Institution Type	Level of Awareness				Total No of Students
	Well Aware	Fairly Aware	Partly Aware	Poorly Aware	
Deemed University	18 (7.9)	42 (27.5)	64 (77.4)	0 (11.7)	124
Autonomous	18 (15.1)	74 (55.4)	144 (156.1)	14 (23.5)	250
Pvt.Aided	1 (6.6)	19 (24.4)	80 (68.6)	10 (10.3)	110
Pvt. Un Aided	6 (11.7)	23 (42.7)	127 (120.5)	37 (18.1)	193
Government	2 (4.1)	7 (15.1)	50 (42.4)	9 (6.4)	68
Total	45	165	465	70	745

Figures in paranthesis are expected counts/frequencies Chi-Square Tests (Table 6)

Pearson Chi-Square Value = 95.51

Asymptotic significance = 0.000*, * Significance at 5 %

Interpretation:

As observed from **table 6**, the chi-square value of 95.51 and a p-value of 0.000 ($0.000 < 0.05$) indicates that the null hypothesis of no association between the type of institution and level awareness is rejected statistically at 5% level of significance. In other words, there is evidence (statistically) that there is an association between type of institution and level of awareness. In other words, the level of awareness among students definitely depends on the kind of institution the students are enrolled.

Table-7 Independent t-test result to test awareness gender wise

Group	N	df	Mean	Mean difference	S.E	t-value	p-value
Male	60	110	6.480	0.014	1.333	0.008	0.994
Female	52		6.466		1.232		

Interpretation:

It is observed from the above t-test output that the mean difference (0.014) between male and female students is not statistically significant ($t = -0.014$, $p=0.000 < 0.05$). In other words, there is no significant difference on awareness between male and female irrespective of type of institutions.

Conclusions

1. The results of Green Business, Green Marketing, Clean and Green Technology awareness levels among first year degree Business and Commerce Students indicate that the awareness depends on the type of Institution. Thus the students of the Deemed Jain and Dyananda Sagar show highest Well Aware level percentage of 19%.The overall awareness results reveal highest percentage of 63% in Partly Aware level. Chirst deemed University shows 8% in well aware level as they conduct only one day work shop for Environmental Science (EVS) subject and not a regular semester course.
2. The Female student's awareness is same as Male students, irrespective of the type of the Institution.
3. The Students should be motivated to learn the Basic concepts of Clean and Green Technology compulsorily in their Environmental Science (EVS) course as it will improve their knowledge Green Business and marketing .Green marketing is not limited to terms such as Ozone-Friendly Environmental friendly and recyclable products but is a much wider marketing activity that is applied to consumer goods, industrial goods and even to Service. Recycling of paper, metals plastics etc. in a safe and environmentally harmless manner should become much more Systemized and Universal. Green marketing is a tool for protecting the Environment for the future generation .Now this is the right time to select Green marketing Globally.
4. The Nature, the Human Society and the Poor in particular are destined to face the dangerous consequences of Climate Change, unless un-expected deep emission reduction that is Green House Gas emissions(GHGs emissions)are agreed during Nov-Dec. 2015 **United Nations Conference on Climate Change in Paris**.

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