

CHAPTER: 4

RESULTS AND DISCUSSION

This empirical research is aiming at designing online course for undergraduate students of Family and Community Sciences / Home Science. Present investigation is an experimental study that piloted with first year Family and Community Sciences/ Home Science students for investigating effectiveness of designed online course. Gain in knowledge is measured to strengthen the study along with administering reaction scale to investigate students' reaction for designed online course, its unique features, different aspects and if any problems faced. This section describes findings and discusses these findings in depth with available literatures. The overview of descriptive findings emerged after applying statistical analysis has been categorized mainly in four sections and several sub-sections.

4.1. Demographic Profile

4.1.1 Demographic Profile

4.1.2 Variablewise details of students according to their Usage of Computer and Internet, Exposure of ICT and Budget spent Internet

4.2 Effectiveness of designed online course in terms of gain in knowledge of experimental group

4.2.1 Overall Effectiveness of designed online course in terms of gain in knowledge of experimental group

4.2.2 Effectiveness of designed online course in terms of gain in knowledge of the students of experimental group in relation to selected variables

4.3 Reactions of the students from the experimental group about the designed online course

4.3.1. Reactions towards the unique features of designed online course, helped students learn better from online course

4.3.2 Reaction towards different aspects of the designed online course

4.3.3 Reactions towards the problems faced while learning through the designed online course

4.3.4 Suggestions of the students of experimental group to make designed online course more effective

4.1 Section: 1 A. Demographic Profile

- All the students belonged to the Age of 17-18 years

- All 95 students belonged to Group D.

Table: 22 Percentage Distribution of the Demographic Profile of the Students

Variable	Categorization	f	%
Educational Level of Mother of the students	Higher level Education	34	35.8
	Moderate level	29	30.5
	Lower level	32	33.7
Educational Level of Father of the students	Higher level	51	53.7
	Moderate Level	27	28.4
	Lower level	17	17.9
Type of Family	Nuclear	74	77.9
	Joint	21	22.1
Family Monthly Income	More Than 70,000/-High)	33	34.7
	5000 to 30,000 INR(Low)	32	33.7
	30,001/- to 70,000/- (Middle)	30	31.6
Stream of Study	General	58	61.05
	Science	37	38.94
Educational Board of Study in School	Gujarat Secondary Education Board	87	91.6
	Central Board of Secondary Education.	8	8.4

The above table reveals that a little more than one forth (30.5%) students' mother had moderate level of education, whereas approximately thirty six (35.8%) percentage had higher level of education, followed by approximately thirty four percentage (33.7%) had lower level of education. Whereas, little more than half (53.7%), of students' fathers had higher level education, 28.4% of students' father had moderate level of education and 17.9 % of students had low level of education.

Majority of the students (77.9%) belonged to nuclear family and rest of the students (22.1%) belonged to joint family. Looking at family income revealed all most equal number of students belonged to lower and higher income group whereas approximately thirty two percentage (31.6%) of students belonged to middle income group. Majority (61.05 %) of the students had general stream in their higher secondary examination or equivalent examination, whereas rest

(38.94%) of students had science stream in their higher secondary examination or equivalent examination.

One of the interesting finding of this experimental study is most of the (98%) students studied from Gujarat Secondary Education Board and very few (8%) studied from Central Board of Secondary Education. Another important finding of this study is almost half 46.3 percent students had Vernacular medium of instructions whereas 53.7 percent had English as a medium of instruction in school. With the diversity of languages and a multitude of problems, the medium of instruction remains a topic of impassioned debate. Having an education system which is riddled with inequities, language can be an obstacle that comes in the way of learning. Although most educationists agree that it's best to teach in the student's mother tongue, but the issue is a complex and emotive one, given the diverse number of languages and dialects in the country. Today, English is considered to be the passport to social mobility as identity, nationhood and power are loosely linked to it and it has also become the preferred language of instruction among every educationist and parent.

The complexity of this issue is addressed by a paper on multilingual education brought out by UNESCO in 2003, which looks at the "contrasting and deeply felt positions" that the choice of language of instruction evokes in people. The document says that political changes have led to new language policies in post-colonial countries; many languages have disappeared while others are endangered; the Internet has "dramatically affected" the way in which languages are used for communication and learning; and globalization "increasingly challenges the continued existence of small, local identities frequently based on language". The paper supports multilingual education, and points to a resolution adopted by UNESCO in 1999, which says that the "specific needs of particular, culturally and linguistically distinct communities can be addressed better by multilingual education". However can this resolution be applied for e-learning too as it has students from linguistically distinct communities?

Figure: 28 Percentage Distribution of the Students according their Mother's Educational Level

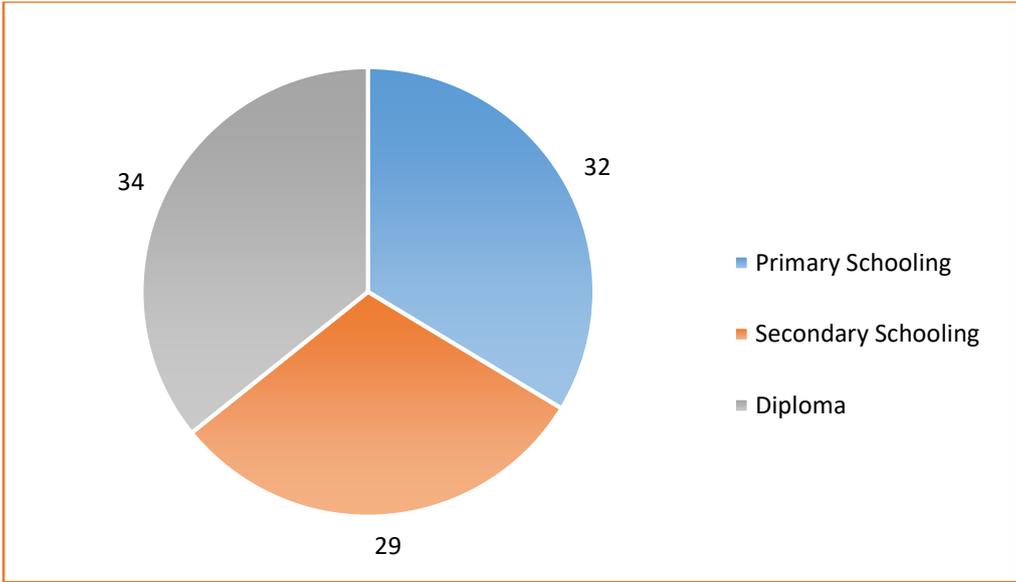


Figure: 29 Percentage Distribution of the Students according their Father's Educational Level

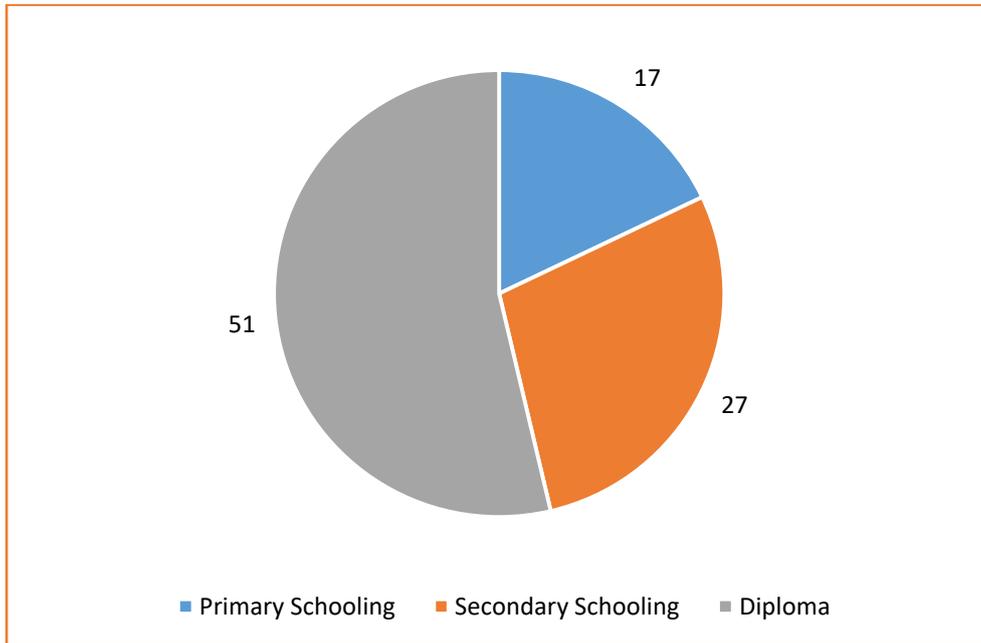


Figure: 30 Percentage Distribution of the Students' according to the Type of Family

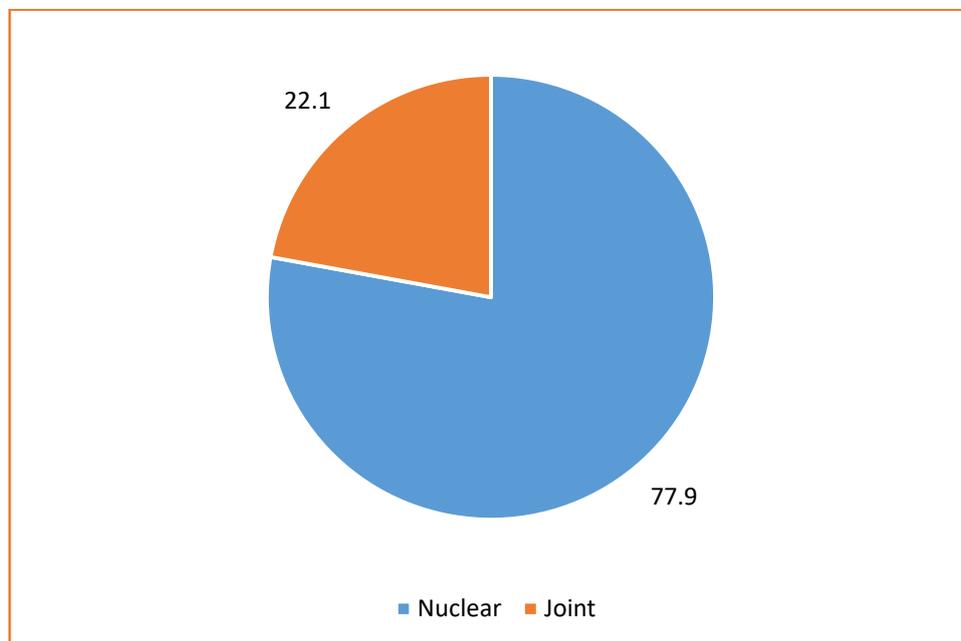


Figure: 31 Percentage Distribution of the Students according to the Family Income

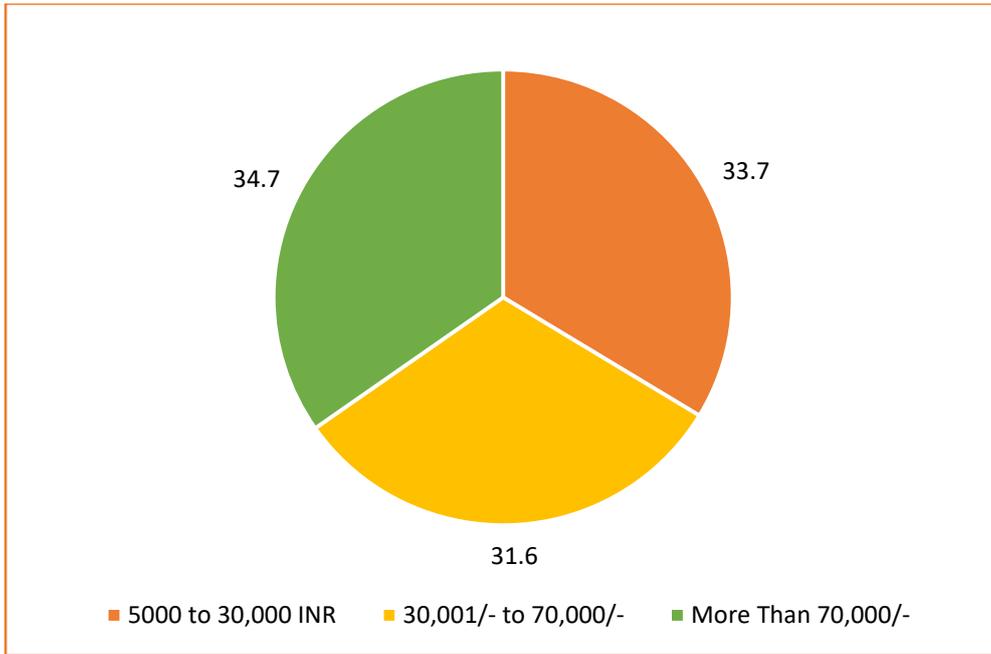


Figure: 32 Percentage Distribution of the Students according their Stream of Study in Higher Secondary Examination or Equivalent Examination

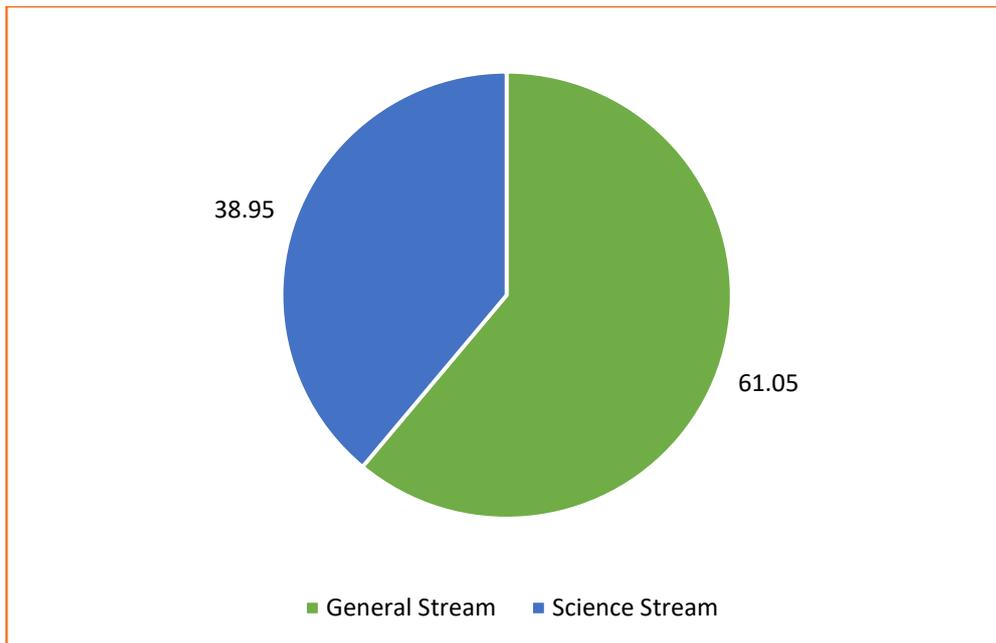


Figure: 33 Percentage Distribution of the Students according their Medium of Instruction in School

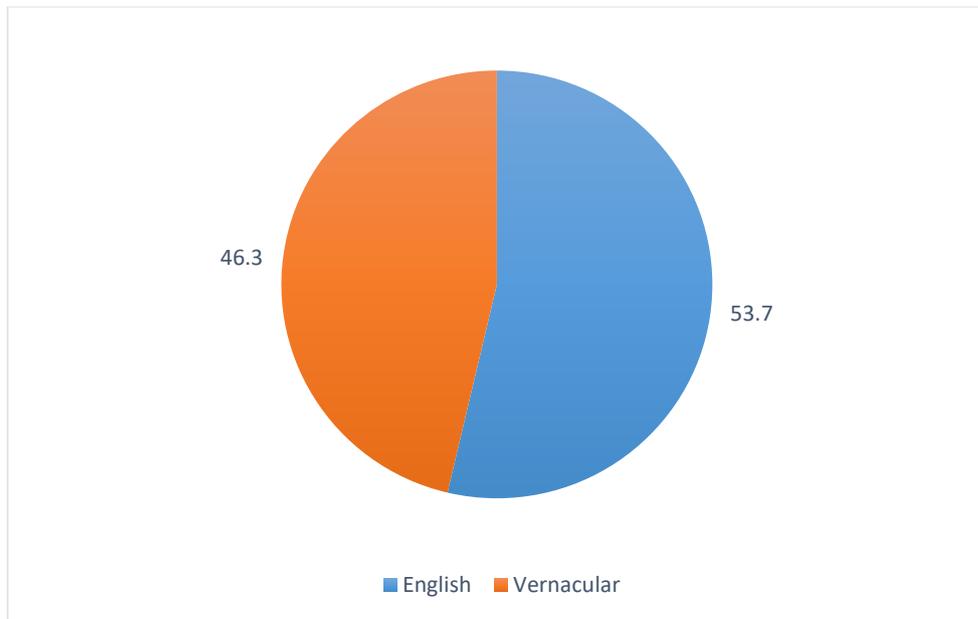
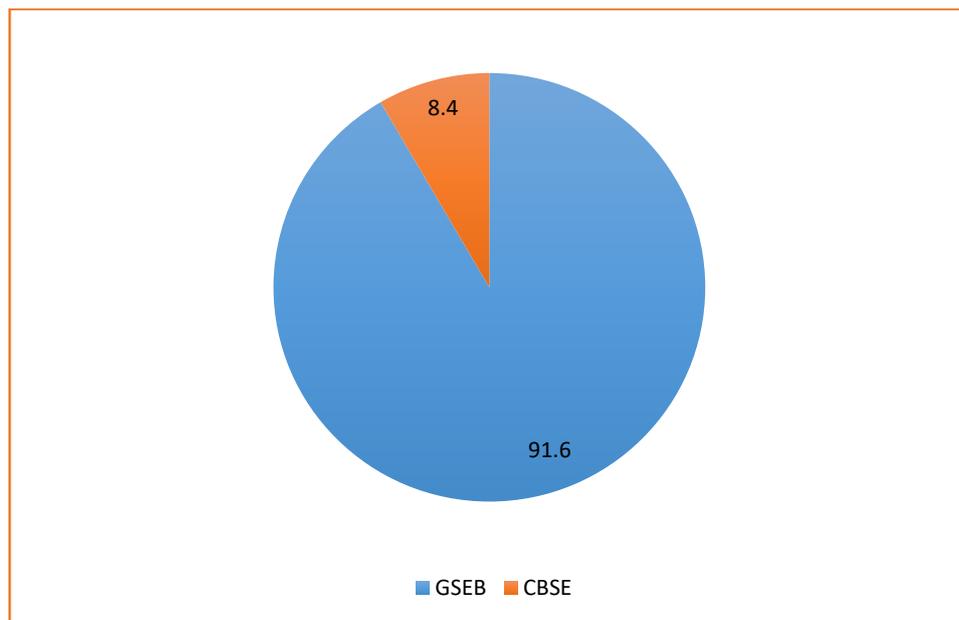


Figure: 34 Percentage Distribution of the Students according their Educational board



4.1.2 Variablewise details of students according to their Usage of Computer and Internet, Exposure of ICT and Budget spent Internet

Table: 23 Percentage distribution of the students according to their Usage of Computer and Internet, Exposure of ICT and Budget spent on Internet

(n=95)

Variable	Categorization	f	%
Usage of Computer and Internet	Low	37	38.9
	Moderate	35	36.8
	High	23	24.2
Exposure of ICT	Low	35	36.8
	Moderate	32	33.7
	High	28	29.5
Budget spent for Internet	Low	42	44.2
	Moderate	33	34.7
	High	20	21.1

This experimental study reveals that out of all the undergraduate student majority (38.9%) of them had lower usage of computer and internet. Similar findings have been observed all across India for undergraduate students in terms of lower usage of computer and internet as a study conducted among 247 undergraduate dental students at the private dental institution in Udaipur, India reported lower levels of internet use than students in other countries. However contradictory findings have been observed in a cross sectional study conducted among undergraduate students from various streams in Mumbai University revealed majority of students spent 3-5 hours on internet in a day but for non-academic work. This could be due to the demographic implicitly and mirroring westernization of a metro cities.

Findings further suggests that approximately thirty seven percentage of students had low exposure of ICT, whereas, approximately thirty four percentage (33.7%) had moderate exposure, followed by thirty percentage (29.5%) had low exposure to ICT. Whereas, little more than forty five (44.2%) the students had low budget for internet usage, whereas approximately thirty five percentage (34.7%).

Figure: 35 Percentage Distribution of the Students according to their Usage of Computer and Internet

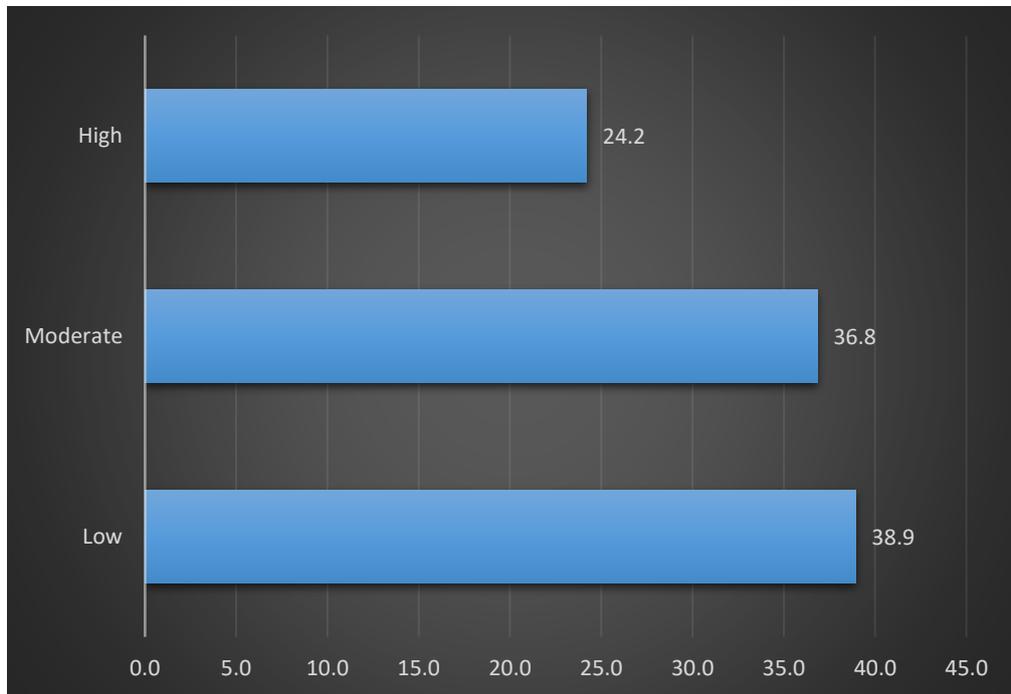


Figure 36 Percentage Distribution of the Students according to their Exposure to ICT

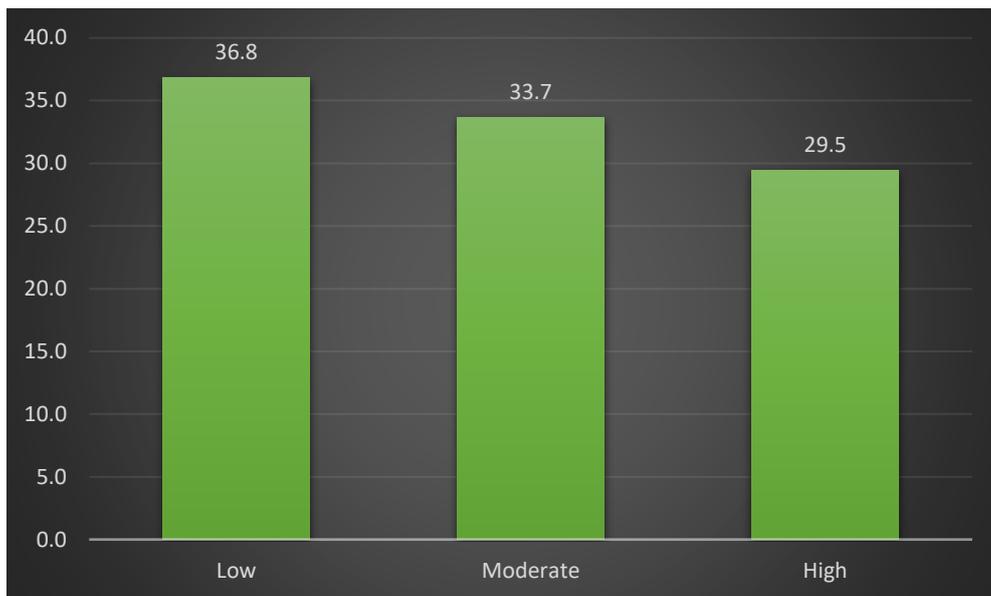
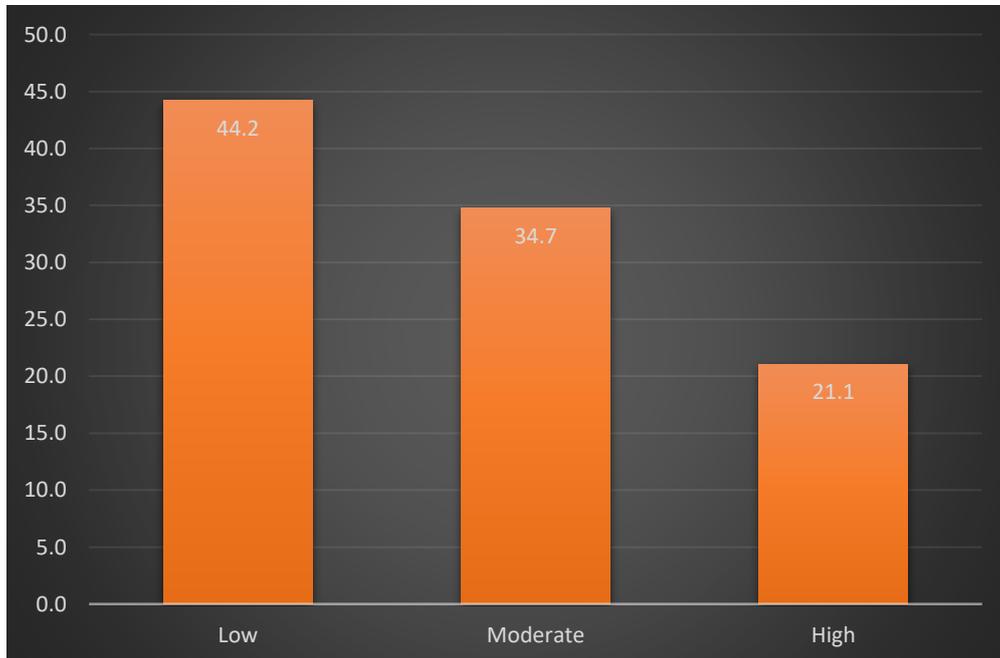


Figure 37 Percentage Distribution of the Students according to their Budget spent on Internet



4.2 Effectiveness of Designed Online Course in Terms of Gain in Knowledge of Experimental Group

4.2.1 Overall Effectiveness of Designed Online Course in terms of Gain in Knowledge of Experimental Group

Table: 24 Wilcoxon Sign Rank Test between Pre-test and Post-test of Knowledge Test (n=95)

Gain in Knowledge	Mean	Std. Deviation	Z	Asymp. Sig. (2-tailed)
Pre-test	1.87	.805	0.239	0.04
Post-test	1.99	.805		

In above table, Wilcoxon sign rank test has been described to measure whether there is a significant difference between the scores of gain in knowledge in pre-test and post-test. It can be derived that there is a significant difference between the scores of pre-test and post-test which explains that there was a significant gain in knowledge learning through the designed online course in students.

The significant gain was noticed in the knowledge that the students acquired through the designed online course. It was higher in the case of those belonging to the experimental group than those of the control group. This means that the online course on the Subject “Introduction to Extension and Communication” was effective for learning.

The possible reasons for the above finding could be many. The designed online course was a unique educational technology to learn in a formal educational system for the undergraduate level students. The designed online course was interactive in nature. The interactivity could further lead to a better understanding and long-lasting learning, by the students. In the area of learning through the online course or e-course and other e-learning for higher education studies were conducted by, Amutha (2016), Jebaraj and Mohanasundaram (2015), Pathiratne (2015), Raval and Gohel (2014), Joan (2013), also have concluded similar findings. It includes one observation that in some cases the students who scored on post-tests indicate that the retention

of content that was learned using the online course/ e-content was found to be superior to retention of knowledge acquired through traditional instruction methods.

Jebaraj and Mohanasundaram (2015) had undertaken a similar study on “Development of an e-Content on ‘Crystal Structures’ which included in the First Semester Syllabus of Engineering Physics subject of “Anna University, Chennai, Tamil Nadu” It was found that the experimental group students who were taught through e-Content material had better achievement scores than the control group students in learning “Crystal Structures”.

Pathiratne (2015) too concluded a similar finding that the experimental group undergraduates who were edified through e-Content material had better achievement scores than the control group Undergraduates in learning - Thermodynamics.

Raval and Gohel (2014) conducted a study on “Construction and Effectiveness of E-Content for Educational Psychology.” Findings of the study revealed E-content programme was effective in comparison with traditional teaching method. It means students got higher achievement taught through E-content.

Joan (2013) conducted a study on “Effect on e-content learning package in Mathematics education for the prospective teachers”. The findings of the study revealed that there was a significant difference between pre-post test scores for the experimental group in learning Mathematics.

One of the reasons for the significant gain in knowledge can be the flexibility online course provides to learners reference time and place. Alebaikan (2010) in the study on “Perceptions of Blended Learning in Saudi Universities” also had a similar finding that a blended learning environment offered Saudi females the flexibility to continue their higher education while maintaining their own cultural values and traditions.

A3 (any time, any place, any pace) learning: (Huang, 2010) this enables the learners to take to study when he/she feels it is convenient to study. This reduces the pressure to come together at a fixed place at a fixed time period. This can be one of the reason for an experimental group of students of students to gain higher learning through the online course.

The designed online course is an interactive individualized learning material. It works on principles of self-learning materials and student centered learning. It is for this reason that it

provided the students with the freedom to learn at their own pace, time and comfort. As the designed online course is an internet-based learning material, it has its own technological advantages like not being tired of repetition, immediate feedback, and reinforcement. Such features helped the learners to learn in a better way. By providing novel means and ways of the technology to further motivated the students to learn more and in a novel way. The students were saved from the trauma of asking their teacher for the further clarification and also from hesitation say that they did about not understand the topic or the concept.

E-learning has certain amount of characteristics that differentiate it from the normal mode of teaching and learning ((M.F.Paulsen, 2003). Some of them are as follows:

- a.** Learner-Centric Approach: the focus is from teacher centric and subject centric approach to that upon the learner itself. Here the student itself is the active participant behind its own learning.
- b.** Flexibility: the timings, pace of learning is flexible according to the convenience of the learner. They are not bound to a rigid pattern of teaching and learning methodologies.
- c.** Customised/Personal content: the learning content is determined by a group of learners or by the individual learners based on their needs and aims.
- d.** Non-linear content: this allows direct access to knowledge in whatever sequence the learner wants to learn from. No static format learning is present.
- e.** Continual learning: the learning can take place continuously in parallel loops.
- f.** Interactive learning: it facilitates more chances of having someone at the virtual end to help the learner with their problems.
- g.** Dynamic content: content is changed automatically continuously for a given user based on the users' input, experiences and new practices.
- h.** Systematic Learning: occurs as an integrated activity.
- i.** Distributed content: this content is generated from educator-learner interactions.

Sathya (2016) conducted a study on “Developing an E-Content Module on the Poem the Road Not Taken”. This study too aimed to show that e-content module as one of the finest ways through which the learners could learn at anytime, anywhere and at any pace. It was user-friendly and flexible for the learners. Findings of the study support the above reason, 90% of the students accepted that the E-content module paves way for self-learning. It provided flexibility through which the students could learn outside the lecture hall at anytime, anywhere and at any pace. It made them become self-directed independent learners. It was an effective

mode for teaching poem with appropriate images, films, metaphors and other poetic devices. The mode facilitated the teacher and it could be used in the absence of teacher but it cannot replace the teacher.

One of the possible reasons for gain in knowledge through the online course as it provides more interactivity and visual support. Rajasekaran and Arulchelvan,(2015) “Effectiveness of Visuals in E-Learning on Media Communication Courses” supports that visuals support higher learning. The major findings of the study revealed that Visuals in stories were adding interest and improved learning was the most important factor on awareness on e-learning content, followed by e-learning used for updating knowledge and user friendly. Visual based e-learning method made the students more understanding of the media, art and design subjects than traditional face-to-face teaching method. Visuals based e-learning could create easy understanding, focus on learning, retention level, and higher score in the examinations among the students were highly possible.

The online course was supplemented with colorful visuals and content and verbal commentary. This may have been of good help to the students to comprehend the content better. The positive reactions of the students support the reason. The students reported that the colorful visuals and examples were of great help to them in comprehending the content. Sternberger (2005) supported on this finding in his study that the students of English as a second language reported that the audio enhanced slide shows provided instruction that was necessary and lead to a higher gain in knowledge. Schoff and Sherman (2004) too discussed in their article on “Educational Technology from Research to the Classroom” that people process visual information 60,000 times faster than text and that visual aids can improve learning by 400 percentage. Edgar Dale’s (1946) cone of experience (further described in dale 1969) that is often referred to in literature on instructional technology. He simplified the findings like we remember: 10 percent of what we read, 20 percent of what we hear, 30 percent of what we see, 50 percent of what we see, hear and discuss and 90 percent of what we see, hear, discuss and do. The interactive online courses preside most of these.

4.2.2 Effectiveness of Designed Online Course in Terms of Gain in Knowledge of the Students of Experimental Group in Relation to Selected Variables

When ‘gain in knowledge’ becomes a yardstick to measure the success of the method experiment with, it may have one more dimension to look at above that of overall gain in knowledge that has been discussed in the earlier line. The dimensions that too need consideration is gain in knowledge in view of different variables.

Table: 25 Mann-Whitney U-Test between Pre-Test / Post-Test and Type of Family (n=95)

Type of Family	Mean	Std. Deviation	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
Pre-test	1.97	.805	657.000	-1.142	.253
Post-test	1.99	.805	770.500	-.062	.951

In above table, Wilcoxon sign rank test has been described that there is no significant difference between the scores of pre-test and post-test which explains that there was no significant gain in knowledge learning through the designed online course on students in relation to their type of family.

The above reveals that there was no significant difference in the gain in knowledge of the students in learning through the designed online course in relation to their type of family. This means that the students' gain in knowledge was equal irrespective of their type of family. Therefore, the null hypotheses stating there will be no significant difference in gain in knowledge for the topic "Communication" and "Graphic Aids" within the students in relation to their type of family was accepted.

Table: 26 Significant Difference of Gain in Knowledge Learning through the Designed Online course in Relation Family Income

(n=95)

Family Income	Mean	Std. Deviation	df	Asymp. Sig.
Pre-test	1.97	.805	2	.228
Post-test	1.99	.805	2	.005

Table: 27 Mean Score showing Gain in Knowledge Learning through the Designed Online Course in relation Family Income

Income of the Family		N	Mean Rank
Post test	Lower Family Income	32	37.27
	Medium Family Income	30	48.35
	High Family Income	33	58.09

In above table, Wilcoxon sign rank test has been described that there is a significant difference between the scores of pre-test and post-test which explains that there was a significant gain in knowledge learning through the designed online course on students in relation to their level of family monthly income.

The above reveals that there was a significant difference in the gain in knowledge of the students in learning through the designed online course in relation to their level of family

monthly income. This means that the students' gain in knowledge differs significantly respective to their level of family monthly income. Therefore, the null hypotheses stating there will be no significant difference in gain in knowledge for the topic "Communication" and "Graphic Aids" within the students in relation to their level of family monthly income was not accepted.

Household conditions and characteristics play an important role in determining the outcomes of children. The strength and nature of that role have been an important research area for social scientists. One characteristic is of special importance for economists –household incomes. Does having more money in the household produce better child outcomes over time? Alternatively, does growing up in poverty produce worse outcomes for children? It is difficult to answer these questions because household incomes are not exogenously given. Income depends mainly on observed or unobserved parental characteristics. Therefore, simply observing that children from high (low) income families tend to have positive (negative) educational, income and employment outcomes in young adulthood tells us little about the actual causation. Parents transmit to their genetic offspring some of their innate abilities and the observed correlation between parental incomes and child outcomes later in life may simply reject this intergenerational transfer and not the effect of income per se.

Researchers have sought to overcome this endogeneity problem by using a number of instrumental variables and fixed effects techniques that attempt to isolate the difference in household incomes that are not due to parental characteristics or ability. Using father's union and occupational status as instruments for income, Shea (2000) finds that income has no effect on child outcomes while Chevalier et al. (2005) finds that permanent income matters in children's educational attainment. Maurin (2002) uses grandparent socioeconomic status as a predictor of parental incomes which is then used to explain a child's performance in early education. He finds that a child is much less likely to be held back in school the higher the household income. Loken (2007) uses the Norwegian oil boom of the 1970's and 1980's, which only affected a few regions of the country, as an instrument for increases in household income that is unrelated to parental characteristics. She finds that there is no effect of family income on child educational attainment. For these instruments to be valid, we must assume that there is no choice involved in union or occupational status or selection in the job loss instruments. Alternatively, we must assume that there is no transmission of abilities across generations for the grandparent socioeconomic instrument to be valid. Finally, in the oil boom scenario, one

must assume no endogenous movement across regions but also that all industries within the affected regions were not differentially affected.

Other researchers have used more permanent income measures such as household assets. Meyer (1997) uses household assets and child support payments as measures of household income (these are taken to be less closely related to parental characteristics) and she finds that income has a positive and significant effect on educational attainment and wages. Blau (1999) uses child fixed effects in the National Longitudinal Study of Youth data and finds that parental income (at least the transitory component) does not affect child test scores. Sacerdote (2007) finds that parental income matters less than parental education for young adult educational, income and health outcomes for Korean-American adoptees in his data; this research design is particularly useful, however, the obvious drawback here is that there is the selection with regard to families willing to adopt children. Households that adopt children are not representative of the population at large.

While previous research has found conflicting results with regard to the effect of household income on the young adult outcomes of household children, none of those studies have been able to identify a truly exogenous income change at the household level. A study by Dahl and Lochner (2005) using panel data and changes in the Earned Income Tax Credit (EITC) in the US have shown that reading and math scores improved in households with increased earnings - especially for most disadvantaged households. Oreopoulos et al. (2005) found in their intergenerational data that children who come from households where fathers were displaced from their jobs have on average 9% lower earnings than children whose fathers were not displaced in childhood. Once again they find the effect to be driven by the most disadvantaged households - this will hold generally in our data as well. Our empirical strategy most closely matches those of Duflo (2003). In her paper, Duflo examines the effect of pension extension to the black South Africans by gender on the anthropometric status of grandchildren in these households. We find, similar to Duflo, that an exogenous increase in household income matters for child outcomes and that there is a gendered effect - women have a large effect on child educational attainment.

Kugler & Kumar (2016) an article "The fewer the merrier: Family size and education in India". Recent research in demographic economics supports the hypothesis that smaller family size (i.e. lower fertility) can spur economic development and help reduce poverty, both at the household and at the aggregate level. Smaller families are more likely to exit poverty traps and

help reduce intergenerational transmission of poverty due to upward income mobility, as household resources are shared among fewer members. One of the important ways in which high fertility affects the economic development is through educational attainment of children. Children from larger families have less education and poor health because parents are financially constrained by having to invest in the education and health of each child. For the financially constrained households, it is more difficult to send children to school since children in these households very often contribute to the family's income. In economic terms, the cost of school attendance, both direct and indirect (i.e. opportunity cost), increases as the size of the family increases, thereby resulting in lower educational attainment for children in larger families than children in smaller families. This negative relationship between family size and children's education is known in economics as the 'quantity-quality trade-off' and was first modeled by Nobel Laureate Gary Becker (Becker and Lewis in 1973).

In a paper using the District Level Household Survey of 2007-08, it was explored the empirical relevance of the quantity-quality trade-off in India (Kugler and Kumar 2015). The main challenge in identifying the causal effect of family size on children's education is that parents may simultaneously decide about the number of children they want to have and also how much they can afford to spend on education and health of the children. It is likely that those parents who prefer to have fewer children also place more value on the education of their children. If this is true, then simply looking at the correlation between family size and education of the children may not reflect the true relationship between these two variables.

Table: 28 Significant Difference of Gain in Knowledge Learning through the Designed Online Course in relation to Parents' Education (Mother)

(n=95)

Mother's Education	Mean	Std. Deviation	df	Asymp. Sig.
Pre-test	1.97	.805	2	.705

Post-test	1.99	.805	2	.500
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The above table reveals that there was no significant difference in the gain in knowledge of the students in learning through the designed online course in relation to their mother's education. This means that the students' gain in knowledge was equal irrespective of their mother's education. Therefore, the null hypotheses stating there will be no significant difference in gain in knowledge for the topic "Communication" and "Graphic Aids" within the students in relation to their mother's education was accepted.

Table: 29 Significant Difference of Gain in Knowledge Learning through the Designed Online course in Relation to Parents' Education (Father)

(n=95)

Father's Education	Mean	Std. Deviation	df	Asmp. Sig.
Pre-test	1.97	.805	2	.465
Post-test	1.99	.805	2	.084

The above reveals that there was no significant difference in the gain in knowledge of the students in learning through the designed online course in relation to their father's education. This means that the students' gain in knowledge was equal irrespective of their father's education. Therefore, the null hypotheses stating there will be no significant difference in gain in knowledge for the topic "Communication" and "Graphic Aids" within the students in relation to their father's education was accepted.

Educational attainment is typically influenced by both public and private investments in education. While state policy typically drives the former, parental education is a crucial part of the latter; indeed parental education is one of the most important determinants of a child's education. In a rigid society with no mobility, parental education completely determines the educational attainment of the child. Put in another way, after controlling for other socio-economic characteristics that potentially affect educational attainment of an individual, the greater the influence of paternal and maternal education, the lower is the extent of intergenerational mobility. Theoretically the concept of caste does not and should not exist for non-Hindus; however, partly because of history and partly because of an affirmative action policies aimed at certain castes, many non-Hindus appear to hold on to their caste.

There is growing number of studies focusing on determinants of child schooling in developing countries. Pal (2004) analyses child schooling data for Peruvian households and reports that parental education positively affects child schooling at primary and secondary levels, but not at post-secondary levels.

Singh (1992) examines major economic aspects of demand of schooling of farm operators in Brazilian rural households and finds that parental education positively affects household demand for children's education with mothers education having larger effect than that of the father. A similar result is reported by Maitra (2003) for demand, for example, it might result in inter-generational transmission of values that result in the next generation attaining more schooling. Alternatively, the unobserved components of a child's schooling decision might be correlated with parents' unobserved characteristics (one such example is genetic characteristics). For schooling in Bangladesh. Dreze and Kingdon (2001) use data on 1143 households for rural north India to analyze the impact of school quality on school participation. They find that probability of participation increases with parental education, though mother's education does not have significant effect on male school participation. Evidence from Pakistan suggests that parental education significantly increases the education of their sons (Holmes, 2003). Unfortunately few studies have explicitly accounted for potential endogeneity of parental educational attainment. One notable exception is Lillard and Willis (1994) who explicitly account for this endogeneity using data from Malaysia.

Maitra and Sharma (2009) in the article "Parents and Children: Education across Generations in India" opines that First, there is a positive correlation between parental education and children's education. Second, on an average, the educational attainment of children is greater than the educational attainment of the fathers, for fathers with less education; i.e., if the father has attained x years of schooling, the child has on an average attained more than x years of schooling – the lowest plots always lie above the 45° line for fathers with low education. The slope is however generally less than 1, indicating that an additional year of schooling attained by the father is not associated with an additional year of schooling attained by the child. For more educated fathers, children have on average fewer years of schooling compared to fathers. It is, however, worth noting that the lowest plots intersect the 45° line at a fairly high level of education attained by the father – to be precise beyond 10 years of schooling.

Table: 30 Significant Difference of Gain in Knowledge Learning through the Designed Online Course in relation to Stream of Study

(n=95)

Stream of Study	Mean	Std. Deviation	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
Pre-test	1.97	.805	872.000	-1.628	.103
Post-test	1.99	.805	868.000	1.660	.097

In above table reveals that there was no significant difference between the scores of pre-test and post-test which explains that there was no significant gain in knowledge learning through the designed online course on students in relation to their stream of study in school.

The above table reveals that there was no significant difference in the gain in knowledge of the students in learning through the designed online course in relation to their stream of study in school. This means that the students' gain in knowledge was equal irrespective of their stream of study in school. Therefore, the null hypotheses stating there will be no significant difference in gain in knowledge for the topic "Communication" and "Graphic Aids" within the students in relation to their stream of study in school was accepted.

It was assumed that the stream of study may affect the comprehension and academic attainment, but the study gave the contradictory finding that the stream of study in their higher secondary or equivalent examination did not make any difference in their knowledge gain leaning through an online course. The possible reasons for the finding can be the flexibility and convenience the online course provides.

Table: 31 Significant Difference of Gain in Knowledge Learning through the Designed Online Course in relation to Medium of Instruction in School

(n=95)

Medium of Instruction	Mean	Std. Deviation	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
Pre-test	1.97	.805	777.000	-2.733	.006
Post-test	1.99	.805	749.000	-2.954	.003

In above table describes that there is significant difference between the scores of pre-test and post-test which explains that there was significant gain in knowledge learning through online course on students in relation to their Medium of Instruction in School.

Table: 32 Mean Score of Gain in Knowledge Learning through the Designed Online Course in Relation to Medium of Instruction

Medium of Instruction		N	Mean Rank
Post-test	English	51	55.31
	Vernacular	44	39.52

The finding of the study revealed that there was a significant difference in gain in knowledge of the students of the experimental group in learning through developed Online Course. The above table reveals that the students studied from English medium in school had high mean scores than the students from the Vernacular medium. Thus, it was found significant on a higher side in relation to the medium of instruction. It means that the students hailing from English medium had higher gain in knowledge than the students who studied in vernacular medium schools. Therefore, the null hypotheses stating there will be no significant difference in gain in knowledge for the topic “Communication” and “Graphic Aids” within the students in relation to their medium of instruction in School was not accepted.

English enjoys a place of global language because of its use in business, sports, science and almost every field of life. Lord Macaulay’s recommendations made English an official and educational language of India. English is used for the administrative purpose, legal purpose, for trade and commerce. English proves to be an important factor in the social life of our country. English is a unifying force and a unifying factor in the interstate and international social life. English is linked language in India. It has been rightly marked by Pt. Jawaharlal Nehru that English is our major 3 window in the modern world. (Sharma, (2008) p.9). If this

window is shut to the modern world we will be isolated from the world and the knowledge of the modern world. The English language has been crucially woven into our education system also. English provides us the knowledge and information related to all the fields and aspects of higher education. According to Kothari commission. “No student will be considered to have qualified for a degree unless he has acquired a reasonable proficiency in English (or in some other library language).” (Sharma, (2008) p.10). India is a multilingual country. We have official languages of different states, various regional languages, dialects, slangs, Hindi as our national language and above all English as a need of today’s times. In Gujarat, Gujarati is a regional language and language of the state. Hindi is used as national language and English works as link language and language of utility. In education system of Gujarat, English mediums use English as a first language and vernacular mediums use English as 2nd or 3rd language. Majority schools in Gujarat, are Gujarati medium schools and students find it easy to learn in these schools as it is their mother tongue. The students studying in The Maharaja University of Baroda, Vadodara has a compulsion to study in English medium as it is an English medium university. The reason for the above finding may be that the medium of instruction at the Faculty of Family and Community Sciences is English. Therefore, the students from Gujarati medium schools would perceive a sudden shift from the Gujarati medium to the English medium more difficult. In schools, students have English as one subject; whereas the first year of college has the entire curriculum and teaching in English. So, here the familiarity with the English language becomes an influencing factor to affect students gain in knowledge.

The study conducted by Mandal in 1992 contradicted with the finding that the students who know good English language claimed better scores as compared to the students with a poor skills in the English language. They showed poor gain in knowledge and development of ability. The studies conducted by Shreck in 1963 and Chatterjee and Mukharjee (1966) concluded that English marks had a comparatively higher correlation with the college success and future performance of the students. Further, a group of scholars like Shrestha (1969), Arora (1977), Singh (1989) and Mandal (1991) share an opinion in their studies and conducted at different points of time that the students with poor background in English faced more problems of academic kind as compared to the students with good language competence in English.

As pointed out earlier, the content of the Online Course is bilingual and so it also presents learning material in Gujarati. It worked towards increasing the clarity of the concepts in particular and the content in general. But when it comes to writing and explaining it in English,

the students may face problems of writing with mistakes in sentence construction. The translation of Gujarati concepts in English is another problem. This may have led students to run short of words due to limited vocabulary in English. So, the main problem with Gujarati medium students is not of grasping the concept and understanding, but to reproduce the same in English in test papers. This may be one of the reasons that students of Gujarati medium acquire lower gain in knowledge as compared those from English medium. Though the content in the Online Course is also given in Gujarati English still remains the dominated language, this may cause further hesitation or discomfort in learning.

Another reason for this finding to reveal may be the medium itself. As the educational Online Course is a computer-based technology, for simple operation of the computer too one needs to understand instructions in English that the computer flashes on the screen. English as the language of instruction may also affect the students to develop lower the level of confidence. The learning, as a result, remains low and less effective.

Since, English is the medium of instruction in online learning, it might be possible that the students from English medium could understand the instruction better as compared to those who came from the Gujarati medium. Thus, students from English medium showed a higher gain in knowledge than the students from Gujarati medium.

Table: 33 Significant Difference of Gain in Knowledge Learning through the Designed Online Course in Relation to Usage of Computer and Internet

(n=95)

Usage of Computer and Internet	Mean	Std. Deviation	Df	Asymp. Sig.
Pre-Test	20.51	2.69	2	0.11
Post- Test	20.51	2.69	2	0.02

Table: 34 Mean Score of Gain in Knowledge Learning through the Designed Online Course in Relation to Usage of Computer and Internet

Usage of Computer and Internet		N	Mean Rank
Post Test	Low	37	56.18
	Moderate	35	41.91

	High	23	44.11
	Total	95	

The above table suggests there was a significant difference in the gain in knowledge of the students in learning through the designed online course in relation to their Usage of Computer and Internet. This means that the students' gain in knowledge differed significantly with respect to their Higher, Moderate and lower Usage of Computer and Internet. The students with higher Usage of computer and internet had higher gain in knowledge in comparison to the students having lower and moderate usage of computer and internet Therefore, the null hypotheses that there will be no significant differences in the effectiveness of an online course on "Introduction to Extension & Communication" in terms of gain in knowledge within the students in relation with their usage of computer and internet was not accepted. The finding of the study revealed that there was a significant difference in the gain in knowledge of the students in learning through the designed online course in relation to their Usage of Computer and Internet. This means that the students' gain in knowledge differed significantly with respect to their Higher, Moderate and lower Usage of Computer and Internet. The students with higher Usage of computer and internet had higher gain in knowledge in comparison to the students having lower and moderate usage of computer and internet Therefore, the null hypotheses there will be no significant differences in the effectiveness of an online course on "Introduction to Extension & Communication" in terms of gain in knowledge within the students in relation with their usage of computer and internet was not accepted.

Kumar and Kumar R (2013) , the study aimed at finding the effectiveness of e-learning in teaching chemistry at a higher secondary level in relation to certain selected variables identified by the researcher. There is no significant difference in the pre-test scores with reference to type of schools. The findings reveal that the students' usage of computer and usage of internet have a better achievement than the other students who are not using the computer and internet frequently.

Bhatt (2006) study reveals relates to the extent of the use of computer significant difference is marked among the students of experimental group learning education CR-ROM in relation to type of computer user. The students with heavy computer usage learned higher than, those with rising computer usage not so much. A good habit and skill are the outcomes of repetitive work on a job of the kind the computer allows. Those who use computers heavily they operate

computers for a long duration with high frequency; they do it with for different purposes and employ different computer programmes. The content is that is of light users. Due to higher frequency and long duration of computer usage a heavy user develops familiarity and efficiency in using the computer. He develops a kind of attachment. Further, heavy user uses computer with higher frequency for many purposes, It leads to repeated use of technology. It again increases confidence among the students to operate CD-ROM and learn better from it. This may further lead them to gain higher in knowledge in comparison to light computer users.

Heavy computer user uses the computer repeatedly for many purposes. It may increase the extent of exposure to the technology. As the extent of exposure increases, the students may develop motivation towards using the same technology to explore more about the technology, and its various dimensions. It may develop efficiency among students to learn through technology. It eventually may lead one to higher gain in knowledge. The light computer users, on the other hand, possess poor efficiency, less familiarity and less frequency with the computer as a system. It affects in him lower confidence to use technology. Such students also feel less motivated in using the technology; this may result in lower gain of knowledge.

Bhatt (2006) the finding of the study revealed one more fact that no significant difference was observed in gain in knowledge among the students of experimental group who learned through the developed Online Course in relation to their accessibility to computer. This means that the students with single and multiple accessibility have equal gain in knowledge, when they learned through the developed Online Course. The students having access to computer at one place may be called to have single accessibility whereas the students having access to computers more than one places are called multiple accessibility. Both showed equal gain in knowledge. The reason for the above finding would be that gain in knowledge or learning is not correlated with a place of access or with more/ less no of places of access, learning highly depends upon the concentration, interest, efficiency and familiarity on the part of an individual rather than a place of study.

A study by Kannan & Muthumanickam (2010) supports the similar findings that the E-content programme on 'p-block elements' for XI standard students is found more effective for students those who are undergone computer course than those who are not undergone computer course. The E-content programme on 'p-block elements' for XI standard students is found more effective for students those who are using internet in Public followed by Home followed by not use internet and followed by School. Students those who are having browsing habit are

found better facilitated in learning through E-content programme than the students those who are not having browsing habit.

Thus, one may find experimental treatment and variables would not affect in any way the students acquisition of a knowledge. The above findings may work significantly to expose lacking, lacuna or weakness or limitation inherent in the traditional system of learning. But it does not mean to cast off the system altogether. In view of lacking and limitations, the system needs to be supported and supplemented with the new technology of revolution is sought have not through destroying and changing the traditional way of learning, but through wise application of the new technology. This is the call of the time that each of us cannot afford to ignore. Hence an attempt is made to draw a few suggestions with a view to affecting constructive changes in the present traditional mould of education.

Table: 35 Significant Difference of Gain in Knowledge Learning through the Designed Online Course in relation to Exposure to ICT

(n=95)

Exposure to ICT	Mean	Std. Deviation	df	Asymp. Sig.
Pre-Test	14.07	2.18	2	0.21
Post-Test	14.07	2.18	2	0.05

Table: 36 Mean Score of Gain in Knowledge Learning through the Designed Online Course in relation to Exposure to ICT

Exposure to ICT		N	Mean Rank
Know Test_Post	Low	35	46.51
	Moderate	32	60.41
	High	28	35.68
	Total	95	

There was a significant difference in the gain in knowledge of the students in learning through the designed online course in relation to their Exposure to ICT. This means that the students' gain in knowledge differed significantly with respect to their Higher, Moderate and lower exposure to ICT. The students with high and moderate Exposure to ICT had higher gain in knowledge in comparison to the students having lower Exposure to ICT. Therefore, the null hypotheses stating there will be no significant differences in the effectiveness of an online course on "Introduction to Extension & Communication" in terms of gain in knowledge within the students in relation with their exposure to ICT was not accepted.

The finding of the study reveals another fact that there was no significant difference noticed in gain in knowledge of the students of the experimental group in learning through developed Online Course in relation to their exposure to ICT. This means that the students having exposure to ICT showed a higher gain of knowledge than the students not having exposure to ICT. The reasons may be that the education Online Course being new and unique technology would be able to attract both the students that are either exposed or not exposed to ICT.

The topic for the study was made compulsory for all the students. So, they did not have any options of not learning them. The media was a novel medium and so it was able to attract both the students, those with exposure to ICT and those either not hand exposure to ICT equally. This becomes a reason for students either having exposure to ICT and or not having exposure to ICT to gain equally.

It is a general experience that the exposure to ICT material develops a habit in learners to grasp and learn through the media. But here to the uniqueness and effective characteristics of the education Online Course play a role. A package and the nature of the content demands direct relation with real life examples, visuals and interesting illustrations. All the above reasons unify the effect of educational Online Course on both the group of students, those having exposure to ICT material and also those not having exposure to ICT material. Hence, the finding was drawn from these reasons that the ICT material proved an effective way to help learners.

Delen and Bulut (2011) in their study was to explain students' science and math achievement by looking at their use and accessibility of computers and related technologies, as suggested by Subrahmanyam et al. (2001). The findings of the research indicated that students' exposure to ICT at home and school was a strong impact of their math and science performance. Whereas, Students' exposure to ICT out of school time had a larger impact on their math and science achievement than their exposure to ICT at school.

Ziya et al. (2010) stated that students using computers in line with their needs, parents controlling the time their children use computers, the internet and computer for entertainment purposes can be beneficial. The research concluded that students' math and science performance in PISA had a positive impact of their ICT usage. The study further suggested that technology usage at school was found to be a weak predictor of math and science achievement. However, previous research showed that it may have still indirect impacts.

Eskil et al. (2010), indicated that some classroom activities have positive effects on students' computer and technology use. Eskil et al. (2010) also argued that when students have advanced knowledge about computer technologies, they can be more successful in their studies. Therefore, direct and indirect effects of ICT usage at school should be taken into consideration. Similar findings were also observed by Kubiato and Vlckova (2010) The findings of the study support the idea that the amount of time spent using a computer had a positive and strong

relation with science knowledge. Students' technology usage may explain the science achievement gap. The same interpretation can be made for math achievement.

Kim and Chang (2010) focused on math achievement gap between students coming from different racial and ethnic backgrounds. It was concluded that home computer usage reduced the gap in math achievement. Contradictory to the above study, Aypay (2010) found that there was no significant relationship between students' use of ICT and academic achievement based on the results of PISA 2006. Aypay (2010) indicated that neither very frequent nor very little use of ICT improved student performance in PISA 2006.

Table: 37 Significant Difference of Gain in Knowledge Learning through the Designed Online Course in relation to Budget spent on usage of Internet

(n=95)

Budget spent for Internet	Mean	Std. Deviation	df	Asymp. Sig.
Pre-Test	13.98	1.58	2	0.68
Post-Test	13.98	1.58	2	0.34

The finding of the study revealed that there was no significant difference in the gain in knowledge of the students in learning through online course in relation to their budget for internet usage. This means that the students' gain in knowledge was equal irrespective to their budget for internet usage. Therefore, the null hypotheses stating there will be no significant differences in the effectiveness of an online course on "Introduction to Extension & Communication" in terms of gain in knowledge within the students in relation with their budget for internet usage was accepted. Further it explain that the money spent for internet, does not affect the usage as well as the learning through online mode of leaning. The possible reason can be the booming and revolutionary changes seen in Indian Telecom market after the Relience JIO entered the market. It has not only changed the face of Indian telecom users but has increased the numbers tremendously. Jio's marketing strategy made the internet more affordable and reachable to people

4.3 Reactions of the Students from the Experimental Group about the Designed Online Course

4.3.1. Reactions towards the unique features of designed online course, helped students learn better from online course

Table: 38 Percentage Distribution of the Reactions of the Students of Experimental Group towards the Unique Features of the Designed Online Course helped the Students in Learning Topic “Communication” and “Graphic Aids”

(N=95)

Sr.no	Features	f	%
1.	Freedom to select my topic of study	93	97.9
2.	Important Terms to remember	92	96.8
3.	Freedom to select my study time	90	94.7
4.	Question Bank	86	90.5
5.	Freedom to study at my own pace	84	88.4
6.	Summarization of each topic	83	87.4
7.	Videos	78	82.1
8.	Movement in visuals	74	77.9
9.	Verbal commentary along with written letters	74	77.9
10.	Test at the each end of the topic/sub-topic	71	74.7
11.	Coloured visuals	67	70.5
12.	Coloured write up	61	64.2
13.	Music in the background	58	61.1

All the students except reported that while learning through an online course it gave them freedom to select the topic of study (97.9%) and important terms to remember helped them in learning the content. Higher Majority of features helped students to learn through Online course were Freedom to select to study at their own time (94.7%), Freedom to study at their own pace (88.4%), Question bank (90.5%), Summarization of each topic (87.4%), and Videos (82.1%). Whereas, Majority of the students opines that Movements in visuals (77.9%), Verbal

commentary with text (77.9%), Tests at the end of each topic or subtopic (74.7%), Colour visuals (70.5%), Colour write-up (64.2%) and Background music (61.1%).

Open education data quoted 10 advantages of taking online course were:

- 1. Variety of programs and courses:** From traditional four-year universities to completely online career colleges, higher education today offers a variety of options for students. This means that no matter what students wish to study, from nursing to neuroscience, they can find online the courses or degree programs they need. They can also earn every academic degree online, all the way from a career certificate to a doctorate.
- 2. Lower total costs:** Online programs can be a more affordable option than traditional colleges. Though not all online degrees have less expensive net tuition prices than traditional colleges, associated costs are almost always less expensive. For example, there are no commuting costs, and sometimes there is also not any required course materials such as textbooks because those are often available for free online. In addition, many colleges and universities have begun to accept credits earned via free massive open online courses (MOOCs), the most recent advance in online education. Free online courses such as these can help students fulfill general education requirements at little to no cost.
- 3. More comfortable learning environment:** Commercials that featuring online students studying in the pajamas only skim the surface of one of the primary benefits of online education: there are no physical class sessions. Lectures and other materials are electronically sent to the student, who will then read them and complete assignments. Students will not have to fight traffic, find parking spaces, leave work early to go to class, or miss important family time.
- 4. Convenience and flexibility:** Online courses give students the opportunity to plan their study time around the rest of their day, instead of the other way around. Students can study and work when they are at their peak energy, whether that's early morning or late at night. Course material is always accessible online, so there's no need to schedule special trips to a library either. All of this makes online learning a good option for students who need to balance their work and family commitments.
- 5. More interaction and greater ability to concentrate:** While there is contradictory evidence about the rate of online student participation versus participation in traditional courses, one thing is certain: online courses offer shy or more reticent students the opportunity to participate in class

discussions or chats with more ease than face-to-face class sessions. Some students even report that online courses are easier to concentrate in because they are not distracted by other students and classroom activity.

6. **Career advancement:** Students can take online courses and even complete entire degrees while working, while in-between jobs, or while taking time to raise a family. This academic work will explain any discontinuity or gaps in a resume as well. Also, earning a degree can show prospective employers that you are ambitious and want to remain informed and prepared for any new challenges.
7. **Continue in your profession:** Even if someone wants to complete a degree program, it doesn't mean that they want to leave their current job. For most students today, college costs mean that it's necessary to continue working while in school. The previously mentioned flexibility of online degree programs enable students to keep working while also pursuing academic credentials.
8. **Avoid commuting:** During snowstorms and thunderstorms, colleges may cancel classes; if they don't, you run the risk of getting hurt in dangerous driving conditions. Rather than miss important class sessions, students in online courses can always "attend" by participating on discussion boards or in chat sessions, turn in their work on time, and watch lectures or read materials. Many students also find that the amount they save on fuel costs can be substantial if they don't have to commute to a physical campus in general, no matter what the weather conditions may be.
9. **Improve your technical skills:** Even the most basic online course requires the development of new computer skills, as students learn to navigate different learning management systems (LMS) and programs. The skills students learn to participate in their online courses translate to many professions, including creating and sharing documents, incorporating audio/video materials into your assignments, completing online training sessions, etc.
10. **Transfer credits:** For college students who want to attend summer classes, but who live too far from their colleges or have to work summer jobs, taking online classes from an accredited college and transferring the credits to their primary college is a good idea. Students will be able to earn college credit while still enjoying their summer vacation or fulfilling the responsibilities of their seasonal jobs. Similarly, if a college or university is unable to offer

enough open sections of a required course, students can take the course online at another college and transfer the credits.

These are just a few of the many advantages of taking online classes. Students in online degree programs are able to manage their time, learn the materials that are presented, and complete assignments on their own schedules.

Meguid and Collins in their study on “Students’ perceptions of lecturing approaches: traditional versus interactive teaching” found the similar findings that interactive online teaching promoted interactivity, focused attention, and provided feedback on comprehension. A total of 95% reported that it increased their participation and found that it clarified their thinking and helped to focus on key points. Another 81.7% mentioned that it increased their motivation to learn. Students regarded it as a useful method for giving real-time feedback, which stimulated their performance and participation. Data from CS students echoed the findings from the dental students. Reports from focus groups demonstrated that this strategy was helpful in focusing students’ attention and in clarifying information.

Wong and Looi (2011) investigated the influence of mobile devices on seamless learning. Seamless learning refers to a learning model that students can learn whenever they want to learn in a variety of scenarios and that they can switch from one scenario or one context to another easily and quickly (Chan et al., 2006; Wong & Looi, 2011). Wong and Looi (2011) selected and analyzed a sample of 54 articles on the use of mobile devices to facilitate seamless learning, and found that all 54 articles contained 10 features, including formal and informal learning, personalized and social learning, and learning across multiple durations and locations.

4.3.2 Reaction towards different aspects of the designed online course

Table: 39 Intensity Indices Showing Different Aspects(Physical Aspects) of Online Course helped students Learning Topic “Communication” and “Graphic Aids”

Physical Aspects	I.I
Colour combination in the e-content was soothing.	4.83
The e-content was well designed.	4.79

Background music in e-content was pleasing	4.62
Each page was organized properly	4.52
e-content worked smoothly.	4.47
Verbal commentary helped in understanding the concepts in better manner.	4.45
Pages were linked well.	4.45
All the button in the e-content worked properly.	4.42
Background music in the e-content increased concentration.	3.85

The above table reveals that All the Physical aspects of the Online course helped students to learn to Great extent and the Colour combination in the e-content was soothing, the e-content was well designed, Background music in e-content was pleasing Each page was organized properly, e-content worked smoothly, Verbal commentary helped in understanding the concepts in better manner, Pages were linked well, All the button in the e-content worked properly, Background music in the e-content increased concentration.

Table: 40 Intensity Indices Showing Different Aspects(Content Aspects) of Online Course helped students Learning Topic “Communication” and “Graphic Aids”

Content Aspects	I.I
Translation in Gujarati of the content helped in understanding the definitions and explanation of the content.	4.81
“Glossary of terms” helped in understanding the concepts.	4.80
Language used in e-content was easy to understand.	4.80
Visuals were relevant to content.	4.72
Examples given in the content increased clarity of concept.	4.71
Content in the developed e-content was explained in detail.	4.63

Content in the e-content was self-explanatory	4.63
Examples given in the developed e-content were sufficient.	4.58
Examples given in the developed e-content were appropriate.	4.58
Content was logically sequenced.	4.56
Visuals were sufficient.	4.56
Content in e-content follows by learning principles i.e. known to unknown and easy to difficult.	4.54
Instructional page in the e-content had complete information about how to operate it.	4.54
Visuals were self-explanatory	4.51
Summarization at the end of each topic helped in knowing the important things to remember from the module.	4.49

Content aspects of the online course helped students to learn to Great extent were Translation in Gujarati of the content helped in understanding the definitions and explanation of the content, “Glossary of terms” helped in understanding the concepts, Language used in e-content was easy to understand, Visuals were relevant to content, Examples given in the content increased clarity of concept, Content in the developed e-content was explained in detail, Content in the e-content was self-explanatory, Examples given in the developed e-content were sufficient, Examples given in the developed e-content were appropriate, Content was logically sequenced, Visuals were sufficient, Content in e-content follows by learning principles i.e. known to unknown and easy to difficult, Instructional page in the e-content had complete information about how to operate it, Visuals were self-explanatory and Summarization at the end of each topic helped in knowing the important things to remember from the module.

Table: 41 Intensity Indices Showing Different Aspects (Evaluation Aspects) of Online Course helped students Learning Topic “Communication” and “Graphic Aids”

Evaluation Aspects	I.I
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After each module and sub-topic in the module, the test helped understanding of the content.	4.62
Questions asked were easy to understand.	4.58
The number of evaluation items was adequate for providing feedback.	4.49
Gaming in the test was interesting.	4.48
Answer keys given for each evaluation items helped in self-correction of answers.	4.44
Questions given in the e-content helped in preparing for the test.	3.72

Evaluation aspects of the online course helped students to learn to great extent were that After each module and sub-topic in the module, the test helped understanding of the content, Questions asked were easy to understand, The number of evaluation items was adequate for providing feedback, Gaming in the test was interesting and Answer keys given for each evaluation items helped in self-correction of answers. Evaluation aspects of the online course helped students to learn to some extent was Questions given in the e-content helped in preparing for the test.

4.3.3 Reactions towards the problems faced while learning through the designed online course

Table: 42 Percentage Distribution of Reactions of the Students from Experimental Group towards Problems Faced while Learning Through an Online Course

A- Agree

DA- Disagree

UN- Undecided

Problems	A	DA	UN
There was interruption in learning because the e-content did not run properly	29.5	65.3	5.3
There was interruption in learning because the computer used to get hanged due to heavy content	20	72.6	7.4
Background music was distracting	16.8	73.7	9.5
verbal commentary was distracting	12.6	83.2	4.2
Faced Difficulty in understanding:			
a) Language	9.5	86.3	4.2
b) Test	7.4	87.4	5.3
c) Visual	9.5	88.4	2.1
d) Audio	7.4	85.3	7.4
e) Video	21.1	75.8	3.2
Note making was difficult	15.8	78.9	5.3
It was found difficult to operate e-content	18.9	77.9	3.2

Tension and anxiety were faced while learning through e-content	14.7	78.9	6.3
Learning lessons through e-content was scary experience.	8.4	85.3	6.3
It was difficult to learn without physical notes	26.3	72.6	1.1
Internet connectivity was creating problem in learning	31.6	60	8.4
Self-regulated learning is not possible at undergraduate level.	31.6	61.1	7.4

It was noticeable that low percentage of students faced problems learning through online course. Problems faced while learning through online course that Internet connectivity was creating problem (31.6%), Self-regulated learning was not possible at undergraduate level(31.6%), There was interruption in learning because the e-content did not run properly (29.5%), It was difficult to learn without physical notes (26.3%), There was interruption in learning because the computer or mobile used to get hanged due to heavy content(20%), It was found difficult to operate e-content (18.9%), Background music was distracting (16.8%), Note making was difficult (15.8%), Tension and anxiety were faced while learning through e-content and verbal commentary was distracting (12.6%), Students reported that they faced difficulty in understanding: Language (9.5%), Visual (9.5%), Test (7.4%), Audio (7.4)% and Learning lessons through online course a was scary experience.

4.3.4 Suggestions of the students of experimental group to make designed online course more effective

Table: 43 Percentage distribution of Suggestions of the students of experimental group to make designed online course more effective

Suggestions	Agree	Disagree
Visuals can be made more interesting	65	68.4
More visuals should be added for the content clarity	60	63.2
More games and indirect evaluation methods should be there in the e-content.	55	57.9
e-content can be made more self-explanatory	46	48.4
The bilingual content can be more helpful.	41	43.2
Colour combination of the pages can be better	40	42.1
With the question bank answers to the question asked should be given	39	41.1
Background music can be more pleasing	37	38.9
e-content should complement / supplement teacher's teaching	31	32.6
Tests should be given at the end of the whole content	30	31.6
More examples should be added for better understanding of concepts	30	31.6
Note taking facility should be made more flexible	26	27.4
The complete content should be bilingual	24	25.3
e-content should be loaded with less information	11	11.6

The students suggested that Visuals can be made more interesting (68.4%), More visuals should be added for the content clarity (63.2 %), 57.9% of students suggested that more games and indirect evaluation methods should be there in the online course, e-content can be made more self-explanatory (48.4%), The bilingual content can be more helpful (43.2%), Colour combination of the pages can be better (42.1%) , The question bank answers to the question asked should be given (41.1%), Background music can be more pleasing 38.9 % , e-content should complement / supplement teacher's teaching (32.6%), Tests should be given at the end of the whole content (31.6%), More examples should be added for better understanding of concepts (31.6%), Note taking facility should be made more flexible (27.4%), The complete content should be bilingual (25.3%), e-content should be loaded with less information (11.6%) will make the online course more effective.

4.4 Conclusion:

It was observed that the designed online course on “Introduction to Extension and Communication” was effective in teaching the undergraduate students. It was also noticeable that the students are still not ready to learn through self-regulated and self-instructional education mode. Thus, the result of the present study suggests that the blended mode of learning that is an instructor led technology based learning proves to be more effective. The reason for this could be that the undergraduate students cannot comprehend well with self-regulatory and only self-instructional technology based educational tools. Such courses and the mode of the teaching –learning can be used for undergraduate students in formal system. Though English being is a compulsory language at school level, it is still not the first language of study and affects the gain in knowledge of the students. So, while designing an online course if the local language support is provided, it can improve the comprehension level of the students. More interesting visuals and visual based content proves to be more effective so, while designing online course more visual with less and easy to understand content should be added. Online courses gives an opportunity to develop courses that are more learner centred. Online education is standardised, delivers quality and innovative education to all the learners irrespective of their gender, age, grasping ability or socio-cultural background. It provides unbiased education and meets the heterogeneous learners’ needs. Online education provides opportunity to reach out large number of learners at a time. It also helps learners to learn anytime and anywhere. Thus, the online course can be offered and tried with students from varied background. The online courses can be offered on various subjects of Family and Community Sciences/ Home Sciences as it helps give holistic learning approach. The knowledge resource from the best brains of various institutes, colleges and universities can to be used for bringing about a standardized and high quality content with innovative technological approach. Technology based education leads to equality among learners. The present research conclude that modernization of education in Indian colleges and universities is a necessary attempt. The syllabuses, subjects and courses should be planned in such a way that it satisfies the needs of learners. Infrastructures should also be standardized so that it satisfies the basic needs of every student. On the technology support side it needs to have adventurous faculty collaborators willing to share both their content expertise, and their experience as effective teachers and communicators. When the world of knowledge is knocking the doors of Indian Higher Education, as a member from education fraternity one should warmly welcome and accept it. Here, Indian education system can be the knowledge

generator according to the needs of Indian students, why to just stay back and be the user of that knowledge. Therefore it can be concluded that necessary attempt should be made with technology based education in the area of higher education.

4.5 Suggestions:

- ▶ More courses should be developed using localized approach
- ▶ Teaching faculties should explore more open source software to design and develop online courses
- ▶ More research studies should be taken up to develop more online courses for Family and Community Sciences/ Home Science
- ▶ The online courses should provide more visual content
- ▶ The online content should provide local language support
- ▶ The research studies and projects can be taken up to do comparative studies of different technology based education
- ▶ More technical support and encouragement should be provided to the students to accept and learn through innovative technology based educational approaches