CHAPTER-5

SUMMARY

1.1 INTRODUCTION

Higher education is generally understood to cover teaching, research and extension. It is the source or feeder system in all walks of life and therefore supplies the much-needed human resources in management, planning, design, teaching and research. Scientific and technological advancement and economic growth of a country are dependent on the higher education system as they are on the working class. It also provides opportunities for life- long learning, allowing people to upgrade their knowledge and skills from time to time based on the societal needs (NAAC, 2006). The report of the UNESCO International Commission on Education in the 21st Century titled "Learning: The Treasure Within" (popularly known as Delors Commission) emphasized four pillars of education: learning to know, learning to do, learning to live together and learning to be. While, higher education intends to inculcate all these four in individuals and the society, the report highlighted the following specific functions of higher education too:

- To prepare students for research and teaching;
- To provide highly specialized training courses adapted to the needs of economic and social life;
- To be open to all, so as to cater to the many aspects of lifelong education in the widest sense; and
- To promote international cooperation through internationalization of research, technology, networking, and free movement of persons and scientific ideas (UNESCO, 1996).

The new technological avenues are changing the face of the higher education system. E-learning is one of the powerful technological intervention happen in the area of education. E-learning (Markovi 2010) enables higher interactivity among professors and students and study material coverage in both undergraduate/graduate students. Further, professors and assistants ensure that students' critical thinking is developed, and to provide them freedom in discussion, topics choice, exchange of ideas and information, and expansion of knowledge.

With time, when technology grows, e-learning helps students to cope up in an easy manner. Over the years it has become a popular medium due to its flexibility and better innovativeness. E-learning is commonly referred to the intentional use of networked information and communications technology in teaching and learning. It is known as widely as online learning,

virtual learning, distributed learning, network and web-based learning. They all conceptualize the educational processes that utilize information and communications technology (ICT). However, these terms cannot be used synonymously with e-learning because it comprises more than these. The word "*e"* in "*e-learning"* stands for "*electronic"*, e-learning would incorporate all educational activities that are carried out by individuals or groups working online or offline, and synchronously or asynchronously via networked or standalone computers and other electronic devices (Romiszowski, 2004). The growth of e-learning is directly related to the increasing access to information and communications technology, as well it's decreasing cost.

Developments in internet and multimedia technologies are the basic enabler of E-learning. It is commonly thought that new technologies can make a big difference in education. Ministry of HRD, Government of India has introduced several online course development programs viz., National Programme on Technology Education Learning (NPTEL) by offering free online video lectures in engineering, science and humanity courses. NPTEL is an open courseware initiative collaboratively started by seven Indian Institutes of Technology (IITs) and Indian Institute of Science (IISc). The purpose of online course development is to create an information rich society. Everyone in the society is empowered to create, receive, share and utilize information for their progress. Very well designed, developed and validated online course will provide access to high quality meaningful digital content and serve as an effective virtual teacher. Many important developments have occurred in education with the arrival of the net. Nowadays, even the youngest of persons are able to effectively use smart phones, internet, text messaging etc. Thus implementing an e-learning course has become an easy matter. Social media, message boards and other forms of online communication allow learners to stay in touch and conduct discussions on course materials, thus giving a feel of a community.

5.1.1 Characteristics of Online Learning

E-learning has certain amount of characteristics that differentiates 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.

Is an online course alternative of chalk and talk method?

The e-learning does not seem to replace the conventional classrooms with black boards but it seems to coexist with the already existing system. "Chalk and talk" is still the predominant method of delivering instructions and traditional face-to-face meetings can still be effective. Using an online environment and saving course time for discussion, questions, and problem solving will be quite effective in content delivery. Many instructors have found that they can save time and increase student learning by allowing students to engage in the material outside of the class. This allows them to use face-to-face time for troubleshooting. Online discussions give many students the opportunity to express themselves in ways they could not in a regular class. Many students are reluctant to speak in class because of shyness, uncertainty, or language issues. It's a boon to many students to have the ability to take their time to compose questions and answers in an online discussion, and instructors report much higher participation levels online than in class. Primarily the traditional methods of learning have been in use in the education. But ICT enabled education, training and learning is much more convenient than traditional methods.

Can online course replace teacher in class room?

Technology has immense potential to upgrade today's educational system. Though there are several advantages of making use of technology in teaching, the question remains – can technology replace teachers in future classrooms? Well, the answer is clearly no. Though beneficial, technologies can never replace a teacher. No matter how advanced or smart a computer program or a product is, it can never come close to the knowledge and life experience

a teacher brings. A teacher leads, guides, facilitates and mentors a student. They are role models who set an example to students and drive them towards a brighter future.

5.1.2 Need for Online Teaching and Learning

Over the years, many reasons have come up which has led to a greater demand for e-learning as an alternative method of teaching and learning. Some of them are outlined as below:

a. Teachers' shortage: the quality and quantity of good teachers is a problem that plagues the education system today. Teaching as a profession is not an option for many individuals today.
b. A3 (any time, any place, any pace) learning: (Huang, 2010) This enables the learners to take to studying 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.
c. Enhanced learning experience: e-learning enables a high degree of personalization and a wide range of instructional methods. Powerful simulation environments, multimedia capability and high-end visualization support enables a learner to relate to the subject much more deeply and hence understands well.
d. Content creation: India, despite her IT prowess, is still a poor contributor of content in the Web. Adopting e-learning enables and encourages one to do this naturally, some once work is already online, perhaps with a limited reach and once are comfortable with this, it is a small step to reach out to the world.
e. Enhancing quality of teaching: it goes without saying that e-learning can help in strong networking with other teaching and learning professionals widening the area of subject knowledge. (Kumaresen, 2002)
f. More systematic feedback and evaluation: Bringing assessment and other activities under e-learning enables to gather much more detailed feedback on various aspects of the course.

5.1.3 Benefits of Online Learning

Increasingly, organizations are adopting online course as the main delivery method to train employees. At the same time, educational institutions are moving toward the use of the internet for delivery, both on campus and at a distance mode. For the instructor, tutoring can be done at any time and from anywhere. Online materials can be updated, and learners are able to see the changes at once. When learners are able to access materials on the internet, it is easier for instructors to direct them to appropriate information based on their needs.

- Multi-access: Despite teacher, student or tutor, the accessibility of information is made available 24 x 7 days on websites. The challenge part is access of information by users for which project implementers have to update the websites continuously. Adoption of technology in eLearning not only helps the individual but also benefit multiple users at the same time.
- Speed: Using electronic resources, Search feature has become quicker and faster to extract the page. Integration of information from one to many, cross-search reference between different publications has become little easy.
- Functionality: Starting with content page to Index page with prominent links will ease user navigation skills. E-Resource will also allow user to identify the publication with a single on-mouse click.
- e-Content: e-Resources can contain a vast amount of information, but more importantly the material can consist of mixed media i.e. images, video, audio and animation which could not be replicated in print.
- Storage: With the increasing storage capacities and multi-variant devices, the ability to store and retrieve large amounts of information has become simple and transparent. Various storage devices like Servers, CD-ROMs, Pen Drives, Hard Disks and Internet Bandwidth are improving their capacities to handle substantial amount of content over the web.

5.1.4 Challenges and Issues of Online Learning for Higher Education

The recent statistics reveal that there is a dearth of quality teachers for various education programs in the country. It became a major hurdle in providing quality education to students and achieving socio-economic development of the country. Hence, a set of quality experts contribute to build such content that can be made available on websites of the institutes, accessible to all groups of users. To meet this goal, Government of India has recently issued guidelines for online course development (UGC, 2012). Another hassle in manual content is search feature which is of course, dynamic in online resources. Retrieval of vast content is so quick with online search feature in online course resources. But the challenge lies in the internet penetration which is little slow in India, though we have occupied third position beating Japan recently. Only 14% e-literacy is observed against 74% of literacy rate among the country population. e-learning and online course both are proportionately related to each other in library domain. Particularly, in distance learning institutions the skills up gradation is

becoming compulsory. Essentially, the receiver must also possess thorough knowledge in using these technology based literature and online services. Having insufficient internet bandwidth and power constraints are big challenges in the Indian context. Since the technology depends on expensive tools like server, personal computer, scanner, photocopier etc thus, selection of automation tools will remove economic inequality among the users. A standard tool that can support all the activities of library in a University by providing not only English content but also content that supports other languages going to play a key role (Parul Sharma et al).

- Inadequate and uncoordinated Information and Communication technology characterized by low access and utilization.
- Lack of formal training in teaching and poor teaching aids/laboratory equipment.
- Sound knowledge of practical examples of use of Open Educational Resources to illustrate key points and up-to-date Knowledge of the arguments for and against use of Open Educational Resources.
- Expertise in technical skills to develop and maintain web platforms to host Open Educational Resources online, as well as to share the content and meta-data with other web platforms.

5.1.5 Importance of Online Content Development

Ministry of HRD, Government of India has introduced several online course development programs viz., National Programme on Technology Education Learning (NPTEL) by offering free online video lectures in engineering, science and humanity courses. NPTEL is an open courseware initiative collaboratively started by seven Indian Institutes of Technology (IITs) and Indian Institute of Science (IISc). The objective of this programme is to enhance the quality of engineering education in the country by developing more than 200 curricula-based video and web courses. Enhance Education of IIIT Hyderabad is offering teacher training program for engineering college faculty giving importance of electronic content for the Indian society. A Certificate program in Information Technology for engineering college students is also being offered to make them industry-ready in the form of using Learning-By-Doing (LBD) methods. National Mission on Education through ICT, another MHRD initiative that concentrates on developing hands-on workshop and remote learning on electronic stream called 'Virtual Labs'. The objective is to cater both post-graduate and under-graduate students who do not have sufficient infrastructure lab facilities in the colleges, can participate in this online hands-on workshops. Considering another example of IGNOU online courses for distance learners that

was another high quality experiment inspired many other education institutions to deliver online courses in electronic form for students. The advantage of keeping content on Internet is that helps user to access the information whenever and wherever he want.

The Four Quadrants of Online Course Module for Development of Online Course: (Guidelines by the MHRD, National Mission on Education through ICT (NME-ICT), Consortium of Educational Communication (CEC))

Quadrant-I (e-Text):

Text should consist of at least 8 pages or minimum 3000 words with detailed write-up on the topic of module in the .rtf/.doc/.odt format. The number of words/pages must be sufficient to make the narrative of the topic clear such that independent learning is also possible. Language should be very simple. Topic should be presented in systematic and logical manner.

The module must consist of the following elements:

• Self-check exercises • Examples & Applications from day to day life, if applicable • Illustrations (Images, Maps, Graphics (2D & 3D) • Appropriate URLs wherever required • Latest Developments and Trends • Summary

The textual description should also be enriched with multimedia supplements, wherever applicable / possible. Multimedia supplements may include images for which resolution should be about 600 dpi, animations, graphics, video or audio clips, line drawings, hand drawings.

Self-check exercises are problems with answers given to learners that allow them to assess how they are doing on an ongoing basis. Doing them online with self-grading provides immediate feedback. Self-check exercises are to be built in the body of the text.

Applications from day to day life, if applicable should be incorporated. For each topic or subtopic, Content Writer should use examples to explain the module, if required.

The summary will help a learner to quickly review of the module.
Text Format: The text may be divided into sections, subsections and, where necessary, **sub-subsections.**

a) Fonts: Format the text using a “Times New Roman” or “Arial” font (size 11). Maintain uniform font size and style through-out the text with single line spacing. Assign sequential page numbers to the module.
b) Formatting Sections, Subsections and Sub-subsections: The first section should state clearly the objective of the work, its scope and the main advances reported, with brief references to relevant work.
c) Style, Spacing and Numbering: The preferred format for numbering the sections 1.,2.,3., …. in Times New Roman Bold. The subsection should be numbered as 2.1.,2.2.,2.3., …. in Times New Roman Italics and the sub subsection should be numbered as 2.3.1.,2.3.2., ….. in Time New Roman Italics.

Quadrant-II (Self-Learning - Audio/Video)

Content delivery through Video to explain the topic is an essential component (self-learning) of each module of the online course. It may include Multimedia, Animation, Documentary, Simulation, Virtual Lab, etc as may be appropriate.

The Video must not be like a spoken tutorial (audio narration / voice-over of text mention in presentation slides). A clear visual description as well as text is required. Training demonstration, illustration of examples, case study, documentary, etc should be added wherever applicable / possible.

It is possible that a content writer / domain expert is not fully acquainted with art of creating multimedia / graphics. In such cases, content writer should describe his / her multimedia requirement using a story board.

The duration of Video should be 30 Minutes. Video tutorial explains the topic of a module. It should be initiated by the content writer / expert. The writer / expert may appear in the video, generally, not less than 25% of the time. Rest of the time which may include in-between sections or sub-sections, or during display of graphics, animations, PPTs and other relevant visuals video timeline may carry writer/expert’s voice.

The expert/writer whose video is being recorded should look straight into the lens and talk to the camera.

The format of video must be MPEG4. The quality of video should 720x576 (pixel), 25 (frame/second), 450 (TVL resolution), 450 Mbps for incorporation in the template.

The audio has to be clear and of superior quality. Ensure that there is no distracting background noise. The equipment used should be professional one.

Presentation: The presentation may be a part of video. The format for presentation would be PPT (PowerPoint Presentation program). During preparation of presentation: • Avoid using long blocks of text. • Use preferably bulleted points. • Use fonts like Arial, Verdana, Helvetica or Myriad pro etc. • Use font size not less than 20 for clear visibility. • Add graphics and images as much as possible appropriately.

*Quadrant-III - (Learn More / Web Resources / Supplementary Materials***):**

Learn more quadrant is about the supplementary material of respective modules in different forms. These may be in the form of: • Books, articles, research papers, journals, case studies etc. • Links to web sites giving additional readings, Wikipedia, blogs, open source content etc. • Glossary.

Quadrant-IV - (Self-Assessment)

For Self-Assessment, The Content Writer / Expert should provide minimum 10-15 questions for each module in one or more of the following formats. i) Multiple Choice Questions with Answer ii) True & False Statements

5.1.6 UNESCO and Sustainable Development Goal Four focusing on Blended learning as initiative for Quality of Education

Throughout Asia and the Pacific, there are growing demands for more flexible pathways to accessing quality higher education and lifelong learning opportunities for all. Technology offers unprecedented opportunities to meet the needs and expectations of the next generation of learners. Building on increased internet access and mobile platforms, blended learning – i.e. the fusion of online and face-to-face contact time between teaching staff and students provides a means to enhance quality, equity, and access to lifelong learning opportunities, which is a key goal for UNESCO. Issues about the quality of education are at the heart of the Sustainable Development Goals, which were adopted during the United Nations Sustainable Development Summit in September 2015. Sustainable Development Goal four, known as Education 2030, aims to ensure inclusive and equitable quality education and lifelong learning opportunities across all modes of formal and non-formal learning. In this way, blended learning is a valuable approach for UNESCO to help promote inclusive education, including reaching those who are marginalized or in vulnerable situations.

This is especially important in Asia-Pacific – the world's most populous and most disaster prone region – so that learners can continue to study without a physical classroom or campus. In all settings, we need to address essential questions such as: Blending what? Learning what? In other words, how does blended learning work in practice? And how can policymakers and institutional leaders promote effective governance and sustainability of these emerging systems to support lifelong learning? Despite promising practices, the sustainability and scalability of blended learning has been an enormous challenge.

On account of continual rapid advancements in information technology and growing familiarity with that technology among younger generations, several scholars on Blended learning have rationalized complementing traditional classrooms with online tools and materials. Graham, Allen and Ure (2003, 2005) put forth three reasons for utilizing Blended Learning:

1. Through Blended learning teachers can improve their pedagogy by creating a more interactive, student-centered learning environment for students.

2. Using Blended learning provides learners with the increased access and flexibility of online materials and tools without sacrificing the human interaction of Face to Face contexts.

3. Blended learning is much more cost effective than traditional classrooms

According to Graham (2006), "blended learning systems provide an opportunity for reaching a large, globally dispersed audience in a short period of time with consistent, semi-personal content delivery" (p. 10). Studies on Blended learning (Rovai & Jordan, 2004; Tayebinik & Puteh, 2012) also seemed to indicate that Blended learning courses create a stronger sense of community among learners in a particular context than both completely online learning environments and traditional classrooms. Blended learning can provide learners with the Face to Face human interactions that online courses lack; at the same time, through Blended learning instructors can create a virtual learning space for more introverted students to express themselves, a space which they may not get in Face to Face classrooms dominated by more extroverted peers.

Blended learning in Higher Education

Blended learning is more than just a hot new trend in education—it's the way classrooms of the future will work. The concept behind blended learning is to take the best elements of in-person classroom instruction and online instruction and combine them. In a blended classroom, students attend classes in person and watch lecture videos or complete online activities. By combining online and in-person elements, educators today are creating the best learning environment possible through blended learning. Blended learning has become extremely popular in higher education settings. Blended classrooms allow greater flexibility for students and can encourage non-traditional students to pursue higher education. This approach also saves professors time, as they can record a lecture one time and use it indefinitely, rather than delivering the same lecture to multiple classes each semester. One common approach to blended learning in the college classroom is to use a flipped classroom method. In the flipped classroom, students watch lecture videos or complete readings on their own. During class, students discuss what they learned or complete supplemental activities to enhance their understanding.

With this approach, classes can meet in-person less frequently. Instead of meeting twice a week, professors might assign lecture videos and readings for students to watch on their own time. Class can then meet once a week to discuss, ask questions, and work with the information they have learned. Just like K-12 educators, college professors must think carefully about which elements of their classroom will work best online. Difficult topics that students typically

have lots of questions about may not work well in a digital format. Professors must also make sure that they are available online to help students, just as they would be in person.

5.1.7 Characteristics of Online Course Development

According to Saxena (2011) explained the possible methods of educational online courses conversions are viz.,

(i) learning by doing and learning by investigation;
(ii) learning by using themes;
(iii) learning by testing / evaluation;
(iv) learning by simulation and
(v) learning by role-playing.

As per the UGC (University Grants Commission, India) guidelines of online course development needs the following categories viz., (i) home; (ii) objectives; (iii) subject mapping; (iv) summary; (v) text with pictures & animations; (vi) video and audio; (vii) assignments, quiz & tutorial; (viii) references, glossary & links; (ix) case studies; (x) FAQ‟s; (xi) download; (xii) blog and (xiii) contact. These categories are arranged sequentially by subject experts along with technical supporters and to develop the online course materials. E-learning is a process and online course is a product. Online course is generally designed to guide students through lot of information in a specific task. An online course package can be used as a teacher in the virtual classroom situations. The quality of learning depends not only on the form of how the process is carried out but also on what content is taught and how the content is presented. This approach of teaching has become an answer to the complicated problems and un-identified areas. In a class room, technology stimulates the learner and gets the learner involved in the learning. Books are an extension of brain; video is an extension of eye; audio is the extension of an ear; audio conferencing is the extension of mind & vocal cord; computer is an extension of fusion on mind, hands & eyes; satellite technology is an extension of human reach and computer network is an extension of human co-operation. So what we would expect from online courses that it should be able to stimulate the learner in such a way that we utilizes the maximum of its potential in learning (Vijayakumari, 2011) online course is valuable to the pupil and also helpful to teachers for all individual instruction systems; online course is the latest method of instruction that has attracted more attention to gather with different concepts. The ultimate aim of the online course is abolish the disparity among the learners through effective education. Online course is facilitating to the teacher to effective

manner. It is enhancing the learner knowledge level which leads to creative thinking and it gives the future ideas on the basis of given links, and references.

e-learning comprises all forms of electronically supported learning and teaching. The Information and communication systems whether networked learning or not, serve as specific media to implement the learning process. It may be classified as Online and Offline. The online learning occurred through, e-forum, SMS / MMS, Search engines, Meta search engines, e-dictionaries, e-books and e-journals. Whereas the off-line learning occurred through MS Office applications, power-point presentations, downloaded documents and CD ROMs.

There is a need innovative work in online course material as a form of digital literacy in educational settings particularly to investigate the implications of new forms of social networking, knowledge sharing and knowledge building. And finally, because of the pervasive nature of online course as a digital technology, the commercial interest that is invested in it and the largely unregulated content of Internet based sources; we also need to begin to sketch out what a critical digital literacy might look like. There is, in short, plenty to be done if we are to prepare children and young people to play an active and critical part in the digital future. Looking at the above view the research had few questions:

Research Questions:

- Can e-learning be solution to issues in Higher Education?
- Can students with minimum exposure to ICT learn through online course?
- Can an online course be designed with the use of available software/ open access software?
- Can an online course be implemented/ executed with minimum infrastructure in class?
- Is there a scope to develop an online course for undergraduate students?
- Can online learning be implemented effectively with students with heterogeneous background?
- Can students gain higher knowledge by learning through online course than tradition ways?

5.1.8 Need of an Online Course for the students of Family and Community Sciences/ Home Science:

- Majority of the students admitted in the Home Science/ Family and Community Sciences are from Gujarati or vernacular medium schools. Against it the courses offered at the

university are through instruction in English. This makes it difficult for the students to grasp.

- It was observed and learned that the students attended form a heterogeneous group with diverse, languages, past experiences and abilities of perception. They also bring with them different educational backgrounds. Hence they may find the subjects on the curriculum as alien to their knowledge and understanding.
- The semester system, which allows just 90 days to complete the study. The system and the stipulated time allowed for study pose additional problems to students to a new setup of educational programme. They ever feel everything being compressed beyond limits and they feel its pressure so badly.
- With all these, absenteeism remains wide spread temptation amongst girl students' tendency on multiple grounds like responsibility at home, health problems, natural calamities and unrest on the university campus.
- In the recent time, the family and community sciences students have increasingly started taking up part time jobs to shoulder the economic burden of the family and to satisfy other materialistic needs. This may divert their attention form study.
- Whether out of compelling condition or tendency formation, if students keep away from regular training programmes it will have season effect on the quality of student graduates that the system churns out. Hence, a need may be felt in the present contact to provide an optional way to study that one can study on own pace. The e-course facilitates a kind of self-study on the part of students in which teachers may view their role as counselors.
- For higher education, the needs are diverse as compared to education act schools. More of conceptual information need to be given to students and much of self-learning has to take place. The online course may provide an opportunity to impart conceptual information in detail with facts and figures.
- The students who join home science / family and community sciences course, majority of them are Low and average achievers. Their IQ and level of grasping is low. Maximum of high achievers tend to join professional course. Whereas it is assumed that online course may help average and low achievers to learn better and at their own pace to perform better.
- Some of the course we have are really dry and theory based courses which makes learning quite monotonous and demotivates students to learn that courses, online learning can make such heavy theatrical and dry subject most interesting and easy to comprehend. The gaming and visual may lead to better comprehension of subject and long lasting learning.

5.1.9 Need to Develop Online course on Introduction to Extension and Communication

The researcher decided of designing an online course on a foundation course for the students of faculty of family and community sciences. It was thus, decided to develop a course on "Introduction to Extension and Communication" which is offered to undergraduate students at introductory level. It was decided to develop an online course on this subject as the research has her specialization in the same discipline and the researcher has taught this subject at undergraduate level for four years. The course is offered to undergraduate students in first year in first semester. The course has both theory and practical aspects. It was decided to develop online course on this subject as students do not have prior knowledge or exposure about the subject during their schooling. The students come from varied background that includes their medium of instruction, their stream of study and their socio-economic status. Thus it was decided to design an online course on subject "Introduction to Extension and Communication".

It was also found that most of the home science colleges offer this course at undergraduate level. The base of the course was taken from the outline laid by Department of Extension and Communication, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara. It is an approved course structure from university board of studies. The course offered is (2+1) = 3Credit course. That includes 2 credits theory and 1 credit practical. Looking at the existing course outline learning objectives and learning experiences for the learners were drown. The language of the course, the reference material and level of difficulty in the course was discussed with the course teachers of the department to make it more learner centric. A clear guideline with leaning objectives and outcomes were formatted with the help of course outline and course teachers teaching the same course. The outputs were laid down as guideline and inputs for the Design phase.

The first year students are generally the fresh passed out from 12^{th} standard from school. They are usually habituated with the formal classroom learning system, where they learn from a teacher. Physical presence of teacher is very essential for students at that phase. They are not at the age and phase of life where they remain responsible for their learning and regulate their study time. Whereas, absence of teacher makes students insecure and inattentive towards learning as they are fresh passed out from school. They are young and excited towards new learning environment. The first year students who are 18 years old are competitive demanding. They are more comfortable and used too with the use of new age media. By keeping the above

possibilities in mind it was thought of teaching online course in blended mode. Teacher as a complimentary aspect of teaching learning process.

5.1.10 Objectives of the study:

- To design an Online course on "Introduction to Extension and Communication" offered to the first year students of Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara
- To validate the designed Online course on "Introduction to Extension and Communication" offered to the first year students of Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara
- To study the effectiveness of the designed Online course on "Introduction to Extension and Communication" in terms of gain in knowledge amongst the first year students of Faculty of Family and Community Sciences
- To study the significant differences in the effectiveness of the designed online course on "Introduction to Extension & Communication" in terms of gain in knowledge within the First year students in relation with the following variables:
  - Medium of instruction at school
  - Stream of Study in Higher Secondary Examination/ Equivalent
  - Level of Education of Parents
  - Family Income
  - Usage of Computer and internet user
  - Exposure to ICT
  - Budget for Internet Usage
- To study the reactions and feedback of the first year students regarding designed Online course in reference to:
  - Features
  - Aspects
  - Problems Faced while leaning
  - Suggestions

5.1. 11 Null Hypothesis:

- There will be no significant difference in effectiveness of designed Online course on "Introduction to Extension and Communication" between the pre and post gain in knowledge amongst the first year students of Faculty Of Family And Community Sciences

▶ There will be no significant differences in the effectiveness of the designed Online course on "Introduction to Extension & Communication" in terms of gain in knowledge within the first year students in relation with the following variables:

- Medium of instruction at school
- Stream of Study in Higher Secondary Examination/ Equivalent
- Level of Education of Parents
- Family Income
- Usage of Computer and internet user
- Exposure to ICT
- Budget for spent Internet Usage

5.1.12 Assumptions of the Study:

▶ It is possible to design an online course for undergraduate students in higher education

▶ Online Courses can be an effective mode for the Higher Education

▶ The group of students selected for the study will vary in relation to:

- Medium of instruction at school
- Stream of Study in Higher Secondary Examination/ Equivalent
- Level of Education of Parents
- Family Income
- Usage of Computer and internet user
- Exposure to ICT
- Budget for spent Internet Usage

5.1.13 Delimitation of the Study:

▶ The Study is delimited to the first year students of Faculty of Family and Community Sciences, Maharaja Sayajirao University of Baroda, Vadodara

▶ The study is delimited to check the effectiveness of an Online course on "Introduction to Extension and Communication" in terms of gain in knowledge amongst the first year students of Faculty of Family and Community Sciences

▶ The study is delimited to study the following variables

- Medium of instruction at school
- Stream of Study in Higher Secondary Examination/ Equivalent
- Level of Education of Parents
- Usage of Computer and internet user
- Exposure to ICT
- Budget spent Internet Usage

1.2 Review of Literature

2.1 Factors affecting the e-learning, Perceptions and Readiness of students about e-learning

- Studies Conducted in India
- Studies Conducted in Abroad

2.2 Development and Validation of E-content/ E-learning packages

- Studies Conducted in India
- Studies Conducted in Abroad

2.3 Blended Learning Experiences in Higher Education

A review of related studies was conducted in the field of e-Learning Technologies. A detailed analysis of the related literature promotes a greater understanding of the problem at hand and design of the study. The researcher reviewed the literature regarding development and validation of online course. To understand the problem of the study and get insight into the area the researcher reviewed literature in two categories:

Research Trends of the Review of Literature:

The research trends of the reviewed literature studies ranged from 2006 to 2017, a decade time span was taken into consideration. Six studies of factors affecting e-learning, perception and readiness of students regarding e-learning were conducted in India and fourteen in Abroad in places like China, Spain, Jordan, Iran, Malaysia, Lebanon, Macedonia, whereas, no studies were found from the third world countries. Ten studies conducted in India belonged to the category of development and validation of e-content, online course/ e-learning packages, whereas four study reviewed were conducted abroad. Whereas, there were seven studies conducted in the section of blended learning experiences in higher education. The trend suggests that from forty two studies twenty three studies conducted followed exploratory research and survey research design, whereas eleven studies conducted followed experimental research design. Maximum size of sample in survey/ exploratory research design was 7717 and minimum sample size was 36, whereas in experimental research the maximum sample size was 9887 respondents and minimum sample size was 20 respondents. The study of largest

sample size with experimental design was conducted in California, USA. One of the study conducted with the help of Microsoft India and larger sample size with students and faculty of VTU, Karnataka. Trend of sampling technique suggests that maximum studies conducted used random sampling and purposive sampling technique. The tools used for data collection in reviewed studies were physical and e-questionnaire, knowledge/ achievement tests, IQ tests, EESM, Psychometric tests, Psychophysical measuring-bio-feedback test, ELUAT-e-learning usability attributes testing.

It was observed that factors like, Age, Gender, previous knowledge, technical skills, exposure to computer and internet, academic achievement, infrastructure facilities, cultural background and personal values significantly affect the perceptions and readiness of students in e-learning. Except one research reported gender to be non-significant for e-learning.

In all the experimental studies e-learning was found to be effective in teaching and learning content. Whereas, it was observed that students and teachers have readiness towards e-learning and had positive attitude. Some of the initiatives many institutions uploaded their courseware, recorded video sessions, interactive tele-conferencing sessions, online counselling sessions, sample question papers, question banks, online assignments, lab manuals on to their website. The most common available facilities of e-learning were online study material, online syllabus while assignment feedback, tests or quizzes, open forums, web seminars and digital libraries were the least available e-learning facilities. Regarding the benefits of e-learning, the stakeholders felt that access to information related to the course content becomes easy and fast in the e-learning platform, flexibility and interesting content, the audio-visual aspects made learning more interesting and long lasting and further it is easy to reach more students in less time. They all almost equally felt that e-learning platform provides the scope for learning at own pace, at any time, in one of the studies it was also reported that it can help remove the cultural barrier of studying away from home.

The e-contents were developed on the subjects like Thermodynamics, literature, educational psychology, mathematics, agriculture extension and education, science crystal structures and laser physics. None of the study was found in the area of communication.

The blended experience study mainly focused on checking the significant difference and satisfaction level of students and faculties. The studies with blended learning experiences had more subjects related to sciences and technology. Whereas, it was observed that none of study

was conducted with subjects of social science. Whereas, the trend showed that there was a significant correlation between the research samples' accessibility to computer and their attitude and satisfaction to blended learning approach. Findings generally showed that the blended learning was an effective approach in making a profound learning of academic subjects.

Thus, looking at the research trends and understanding the features and scope of online learning it was felt to conduct a study on "Designing an Online Course for Undergraduate Students of Family and Community Sciences / Home Science" to contribute in the area of e-learning and higher education.

5.3 METHODOLOGY

The present study is aimed at **Designing an Online Course for Undergraduate Students of Family and Community Sciences / Home Science** for students of F.Y.B.Sc. (F.C.Sc), Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara. The study was conducted using experimental design in the academic year 2017-18.

Pre-post experimental research design was used to conduct the research. It was decided to take only one experimental group to reduce the error in the experiment and control external variables. The students of first year were selected as an experimental group. There were 103 students enrolled for the experiment but 95 students sustained till the end of experimental period. The procedure followed for the study was as follows:

5.3.1 Population of the Study

The population of the study comprised of First Year B.Sc. (F.F.C.Sc) students, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, of the academic year 2017-18.

5.3.2 Sample of the Study

The sample of the study consisted of 95 First year B.Sc.(F.C. Sc) students of Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, of the academic year 2017-18.

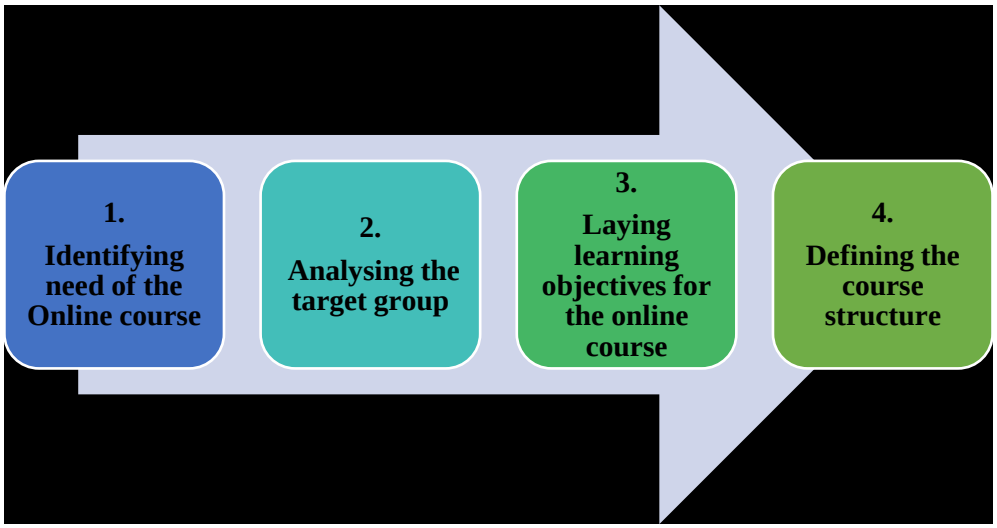
5.3.3 Designing an Online Course

This phase aims at reviewing design and development of an online course. It discusses the stages of developing an online course, the resources and technology required. The components

developed online course and each stage of designing an online course on “Introduction to Extension and Communication” is explained in detail.

It was decided to have an instructor-led and facilitated online course. In this model, a linear curriculum was developed that integrated several content elements and activities into a chronological course or syllabus. The course was scheduled and led by an instructor or facilitator through an online learning platform. E-learning content for individual study was integrated with the instructor’s lectures, individual assignments, and collaborative activities among learners. Learners, facilitators, and instructors can use communication tools such as e-lessons, application sharing, and audio and video to communicate and work together. At the end a final step typically included an exercise or assessment to measure learning.

5.3.3.1 STAGE 1: IDENTIFYING AND ORGANISING ONLINE COURSE



1. ***Identifying need of the course:***

The new technology allows a student to study at his/her flexibility and free time when he/she may feel like studying. He/she does not have to attend classes at fixed hours. It is a mobile

medium. One can study anywhere and anytime, either at home or anywhere may be a library, a classroom etc.

The cost of the production of an online course may be high, but it is a onetime investment. The Online course runs on web portal so the size and space of data is never a problem. It also includes animation, sound and graphics. This proves very helpful in educational programmes for heterogeneous groups. A higher quality of teaching material can be produced and one does not have to worry about shelf-life or corruption of the hardware. For higher education, the needs are diverse as compared to education in schools. A large amount of conceptual information needs to be imparted to students and much of self-learning has to take place. The online course provides an opportunity to impart conceptual information in detail with facts and figures. The majority of students joining Home Science / Family and Community Sciences course are low and average achievers with creative mindsets. A large number of high achievers tend to join professional courses, whereas online courses help average and low achievers to learn better and at their own pace to perform better. Some of the courses we have are really dry and theoretical in nature which makes learning quite monotonous and de-motivates the students to make an effort to learn those courses. E-learning makes such heavy theoretical and dry subjects more interesting and easy to comprehend. The gaming element and visuals leads to a better comprehension of subject. Content can be reused for different learners' groups in the future. This course is not only offered to the first year students of Family and Community Sciences, but also to all Home Science colleges. The online course addresses short-term learning needs.

By looking into the development of the above skill sets, the researcher thought of taking the foundation course on "Introduction to Extension and Communication" which requires developing cognitive, interpersonal, as well as psychomotor skills amongst the students, as the course is structured to give theory as well as practical knowledge to the learners. Thus, this course was chosen for developing an online course. This seemed to be an appropriate content for developing an online course as it could be made more interactive and can generate more interest amongst the students.

2. Analysing the target group

The decision to develop an online course for undergraduate students of Faculty of Family and Community Sciences seemed appropriate because:

If we look at the trend of the last few years of the students getting admitted in Faculty of Family and Community Sciences at the first year level, following were a few observations that were recorded:

- Majority of the students admitted in the Faculty of Family and Community Sciences are from Gujarati or vernacular medium schools. Against this, the courses offered at the university have English as the medium of instruction. This makes it difficult for the students to grasp.
- The students admitted, form a heterogeneous group with diverse languages, past experiences, and differential abilities of perception. They also bring with them different educational backgrounds. Hence they may find the subjects on the curriculum to be aliens to their knowledge and understanding.
- The university has a semester system, which allows just 90 days for completing the study. The system and the stipulated time allowed for study pose additional problems to students in a new setup of educational programme, totally different from the school experience. The students feel pressurized beyond limits in order to cope up with the academic requirements.
- With the afore mentioned issues, the problem of absenteeism remains a wide spread issue temptation amongst girl students' tendency on multiple grounds like responsibility at home, health problems, not just related to girls natural calamities and unrest on the university campus.
- In recent times, the Family and Community Sciences students have increasingly started taking up part time jobs to shoulder the economic burden of the family and to satisfy other materialistic needs. This may divert their attention from study.
- There is a significant amount of content to be delivered to a large number of learners as the course is offered to approximately 400 students at foundation level of Family and Community Sciences, and to many Home Science colleges at the introductory level.
- Learners cannot afford to give stipulated amount of time to learning what interests them as the semester system seldom leaves them with any time. In this case, online courses can give them the necessary time and pace for the learning to take place.
- As the learners join just after their high school, they do not have effective listening and reading skills.
- Learners have at least basic computer and Internet skills in the contemporary digital era;

- These all learners are required to develop homogeneous background knowledge of the course as course is offered at an introductory level to all the undergraduate students
- Whether out of compelling conditions or tendency formation, if students keep away from regular training programmes it will have a seasonal effect on the quality of student graduates that the system churns out. Hence, a need may be felt in the present contact to provide an optional way to study that one can study on one's own pace. The online course facilitates a kind of self-study on the part of students in which teachers may view their role as counsellors and facilitators.
- For higher education, the needs are diverse as compared to education provided in schools. More of conceptual information needs to be given to students and much of self-learning has to take place. The online course provides an opportunity to impart conceptual information in detail with facts and figures.
- Majority of the students, who join Home Science / Family and Community Sciences course, belong to the category of low and average achievers. Their IQ and level of grasping is average or low. Maximum of high achievers tend to join professional course. Whereas the online course with help the average and low achievers to learn better and at their own pace to perform better.

  Whereas following Online course features help learners learn better:

- Simple learning resources;
- Interactive e-lessons;
- Electronic simulations; and
- Testing aids

Thus, it was decided to develop an online course for undergraduate students of Faculty of Family and Community Sciences

3. Laying out learning objectives for the course:

A learning objective is a statement describing a competency or performance capability to be acquired by the learner. Objectives were specified for the course as well as for each single unit. Learning objectives were defined the expected outcomes of each learning unit.

Learning objectives combined two main elements: -

- The expected level of performance (through an action verb, such as "describe" or "explain"); and

- The learning content (i.e. the type of knowledge or skills that must be learned, such as "the process of communication").

Performance Levels for the Cognitive Domain-

- **Remember**: The learner is able to recognize or memorize information.
- **Understand:** The learner is able to reformulate a concept.
- **Apply:** The learner is able to use the information in a new way.
- **Analyse:** The learner is able to decompose and define relationships among components.
- **Evaluate:** The learner is able to justify a decision according to a criterion or standard.
- **Create:** The learner is able to realize a new product or approach.

By keeping in mind the above principles, following objectives were laid for the online course:

- To help learners recognize or memorize the concept and meaning of Extension and Communication
- To help learners reformulate concepts of communication in reference to extension and with special reference to Family and Community Sciences
- To help learners decompose and define relationships among components of Extension and Communication
- To learners to use the information regarding the types of communication aids and their functions in teaching-learning process
- To develop an ability among learners in preparing graphic aids
- To develop understanding regarding the role of various mass media in Extension and Communication

4. Defining the course structure

After laying out the course objectives, the next step was to develop the course structure. The course structure was laid according to the revised Bloom's taxonomy of the cognitive domain, learning objectives implied six different types of cognitive performance, ranging from the lowest performance level (remember) to the highest (create).

The content was structured with reference to the curriculum of First Year B.Sc. (Family and Community Sciences) programme in "Introduction to Extension and Communication". This course is introductory core course offered at first year, in first semester. To decide the content structure for the course "Introduction to Extension and Communication" the investigator first

referred to the course outline of the course “Introduction to Extension and Communication”. The researcher had further consulted the concerned teachers of the Extension and Communication Department that offers this course, regarding the selection of the topics and reference material. To decide the content matter for an online course the investigator referred to numerous books, textbooks and reference materials, audio and video references. After thoroughly studying the available material, duly consulting the expert teachers, and considering practical and theoretical coverage of the curriculum, the content for ONLINE COURSE was selected. The content was structured according to the introductory/ foundation level. After selection of the content the content was divided according to course requirement and difficulty level. After division of the content, it was divided under the following Heads:

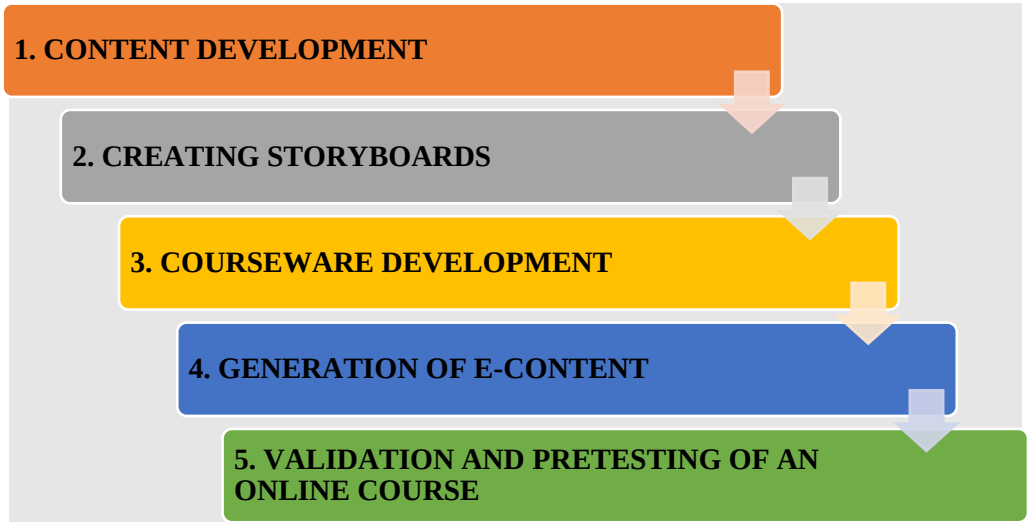
Module : 1 Communication

Module : 2 Graphic Aids

Module : 3 Extension

Module : 4 Mass Media and Communication

5.3.3.2 Stage: II Defining Instructional, Evaluation, and Delivery Strategies



1. Content Development

As this course has been taught at first year level since quite a period of time now, the teaching material was already available with the course teachers. Those were user manuals and technical documentation; classroom course handouts and lecture notes; presentations, such as Power Point slide shows, etc.

The e-learning course will include a set of self-paced e-learning lessons to illustrate basic concepts. Preparing all the required knowledge and information –the "heart" of the course was an essential task.

Process for content development

- Before developing the content for the assigned lessons, the investigator reviewed the proposed learning objectives as guideline to develop course.
- The content and knowledge assessment tests and exercises "match" the lesson objectives at every step in the work flow process in order to make the learning more meaningful.
- All the knowledge needed to meet the learning objectives was provided using reference material, including information that may seem unknown to the learners.
- The examples that were likely to be familiar to the learners were selected and jolted. Students undertaking the course have different backgrounds, so a variety of examples were used. This will help learners understand and remember concepts.
- The concept of the course was developed from easy to complex learning and from known to unknown learning.

Use of Language Style for content delivery:

The content was written directly in a simple and clear manner.

To accomplish this, the sentences were kept short. It was important to only give the readers ideas or information than can be handled at one time. Jargons were avoided. As had to address a multicultural audience, culture specific slang, colloquial language and examples were avoided. Investigator was sensitive to the fact that many learners were not native English speakers. The content was written in a conversation mode. Informal language and contractions (e.g. don't, we're) were used. To make the sentences simpler and clearer the sentences were broken into shorter sentences.

- Personal pronouns (e.g. "you") to refer to learners were used. The instructions were personalised and involved reader. Bulleted lists were used where it felt appropriate.

- Gender-inclusive, non-sexist language (e.g. sexist: “Over the years, men have continued to use non-renewable resources at increasing rates;” gender-inclusive: “Over the years, people have continued to use non-renewable resources at increasing rates.” were used.
- The sentences were constructed in the active voice.
- Acronyms were spelt in full, the first time they were used.

  For references documented case studies; photographs, images, graphs, tables and other illustrative materials; training materials, such as self-study guides, web guides and other distance learning materials; and reference materials, such as specialized thesaurus and glossaries were used.

Scripting for an Online Course:

The scripting of the course content was developed keeping in mind the following principles of e-learning:

- Learner-centred content: The curriculum selected for online course was relevant and specific to learners’ needs, roles and responsibilities. Skills, knowledge and information structured was designed according to learners’ level of grasping, their previous experience and understanding.
- Granularity: The developed content for online course was segmented to facilitate assimilation of new knowledge and to allow flexible scheduling of time for learning.
- Engaging content: The designed content for online course have Instructional methods and techniques used creatively to develop an engaging and motivating learning experience.
- Interactivity: To sustain attention and promote learning for frequent learner interaction was developed.
- Personalization: The designed online course is made keeping in mind the fact that it is self-paced, can be customised to reflect learners’ interests and needs; an instructor-led course, tutors and facilitators would able to follow the learners’ progress and performance individually.

After deciding the contents of the ONLINE COURSE, the researcher classified the main content into various **subtopics** for making it **logically sequenced**. For finalizing on the script, the researcher finalized ideal length of the time for showing each part of the content. With this as a background, entire content was set in frames. According to learning principles and by keeping in mind students’ ability to grasp at a time, the content was further divided in different frames. Lengthy topics were broken in small points with better explanations. While **finalizing**

the script, the researcher ensured proper use of language that was easy to understand and simple to remember.

To generate interest and to make the learning process more interesting, **apt examples and illustrations** were added in the script. For better understanding and to make the learning more interesting and effective the researcher thought of the **apt and interesting visuals**.

The style of communication used for the ONLINE COURSE was **interactive in nature**. To ensure effective learning, extra explanation was provided for difficult words and terminologies.

The added feature was a link to **"Glossary of Terms"** provided by the researcher.

To ensure that the content was understood well and for the purpose of **self-evaluation,** small tests were prepared after each subtopic and topic. To make this process of self-evaluation more interesting, an element of game was added in the tests.

"Question Bank" was developed as an added feature to learning. Question bank was developed for the students so that they could have the idea of the type of questions that come in the exam and also for the purpose of practicing before giving the exams. This was initiated with the help of formulating a self-evaluation pattern in the form of a game so that the students could evaluate themselves with ease in a pattern that is not monotonous.

The investigator added **verbal commentary** into the ONLINE COURSE content, for memorising and better learning. The vocal content was developed so as to help learners having lower reading, writing and grasping ability and also from the students studied in vernacular medium in school

For the students' ease the investigator thought of making the content less complex, fast to grasp and fast to remember, and for this purpose summary of each chapter was developed. **Summary** of content helps the students to learn topic at a glance and remember the content learned by the students. To make the students understand the operations of the ONLINE COURSE and all the related facilities, buttons and instructional pages were designed manually. While preparing the Pages, logical sequence was carefully maintained. The links were decided in this order prior to designing the ONLINE COURSE.

2. Creating Storyboards

After developing the script for the online course the next stage was to develop a story for Online Course.

After reviewing the content developed; the instructional technique which was more appropriate to present that type of content used; accordingly it determined the lesson's content sequence; a storyboard which specified which elements would appear in each screen of the e-lesson. These elements included: text, images and other media, interactive questions, "more information" windows and annexes.

In creating the storyboard for an interactive e-lesson, the investigator reorganized the content developed into a sequence of pages, which will correspond to the screens of the final interactive lesson.

Presenting the content

The content was presented in a sequence of introduction, concept, process and types and roles. The content was put up on storyboard with logical sequence for making it more meaningful and easy to grasp. The presentation of content is an essential area where the content is put in such a way that the subject matter becomes more interesting and sequenced from known to unknown and easy to complex learning matter.

Adding Supportive material to facilitate understanding

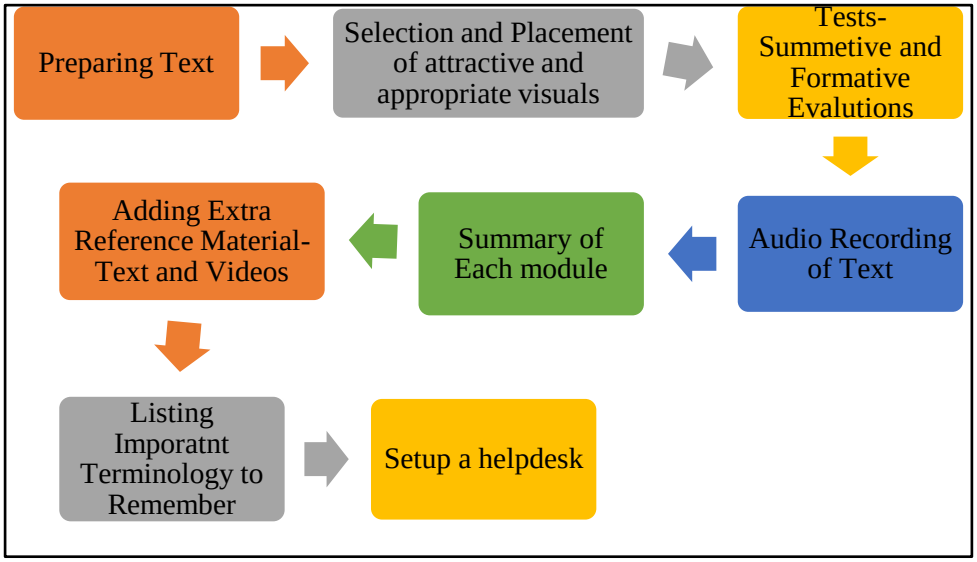
Adding examples was a key to ensure that learners could make sense of the illustrated concepts. Examples were used in deductive and inductive ways: to illustrate a concept or show the steps of a procedure which has been previously introduced (deductive); or to stimulate thinking and reflection before providing definitions and principles (inductive).

Examples help bridge the gap between theory and practice. Thus, learners were given an example of how to accomplish a task together with an explanation of the underlying procedure or principle; afterwards, you can ask them to answer questions about the examples to stimulate their reflection and prepare them for actual performance.

Integrating media elements

Different kinds of media elements were combined to create interesting e-lessons. Careful attention was given when integrating media elements into the storyboard to avoid overloading learners' working memory, as this can be detrimental to the learning process.

Media elements: Text, animation, video, audio



3. *Courseware Development*

Once the storyboards were ready, the step was to meet the media development team. Development team creates the final interactive e-lessons. Alpha and beta versions were prepared for testing and review before distributing the course online.

Courseware development required the work of a group of professionals. Specifically:

A course integrator to assemble all the course components and set up the course interface; the person was also responsible for quality assurance testing; Graphics developers to create graphics and animations, including navigation buttons and icons; HTML/XML coders was needed to develop tailored templates; and programmers to develop complex interactions.

Authoring tools

Various tools were used to produce e-learning content, depending on the file formats. In a very broad sense and at the simplest level, slide-based tools, like Microsoft PowerPoint or even word processors, were regarded as e-learning tools. While those tools were not appropriate to present interactivity, testing and scoring, they were found to be sufficient in creating simple learning resources.

In terms of developing interactive content, various elements were assembled (e.g. text, illustrations, animations, audio, video, interactivity). There are two main ways to do that:

Using programming tools which have been created to develop web content (not only for e-learning) and customize them to specific e-learning needs; or using special tools – known as authoring tools or author ware – which have been created specifically to develop online courses.

Usually programming tools (particularly those that are sophisticated and complex) require professional expertise and considerable development time, while authoring tools can be used by people without programming skills. The main advantage of authoring tools is that they are easier and faster to use, and they therefore shorten development time.

Selecting an authoring tool

There was no right or wrong authoring tool – the best choice was the one that meets your needs and best supports your instructional approach. The best way to select an authoring tool was to

create a requirement sheet, grouping all prerequisites and functions that were required to support all instructional patterns.

The first requirement for generating an online course was to buy with the help of software expert. It was decided to use wordpress platform to generate online course.

Justification to use WordPress Platform for an online course

WordPress has evolved throughout the years into a versatile content management system (CMS). While one can still use WordPress to create a simple blog, now it also allows to create fully functional websites and mobile applications.

WordPress is free as in freedom : WordPress is a free software, this means one can download, install, use and modify it for free. One can use it to create any kind of website. It is also open source which means the source code of the software is available for anyone to study, modify and play with. There are currently 2600+ WordPress themes and 31,000+ plugins available for free. One can download, install and use them on any website. To run WordPress, all one needs is a domain and web hosting. Due to the nature of open source, WordPress is a community software. It is maintained by a large group of volunteers majority of whom are WordPress consultants with active interest in growing and maintaining WordPress. Anyone can contribute to WordPress by writing patches, answering support questions, writing plugins, creating themes, translating WordPress and updating documentation.

WordPress is easy to use and learn: WordPress is used by millions of people and almost every day new people are joining the WordPress community by creating their first WordPress powered websites. The reason why people quickly adapt to WordPress is because it is fairly easy to use.

WordPress is extendable by using themes and plugins: Most people using WordPress are neither web designers nor programmers. As a matter of fact most folks start using WordPress without any prior knowledge of designing websites. The reason why WordPress is such an ideal candidate is because there are thousands of free templates (themes) to choose from. There is a perfect theme available for every kind of website. WordPress themes are easy to customize because a lot of them come with their own options panel allowing you to change colors, upload logo, change background, create beautiful sliders, and do other cool things with your website without ever writing any code at all. WordPress is super flexible and can be extended by using

plugins. Just like themes, there are thousands of free and premium plugins available. Not only these plugins can add extra functionality to WordPress, there are lots of plugins which can add a whole new platform to the WordPress site.

WordPress is search engine friendly: WordPress is written using standard compliance high quality code and produces semantic mark-up which makes the site very attractive to search engines. By design WordPress is very SEO friendly, and one can make it even more SEO friendly by using WordPress SEO plugin.

WordPress is easy to manage: WordPress comes with built-in updater that allows to update plugins and themes from withi WordPress admin dashboard. It also notifies when there is a new version of WordPress is available, so one can update it by just clicking a button. One can keep all the WordPress content safe by setting up automated regular WordPress Backups.

WordPress is safe and secure: WordPress is developed with security in mind, so it is considered quite safe and secure to run any website.

WordPress can handle different media types: Using WordPress one is not just limited to writing text. It comes with built-in support to handle images, audio, and video content. One can also use for document or file management. WordPress supports embed enabled websites which means one can embed YouTube videos, Instagram photos, Tweets, and Soundcloud audio by just pasting the URL in the post. One can even allow the visitors to embed videos in comments.

4. ***Generation of E-content****:*

- In this stage of generation of e-content for online course a team work was done between, researcher as subject matter specialist and designer, graphic designer, website designer and programmer coder. All the members of this team played different roles at different stages of generation of e-content. After developing a storyboard and selecting a platform for online course with the help of a website designer researcher bought a domain for wordpress.
- After **domain registration** admin registration was developed on WordPress. After registration first of all the Menu bar was created **selecting a theme and design** on **WordPress**. Menu Bar included the items for Module and sub module design and Page navigation. The menu of the page had three menus for content navigation top, bottom and side so as to have access to the menu during the learning and it also facilitates in small screen.

- With the help of website designer a theme was selected and designed for the website and the scripted content was transferred on Wordpress according to its sequence and page requirements. The home page included the information about the course and the about the designed e-content.
- The researcher decided to have mentioned image as the home page as it signifies the world within the access of the palms of an individual. The graphics were carefully chosen to depict networking, creating a learning environment across the globe by not restricting oneself to the four walls of the classroom setting.
- The whole **content was uploaded** according to module sequence and subtopics of the modules.
- The theme of the content was designed according to the colour legibility and graphic coordination. The visuals selected and designed for the website were selected according to the theme of subject. The theme and colour theme goes similar in all the modules so as to maintain uniformity and simple fonts were selected in a bold way to increase readability in small and light screens also.
- After transferring content the researcher again check the sequence of the content uploaded and designs and menus.
- After transferring the content **Sound cloud were added** after each topic, which gives freedom to the learner to learn through audio version. The recorded audio were recorded in silent recording studio for good audio sound clarity without any disturbance. The videos were uploaded in reference section in all the modules and there were also **hyper linked to the subtopics** of the module for better understanding and learning. Before uploading the audio the audio was converted into AVI or MP3 format. After uploading the audio in sound cloud with the help of website manager the researcher played and checked the sound clarity and smooth functioning. The audios uploaded were checked and cut according to the content length. The audio in the content was not on auto play mode.
- For designing test the researcher took hep of a programmer for developing coding for the tests. After uploading the whole content **tests were uploaded** in quiz section after each subtopic. The tests were designed and uploaded for formative evaluation. The format of the tests were multiple choice questions and fill in the blanks.
- In the next stage the sample questions were uploaded in **questions bank.**
- The **Important term to remember** for each module was uploaded in important terms.

- **Summary** of each module were unloaded in each module menu. After uploading the whole content testing was done for smooth functioning and navigation. The **navigation of each page**, frames to other and earlier frames were designed and checked.
- After checking the perfect navigation the home page **students' login** was developed.

5. *Validation And Pretesting Of Online Course*

Validation of an Online Course:

After Generation of online course, the generated online course was sent to ten Experts for validation. The seven experts included three course experts, three e-learning experts, two education technologist, one language and one technical expert. The experts appreciated the efforts in the ICT based education mode in higher education. One of the expert suggested to link the reference videos with each subtopics, and it was also suggested by the expert to reduce content by scroll down menu. “Hyperlink key words” in textual content with online resources like dictionaries, Wikipedia, encyclopaedia etc. Hyperlink key concepts with Glossary of Terms page so students can click and open the page whenever they want to know about the word. The suggestions of all the experts were incorporated in the generated online course. After making necessary changes the link of online course was sent to F.Y teachers teaching the course at the first year level in order to study the completeness of course, designing and functioning of the online course. The teachers suggested to add more examples at few places and to add notes in PDF download format to make learners more comfortable. The possible suggestions of the course teachers were also incorporated.

Pre-testing of an Online Course with students

The online course exposed to the students studying in second year who have studied this course in previous year. The students oriented to the course in order to get suggestions about the difficulty level, the design of the content, online mode of study and clarity of content and appropriateness of the language. The students were really amazed to have such comfortable and interesting mode of study, they suggested that the content should be first thought with the assistance of teacher, and help desk can be linked online as well as the online course should be mobile phone friendly so that students can study anywhere anytime. It was also suggested to give summary of the each module in pdf downloading format to reduce the anxiety of the students.

Tools Used For Data Collection

There were different tools develop for the purpose of data collection under the study.

1. *The Tools Used for Data Collection were:*

TOOL	PURPOSE
Questionnaire	For collecting Profile of the selected students To collect students' extent to Computer and Internet Usage To Collect Students' Exposure to ICT To collect students' budget related internet usage
Knowledge Test	To obtain pre and post knowledge level of the selected students on the topic " Communication" and "Graphic Aids"
Reaction Scale	To collect the reactions of the students learned through the Online Course

1) Questionnaire :

The checklist was used to obtain background information of the selected students of F.Y B.Sc. (Home). The checklist developed by the researcher was divided into two majors sections:

- Background information, Information related to computer and internet usage ,Exposure to ICT, Budget spent on Internet

Construction of the tool was done with the purpose to obtain the background information of the student and to know computer proficiency of the student.

Description of Tools

Section	Aspects
Profile	Background Information
Usage of Computer and Internet	Computer related information about: Usage Accessibility Purpose Knowledge level
Exposure to ICT	Exposure to ICT: Exposure to technology for teaching-learning Usage of technology Purpose to use technology

Budget for Internet Usage	Budget for Internet Usage: Type of Internet connection Gadget to use Internet Type of data plan Expanse for internet

2) Knowledge Test:

Knowledge test was used to assess the students' level of knowledge regarding the topics "Communication" and "Graphic Aids". The purpose of preparing a Knowledge test for this study was to obtain knowledge level of students with reference to the topic of "Communication" and "Graphic Aids" before and after the experiment. The knowledge test prepared on the said subject carried 35 questions and 35 marks. Questions in the test fell into following two categories:

- Objective type- Multiple choice questions and fill in the blanks
- 20 Questions of Module -1 Communication , 15 Questions of Module -2 Graphic Aids

3) Reaction Scale:

After reviewing various reaction scales from numerous dissertations, the investigator developed a reaction scale for measuring reactions of the students of experimental group. It was constructed keeping in mind the understanding level of the students. The reaction scale was developed to obtain feedback of the experimental group regarding different aspects of the Online Course, problems faced while learning through Online Course and suggestions to make the Online Course more effective. Different aspects covered in the Reaction Scale were as follows:

- Content of the Online Course
- Presentation of the software
- Examples
- Illustrations, figures and graphs
- Evaluation items and system of evaluation
- Instruction given in the user manual
- Learning experience and
- Utility of the software package

  The scale used was a 5-point scale. The feedback was sought mostly around the problems faced in the following area:

- Operating the Online Course

- Learning experience
- Understandability of the language
- Absorbing the concept
- Understanding the visuals and examples with reference to the content

  Further, in the reaction scale, the students were asked to give suggestions to make an Online Course more effective. For both the reactions related to problems and suggestions, sentences were put up as a checklist.

2. Validation of the Research Tools:

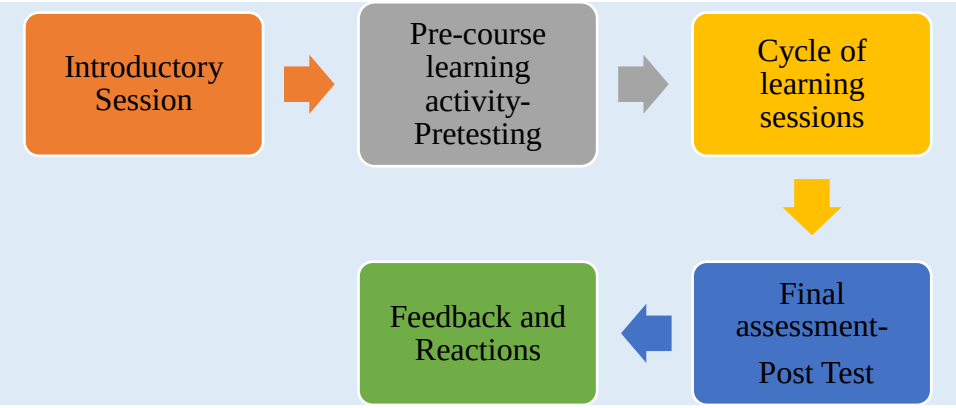
Judgment of the experts was used to validate the research tools. All the research tools were given to the five experts were from Department of Extension and Communication, Faculty of Family and Community Sciences, One Expert from Faculty of Education and Psychology, and one faculty from English department, The Maharaja Sayajirao University of Baroda for the purpose of validation. Knowledge test, the research tool for pre and post-testing, was given to experts for validation of the content coverage, language, question structure, response system and the scoring pattern. A Checklist for collection of Profile of students, Computer and Internet Usage, Exposure to ICT and Budget for Internet Usage was given to check the items, questions asked, structure, sequence of the items and the response system. The reaction scale was given to experts to validate the structure, response, items and categorization. The suggestions given by the experts were incorporated in the final drafts of the research tools.

5.3.4 EXPERIMENTAL PHASE

Conducting an Experiment

Online facilitated and instructor-led course was organized into sessions, which was daily or weekly, depending on the duration of the course and on learners' available time on their time table.

The following were the components of an online course learning:



The experimental phase refers to the actual delivery of the instruction, whether it's classroom-based, lab-based, or computer-based. The purpose of this phase was the effective and efficient delivery of instruction.

As the researcher teaches first year and she was assigned Group D, for convenience and with purpose the sample was selected. It was decided to do the experiment of two module to check the effectiveness, Module 1 Communication and Module 2 Graphic Aids. These two modules were selected keeping in mind the theory as well as practical aspects of the course. Those lessons were divided into 14 learning sessions. As decided in analysis phase the experiment was conducted using the blended mode of teaching leaning to increase the participation, learning and reduce the anxiety of the students. It was decided to take two theory sessions and one practical session every week. The experiment was decided to conduct during the month of July, August and September for 7 weeks.

After all the preparation, the time had come for action and that was conducting the experiment. The classes were arranged at seminar room- Pragati a Centre for non-formal education as the room had audio-visual facility. After selection of the sample the researcher provided the URL http//:www.introduction toextensionandcommunication.co.in of Online course on "Introduction to Extension and Communication" to the students of experimental group for study. To initiate the study, the researcher visited the class, she introduced herself and explained about the experiment. Then, all the 103 students were given pre-test to check the knowledge level of the sample before the beginning of the experiment. After conducting the pre-test, students were given the checklist to fill to collect the profile of the students. The schedule of teaching -learning through the developed online course was as follows:

Session Details of Module 1 Communication (13 Hours)-Time: 1 hour Per Session

Session Number	**Session Details of Module 1**	**Date**	**Day**

Session 1	Ice-Breaking and Briefing about the Subject and Experiment	11/7/17	Tuesday
Session 2	Pre-testing and Collecting Profile of Students through a check list Demonstration of the Online Course	15/7/17	Saturday
Session 3	Teaching-Learning Session: Concept and Meaning of Communication	18/7/17	Tuesday
Session 4	Teaching-Learning Session: Process of Communication Elements of Communication- 1. Communicator, 2. Message	22/7/17	Saturday
Session 5	Teaching-Learning Session: Process of Communication Elements of Communication-3. Channel, 4. Audience, 5. Feedback	25/7/17	Tuesday
Session 6	Teaching-Learning Session: Types of Communication Intrapersonal Communication Interpersonal Communication	29/7/17	Saturday
Session 7	Teaching-Learning Session: Types of Communication Group Communication Mass Communication	31/7/17	Tuesday
Session 8	Teaching-Learning Session: Characteristics of Communication	5/8/17	Saturday
Session 9	Teaching-Learning Session: Need and Importance of Communication	8/8/17	Tuesday
Session 10	Teaching-Learning Session: Role of Communication for Social Change	12/8/17	Saturday
Session 11	Teaching-Learning Session: Role of Communication for Social Change	19/8/17	Saturday
Session 12	Post-Test	22/8/17	Tuesday
Session 13	Taking reactions of Students regarding their study experience to learn through an Online Course	26/8/17	Saturday

Session Details of Module 2 Graphic Aids (16 hours) Time: 2 Hours per Session

Session Number	Session Details of Module 2	Date	Day
Session 1	Meaning and Concept of Graphic Aids	12,13,14,15 July 2017	

	Educational values of Graphic Aids Concept of layout, Steps in Preparing Layout		Wednesday, Thursday, Friday, Saturday
Session 2	Elements of designing Graphic Aids Principles of Designing Graphic Aids Designing a Layout for Poster	19,20,21,22,23 July 2017	Wednesday, Thursday, Friday, Saturday
Session 3	Designing a Poster	26,27,28,29 July 2017	Wednesday, Thursday, Friday, Saturday
Session 4	Submission of Poster	2,3,4,5 August 2017	Wednesday, Thursday, Friday, Saturday
Session 5	Concept of Flash cards Designing and Use of Flashcards Use of Computers for designing Graphic Aids Designing layout Flash Cards	9,10,11,12 August 2017	Wednesday, Thursday, Friday, Saturday
Session 6	Designing Flash Cards	16,17,18,19 August 2017	Wednesday, Thursday, Friday, Saturday
Session 7	Submission of Flash Cards	23,24,25,26 August 2017	Wednesday, Thursday, Friday, Saturday

Session 8	Presenting Flash cards	30, 31 August 1,2 September 2017	Wednesday, Thursday, Friday, Saturday
Session 9	Post-Test	6,7,8,9 September 2017	Wednesday, Thursday, Friday, Saturday
	Taking reactions of Students regarding their study experience to learn through an Online Course		

The theory sessions were conducted using online course and the students used to study the topic at home through their phone or on laptops or desktops.

Post Experimental Phase- Feedback and Reactions:

After the blended learning through the online course the students were given the knowledge test to check gain in knowledge. A reaction scale was also used to take the feedback and reactions of the students about their experience to study new learning technique, the problems they faced while learning and suggestions for future of developing online course.

5.3.5 Scoring and Categorization:

Demographic Profile

Level of Education of Parents

Variable	Basis	Categorization
Education Level of Parents	Illiterate	Low Level of Education
	Primary Schooling 1-9th Std.	
	Secondary Schooling(S.S.C)	
	Higher Secondary Schooling (H.S.C)	

	Diploma	Middle Level of Education
	Graduation	High Level of Education
	Post-Graduation	

Categorization of variable Income of the Family

Variable	**Basis**	**Categorization**
Income of the Family	5000 to 30,000 INR	Low Income
	30,001/- to 70,000/-	Medium Income
	More Than 70,000/-	High Income

Categorization of variable Stream of Study

Variable	**Basis**	**Categorization**
Stream of Study	Arts/humanities, Commerce	General
	Science and Diploma	Science

Categorization of variable Medium of Instruction at School

Variable	Basis	Categorization
Medium of Instruction at school	English Medium of instruction in school	English
	Gujarati or any other vernacular medium of instruction in school	Vernacular

Categorization of variable Usage of Computer and Internet

Sr.no	Description of Variable	Categories of Variable	Scoring
1.	Frequency to use computer	Daily- thrice a week Weekly and fortnightly Rarely	3 2 1
2.	Place to Access Computer	One Place Two Place Multiple Places	1 2 3
3.	Sources to learn to operate computer	Personal help Professional Help Both	1 2 3
4.	Years of access to computer	1-5 Years 6-10 Year 11-15 Year	1 2 3
5.	Use of computer programmes	Two Programme Three Programmes More than three programmes	1 2 3
6.	Years of access to Internet	1-5 Years 6-10 Year 11-15 Year	1 2 3
7.	Place to Access Internet	One Place Two Place Multiple Places	1 2 3
8.	Purposes of using computer and Internet	1-3 purpose 3-6 Purpose More than Six purpose	1 2 3
9.	Proficiency to Use Computer & Internet	1-2 rating 3-4 rating 5 rating	1 2 3
10.	Time Spent to use computer & internet	Half an hour to one hour 2-3 hours More than 3 hours	1 2 3

Categorization of Variable Usage of Computer and Internet

Variable	Description	Categories
Usage of Computer and Internet	Above Mean	High Usage
	Mean	Moderate Usage
	Below mean	Low Usage

Categorization of variable Exposure to ICT

Sr.no	Description of Variable	Categories of Variable	Scoring
1	Exposure to technology	One technology Two-four Technology More than Four Technology	1 2 3
2	Comfort to Technology	Not comfortable Moderately comfortable Very Comfortable	1 2 3
3	Usage of Technology for Education	Half an hour to 1 Hour 2-3 Hours More than 3 hours	1 2 3
4	Purpose of Using technology for educational Purpose	1-3 purposes 4-6 Purposes More than Six purpose	1 2 3

Categorization of variable Exposure to ICT

Variable	Description	Categories
Exposure to ICT	Above Mean	High Exposure
	Mean	Moderate Exposure
	Below mean	Low Exposure

Categorization of variable Possession of Gadgets

Variable	Basis	Categories
Possession of Gadget	Owns One Gadget	Single Gadget owner
	More than One Gadgets	Multiple Gadget owner

Categorization of variable Budget for the Internet Usage

Sr.no	Description of Variable	Categories of Variable	Scoring
1	Owning Internet Connection	• Yes • No	1 2
2	Number of Internet Connection	• One • More than one connection	1 2
3	Kind of Internet Connection	• Prepaid • Post-paid	1 2
4	Speed of Internet Connection	• Low Speed(2G Limited, and unlimited) • High Speed(3G & 4G)	1 2
5	Budget for Internet Data pack	• Spending less(50-300) • Spending More(More than 300)	1 2
6	Find internet usage	• Expensive(Very Expensive, Expensive) • Not Expensive(Little Expensive, Not expensive)	1 2
7	Change for cost effective internet services	• Not changing or only it is free • Yes for Change	1 2

Categorization of variable Budget for the Internet Usage

Variable	Description	Categories
Budget for the Internet Usage	Above Mean and Mean	High Budget for Internet Usage
	Below Mean	Low Budget for Internet Usage

Item Wise Intensity Indices:

Item wise intensity indices were calculated for the reactions of students related to different aspect of designed online course. The range for the Item wise Intensity Indices for all items having 5-point scale were as follows:

Table: 20 Intensity Indices

Range of Scores	Level
4.60 – 5.00	Great Extent
3:01– 3.59	Some Extent
2.60 – 3.00	Less Extent
1.60 – 2.59	No Extent
1.00 – 1.59	Undecided

Formula used for calculating Item wise Intensity Indices:

$$\text{Itemwise Intensity Indices} = \frac{\text{Total score for an item}}{\text{Total number of the students}}$$

5.3.6 Plan of Statistical Analysis:

Different Statistical Measures Used for Analysis of Data

No.	Purpose	Statistical Measures
1.	Background information of the respondents	Percentage
2.	Effectiveness of an Online course in terms of gain in knowledge amongst the students of F.Y.B. Sc (F.C.Sc)	Wilcoxon Sign Rank Test (Non-parametric Statistics)
3.	Significant differences in the effectiveness of an online course in terms of gain in knowledge amongst the students of F.Y.B. Sc (F.C.Sc), The Maharaja Sayajirao University of Baroda in relation to the following variables: Medium of instruction at school Stream of Study in H.S.C Educational Qualification of Parents Type of Computer and internet user Exposure to ICT Possession of Gadgets Budget for Internet Usage	Mann-Whitney U Test (Non-parametric Statistics)
4.	Reactions of F.Y.B.Sc.(F.C. Sc) Students towards the Online course Features Aspects Problems Suggestions	Percentage Intensity indices Percentage Percentage

5.4 Major Findings

SECTION: 1 A. Demographic Profile

- All the students belonged to the Age of 17-18 years
- All 95 students belonged to Group D.
- 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.
- Most of the (98%) students studied from Gujarat Secondary Education Board and very few (8%) studied from Central Board of Secondary Education.

SECTION: 1 B Variablewise Details of Students According to their Usage of Computer and Internet, Exposure of ICT and Budget Spent for Internet Usage

- Little less than forty percentage (38.9%) of students had lower usage of computer and internet, whereas 36.8% had moderate usage followed by 24.2% with high computer and internet usage.
- 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.
- Little less than forty five (44.2%) percentage of the students had low budget for internet usage, whereas approximately thirty five percentage (34.7%).

Section: II A Effectiveness of Designed Online Course in Terms Of Gain in Knowledge of Experimental Group

There was a significant difference between the scores of gain in knowledge in pre-test and post-test. It can be derived 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 in students. This means that the online course on the Subject "Introduction to Extension and Communication" was effective for learning topic "Communication and "Graphic Aids".

Section: II B Effectiveness of Designed Online Course in Terms of Gain in Knowledge of the Students of Experimental Group in Relation to Selected Variables

- There was no significant difference in the gain in knowledge of the students in learning through online course in relation to 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.
- There was significant difference in the gain in knowledge of the students in learning through online course in relation 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. The students belonging to higher family income achieved higher in comparison to students with medium and high family income.
- There was no significant difference in the gain in knowledge of the students in learning through online course in relation to 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.
- There was no significant difference in the gain in knowledge of the students in learning through online course in relation to 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.
- There was no significant difference in the gain in knowledge of the students in learning through online course in relation to 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.

- There was **significant difference in the gain** in knowledge of the students in learning through online course in relation to their **Medium of Instruction in School**. This means that the English medium and Vernacular medium students' gain in knowledge differed as per their Medium of Instruction in School. The students of English medium had higher gain in knowledge in comparison to the students from vernacular medium. 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 medium of instruction in School was not accepted.
- There was **significant difference in the gain in knowledge** of the students in learning through 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 lower Usage of computer and internet had higher gain in knowledge in comparison to the students having high 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.
- There was **significant difference in the gain in knowledge** of the students in learning through 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 Low and moderate Exposure to ICT had higher gain in knowledge in comparison to the students having higher 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.
- 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.

SECTION III Reactions of the Students from the Experimental Group about the Designed Online Course

Students 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**.**
- Freedom to select to study at their own time (94.7%),
- Freedom to study at their own pace (88.4%),
- Question bank (90.5%),
- Summarisation of each topic (87.4%),
- Videos (82.1%),
- Movements in visuals (77.9%),
- Verbal commentary with text (77.9%),
- Tests at the end of each topic or subtopic (74.7%)

All the Physical aspects of the Online course helped students to learn to **Great extent:**

- 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.

Content aspects of the online course helped students to learn to Great extent:

- "Glossary of terms" helped in understanding the concepts,
- Language used in e-content was easy to understand,
- Visuals were relevant to content, sufficient, & were self-explanatory
- Examples given in the content increased clarity of concept,

- Content in the developed e-content was explained in detail, was logically sequenced & was self-explanatory y,
- Examples given in the developed e-content were sufficient & appropriate
- 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,
- Summarization at the end of each topic helped in knowing the important things to remember from the module.

Evaluation aspects of the online course helped students to learn to Great Extent:

- 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

- 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 was scary experience.
- 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.

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 –leaning 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, 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 standardised and high quality content with innovative technological approach. Technology based education leads to equality among leaners. 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.

Suggestions:

- More courses should be developed using localised approach
- Teaching faculties should explore more open source softwares 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