

CHAPTER: 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:

3.1 Population of the Study

3.2 Sample of the Study

3.3 Designing an Online Course

3.3.1 Stage : I Identifying and Organising Content

3.3.2 Stage : II Defining Instructional, Evaluation and Delivery Strategies

3.4 Experimental Phase

3.5 Scoring and Categorization

3.6 Plan of Statistical Analysis

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.

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.

3.3 Designing an Online Course

This phase aims at reviewing the 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.

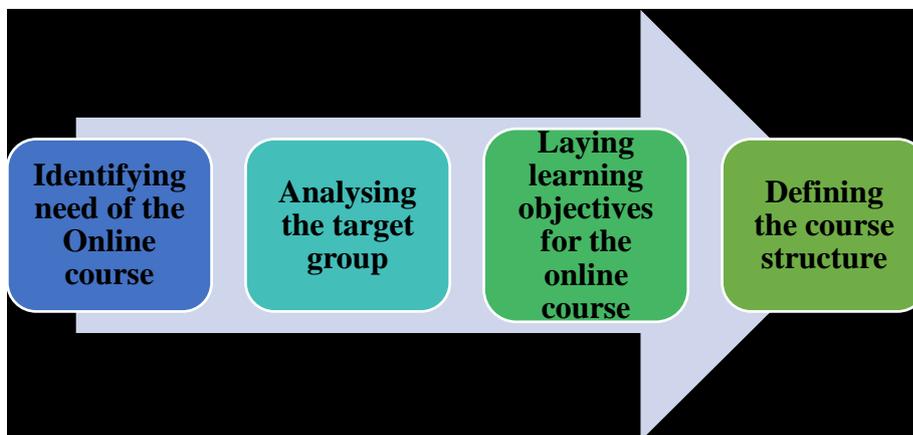
Before designing the online course following factors were studied:

- Region or geographic area in which learners reside. This was needed to define language and cultural issues and to inform choices between synchronous and asynchronous tools (learners located in different time zones will have difficulty communicating in real time).
- Kind of organization or institution in which learners work and their professional role(s) within them. This helped to identify specific learning objectives for each target audience group.
- Learners’ previous knowledge and expertise on the subject was checked. In general, learners with a lot of prior knowledge do not need the same kind or level of support as novices.

- Learners' computer skills and technical expertise. This helped to define the complexity of the computer based interactive activities.
- The amount of time available for the online course and the learning context.
- The information for online course influenced the amount of content to be provided and the need for chunking the content into small units.
- The location where learners will participate in e-learning and from where they can access the Internet; can they study at home, at college or in e-learning centres?
- It helps to determined how much connection time was required for the course and whether learners can download plug-ins from the internet. Network bandwidth. Bandwidth limitations may slow application performance and decrease user productivity. In certain situations, low bandwidth applications was preferred since they took less time to transmit. Computer and software capabilities, such as screen size, number of colours they can display, sound playback, RAM (amount of memory), processor type and speed.
- Technical requirements, including multimedia capabilities, influence the selection of the media mix and plug-ins.

3.3.1 STAGE 1: Identifying and Organising Online Course

Figure : 1 Stage 1 Identifying and Organising Online Course



3.3.1.1 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 doesn't 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.

The Online Course is aimed at developing the following skills:

- *Cognitive skills* involved knowledge and comprehension (e.g. understanding scientific concepts), following instructions (procedural skills) as well as applying methods in new situations to solve problems (thinking or mental skills);
- *Interpersonal skills* involved in active listening and presenting, as well as
- *Psychomotor skills* involving the acquisition of physical perceptions and movements (e.g. making poster or chart). How can the online course address these diverse domains? Most online courses are developed to build cognitive skills. Within the cognitive domain, thinking skills require more interactive e-learning activities because those skills are learnt better "by doing" (experiential learning). Learning in the interpersonal domain can also be addressed in online course by using specific methods. For example, interactive role playing with appropriate feedback can be used to change attitudes and behaviours.

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.

3.3.1.2 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 context 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 counselors 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

3.3.1.3 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

3.3.1.4 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

Course was structured in topics and subtopics according to the learning principles and need of the course in the following format:

Module 1 Communication

1.1 Meaning & concept of Communication

1.2 Process of Communication

- Communicator
- Message
- Channel
- Receiver/ Audience
- Feedback

1.3 Types of Communication

- Intrapersonal

- Interpersonal
- Group
- Mass

1.4 Need and Importance Communication

1.5 Characteristics of Communication

1.6 Role of Communication for development and Social Change

Module 2 Graphic Aids

2.1 Meaning of Graphic Aids

2.2 Educational Values of Graphic Aids

2.3 Steps in Preparing Effective Graphic Aids

- Preparing Layout
- Principles of Layout Design

2.4 Elements of Graphic Aids

- Message
- Lettering
- Illustration
- Colour

2.5 Types of Graphic Aids

- Charts
- Posters
- Flashcards

2.6 Computer in making effective Graphic Aids

2.7 Problem in using Graphic Aids

2.8 Limitations of Graphic Aids

2.9 Evaluation Criteria for Graphic Aids

Module 3 Extension

3.1 Meaning and Concept of Extension

3.2 Components of Extension

3.3 Principles of Communication in Extension

3.4 Importance of Feedback in Extension Communication

Module 4 Mass Media and Communication

4.1 Radio

- Definition
- Advantages
- Disadvantages
- Use of Radio for Extension work

4.2 Television

- Concept
- Characteristics
- Advantages
- Limitation
- Role of Television in Extension

4.3 Films

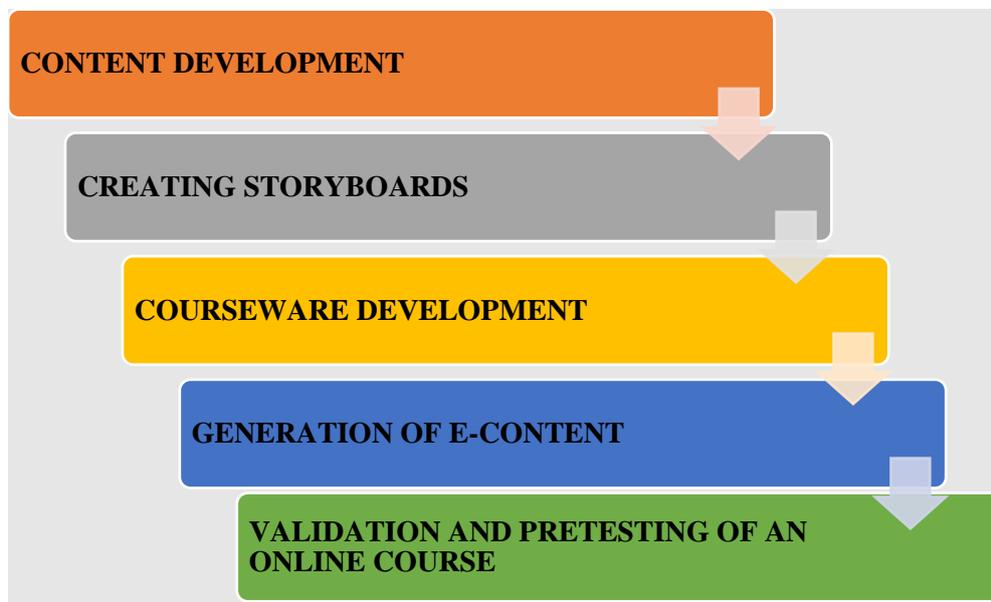
- Film as Mass Medium
- Advantages
- Limitation
- Role of Film for Extension

4.4 Print Media

- Print Media as Mass Media
- Newspapers
- Magazines
- Characteristics
- Advantages
- Limitation

3.3.2 Stage: II Defining Instructional, Evaluation and Delivery Strategies

Figure: 2 Defining Instructional, Evaluation and Delivery Strategies



3.3.2.1 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.

3.3.2.2 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

Written text is an important “media” for communicating course content. Great attention was given to its graphic display and integration with images.

- Display on-screen text to provide the best readability and clarity, the text font were simple, bold and in dark colours so as to make it more legible.

- Diagrams, graphs and flow charts were used to help the learners understand the content and memorise it better, this was added at the various places where the process, types or hierarchy was explained in the subject matter.
- List points or blank spaces were used to separate items in a list or focus the attention on a particular topic.
- Word and row spacing were added to have improved text readability.

Developing Practice and Assessment Tests

Practice and assessment questions were designed to reinforce the achievement of learning objectives. Questions play an important role in involving learners and keeping their attention, so it was added as much as it could be added in the storyboard.

Developing practice and assessment tests for different types of knowledge-

Different types of practice and tests are required for different types of content. The table below offers some tips for promoting and assessing:

- Memorization of facts;
- understanding of concepts and processes; and
- Application of procedures and strategic principles.

Questions formats- Justify evaluation strategy

In self-paced e-learning, practice and tests mainly consisted of questions associated with response options and feedback. Generally the following structure was followed:

- a question or statement;
- an operational message that indicates to the learner how to perform the required operations (e.g. click, drag, press a key);
- a series of options;
- the correct answer; and
- Feedback for the correct and incorrect answers.

The used question formats include:

- multiple choice;
- multiple responses;
- fill-in-the-blank;
- Short answer/essay.

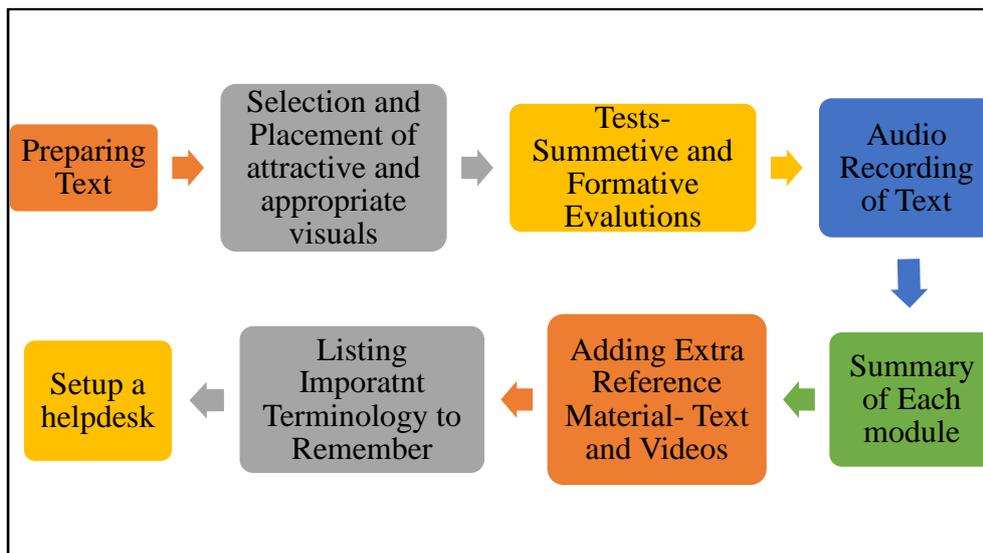
Practice questions were created for all critical topics or tasks.

- The text of the question was clear and unambiguous as possible.
- Incorrect options were plausible. An obviously wrong option does not play any useful role and decreases the learner's interest. Incorrect options should aim not to distract learners, but to anticipate common errors so that useful information can be provided in the feedback.
- Explanatory feedback: after the learner responded to a question, feedback saying whether the answer was correct or incorrect with a succinct explanation was provided.

Additional Material/ Resources

Additional referencing/ reading material in the format of word, PDF, audio or video references were collected and kept as an additional material or resources.

Figure: 3 Elements added to Develop Online Course



3.3.2.3 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 with 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 Sound cloud audio by just pasting the URL in the post. One can even allow the visitors to embed videos in comments.

3.3.2.4 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 help 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.

Screenshots of the Online Course

Figure: 4 Home Page



Figure: 5 User Registration

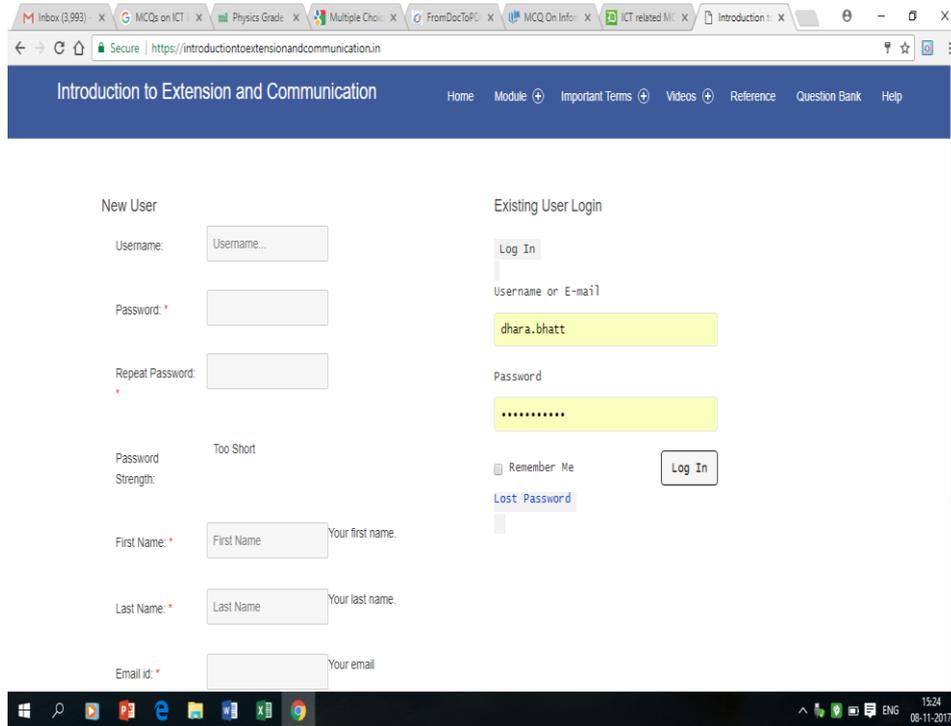


Figure: 6 Learning Objectives of the Course

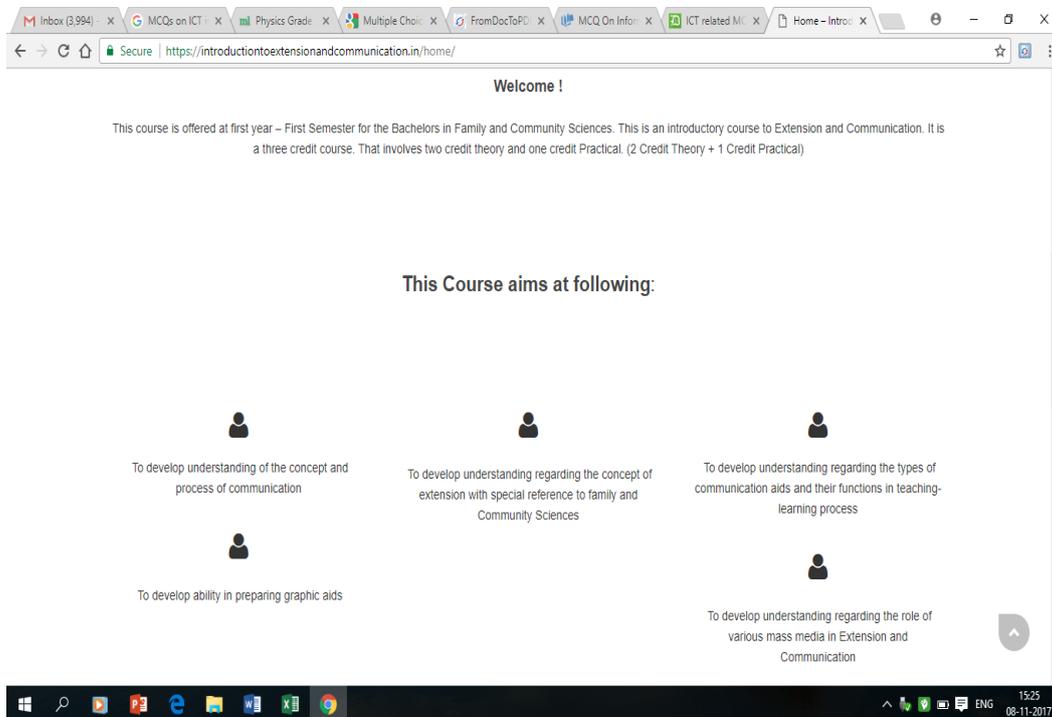


Figure: 7 Module Menu

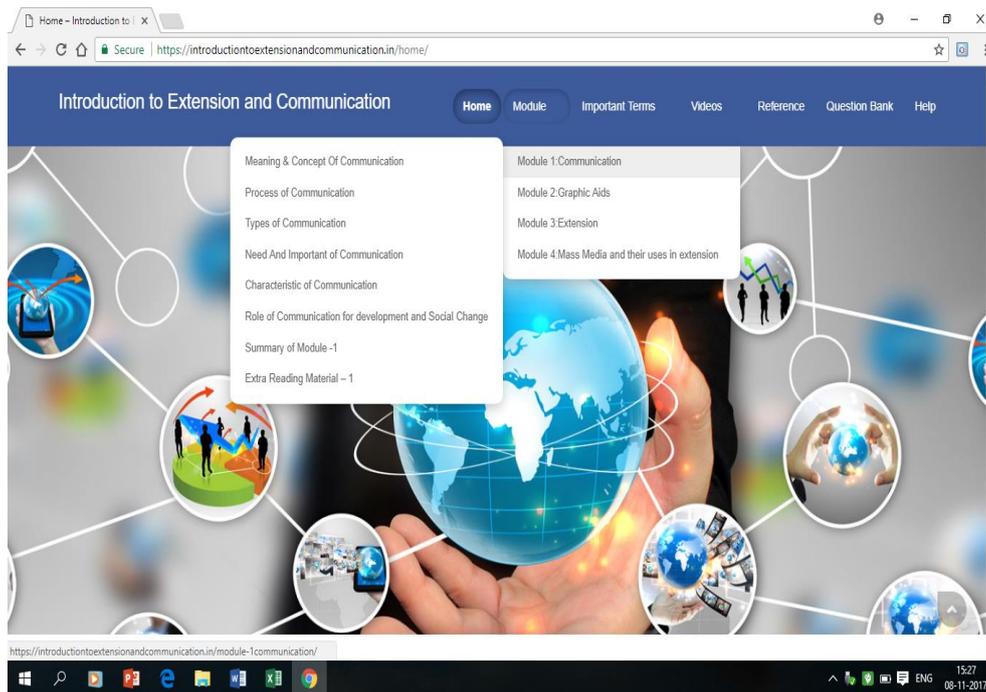


Figure: 8 Module -1 Communication

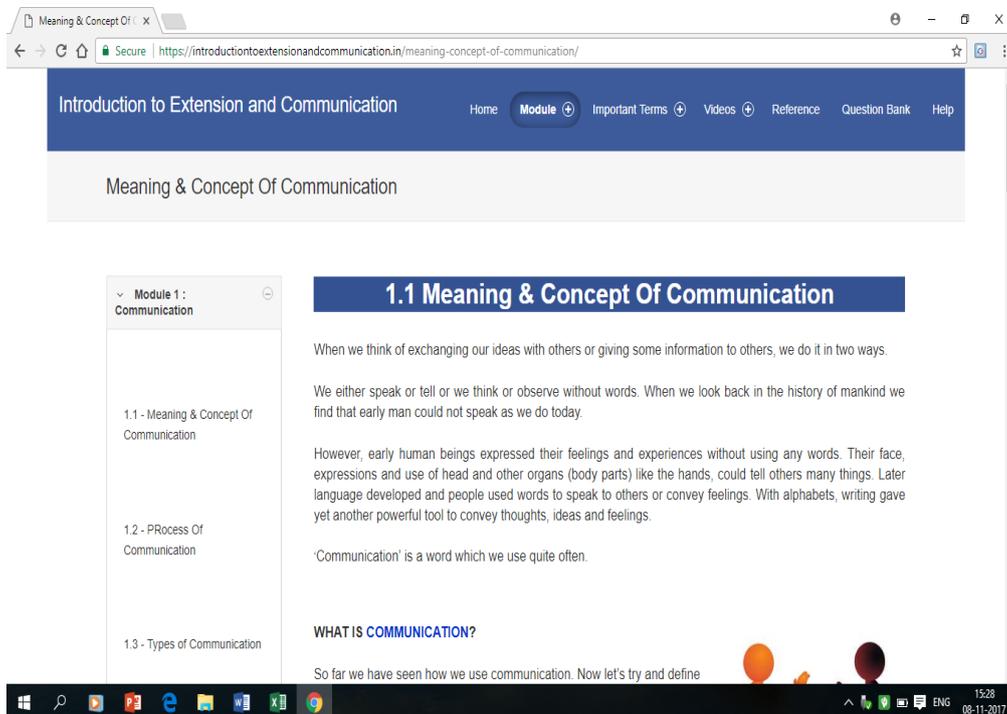


Figure: 11 WordPress Dashboard- Selection of theme and structure

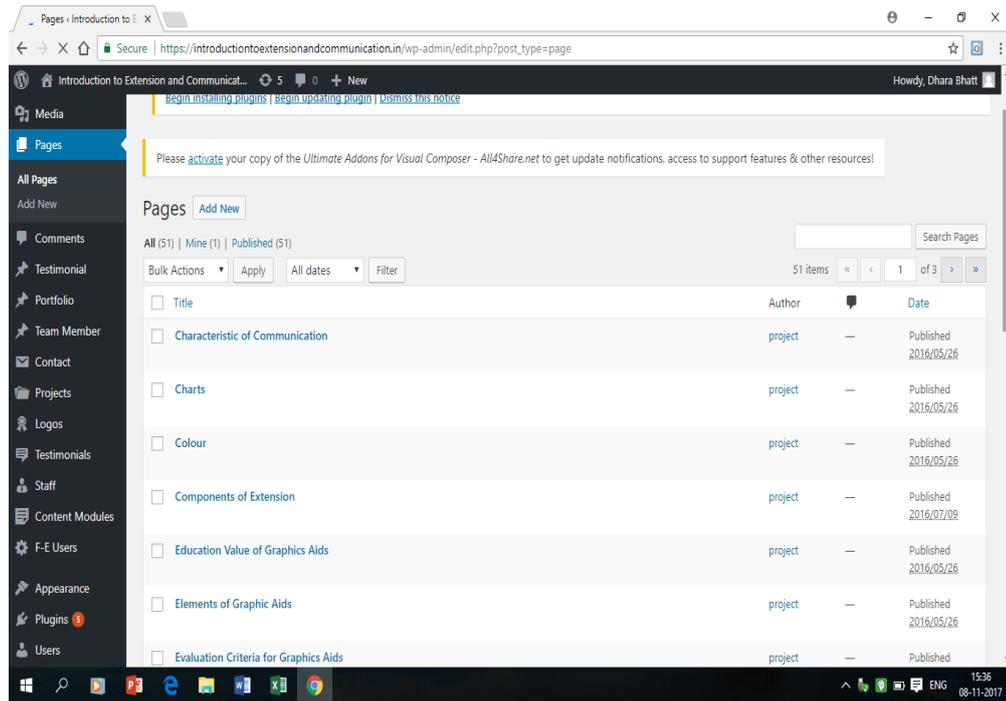


Figure: 12 Uploading Quiz-Tests

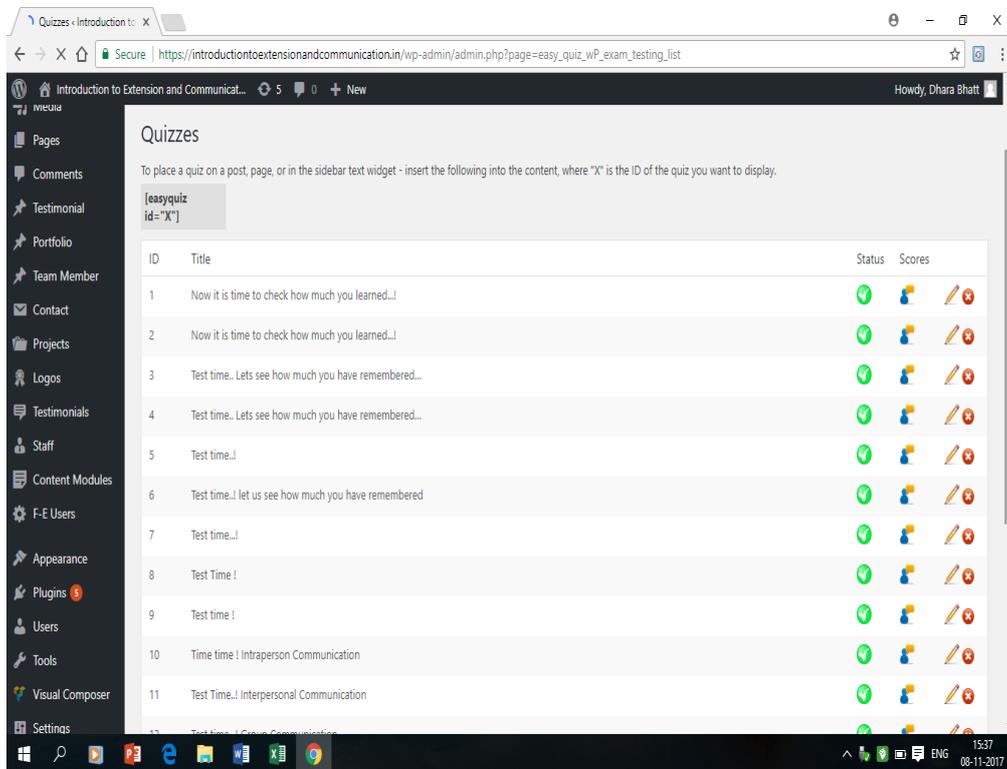


Figure: 13 Menu- Module Design

Process of Communication

Module 1 : Communication

- 1.1 - Meaning & Concept Of Communication
- 1.2 - Process Of Communication
- 1.3 - Types of Communication

1.2 Process of Communication

- Communication is a round-the-clock process.
- It occurs either consciously or subconsciously between or within people. When we talk about the subconscious communication, we think about people or we dream. A lot many times we do not remember our dreams.
- Consciously within persons or between individual or in groups or with the masses. We plan something, we share or talk to our friends, family or colleagues

Figure: 14 Tests after each subtopic

Process of Communication

Introduction to Extension and Communication

POSITIVE ATTITUDE TOWARDS

- Audience – target group. The communicator should have positive attitude and faith in audience towards their change
- Message- the message should be planned in such a way that it brings desired change in the people. E.g Polio campaign, it should focus on 100% irradiation of Polio from our country

00:00 00:00

Test time..!

Start Test

- + 1.2.2 - MESSAGE
- + 1.2.3 - CHANNEL
- + 1.2.4 - AUDIENCE
- + 1.2.5 - FEEDBACK

Communication is described depending upon the situation in which communication takes place. We communicate with ourselves, with others face to face, using a public address system with a large number of people or use radio or television. Friends, as we have understood the elements of Communication and its process, let us now go further to the next topic, where we are going to study about the different types of communication-

Figure: 15 Formative Evaluation Tests

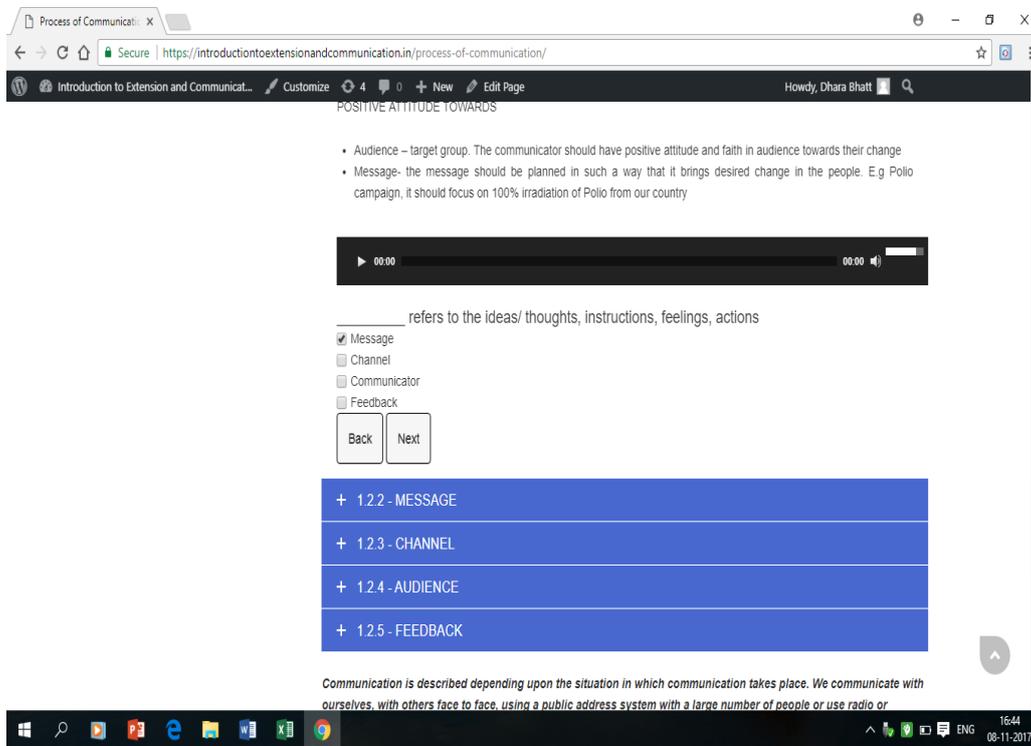


Figure: 16 Important Terms to remember in each Module

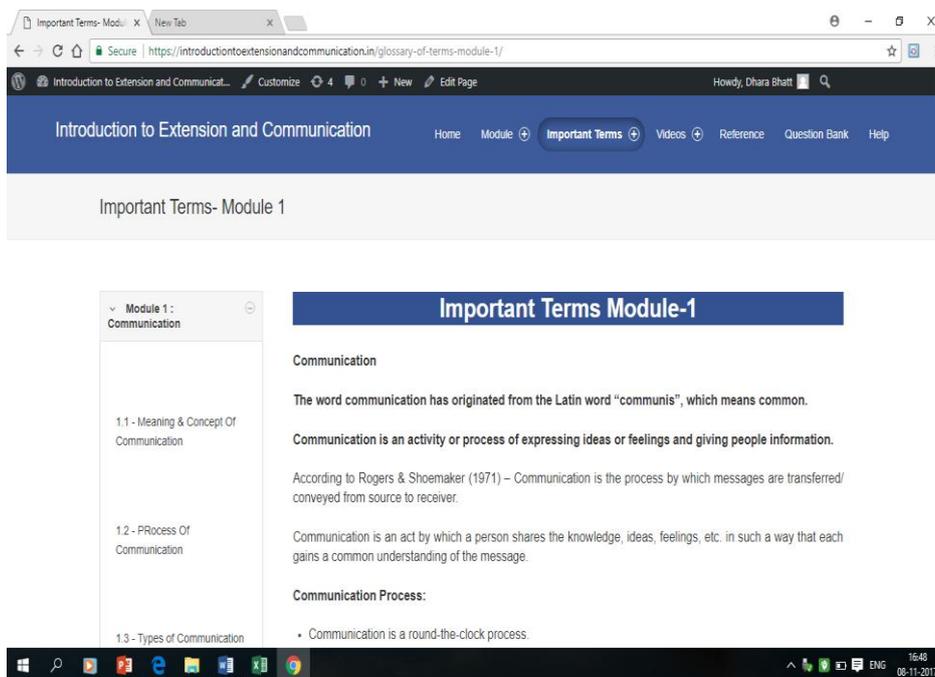


Figure: 17 Reference Videos related to Course Content



Figure: 18 Extra Reading Material for each Module

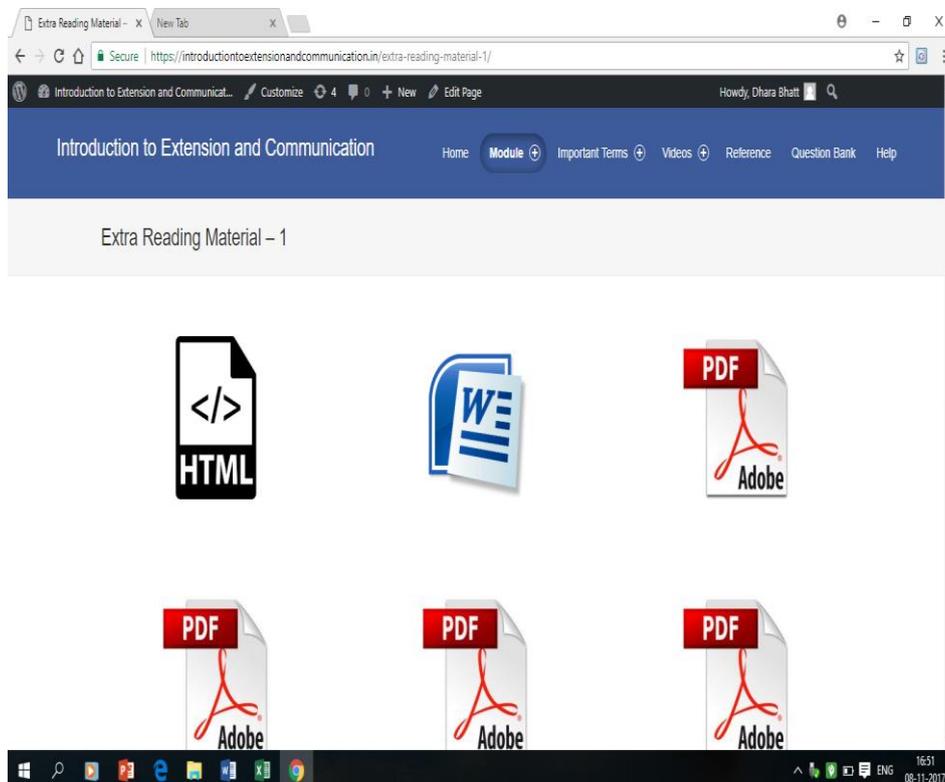


Figure: 19 Summary of each Module for better Remembering

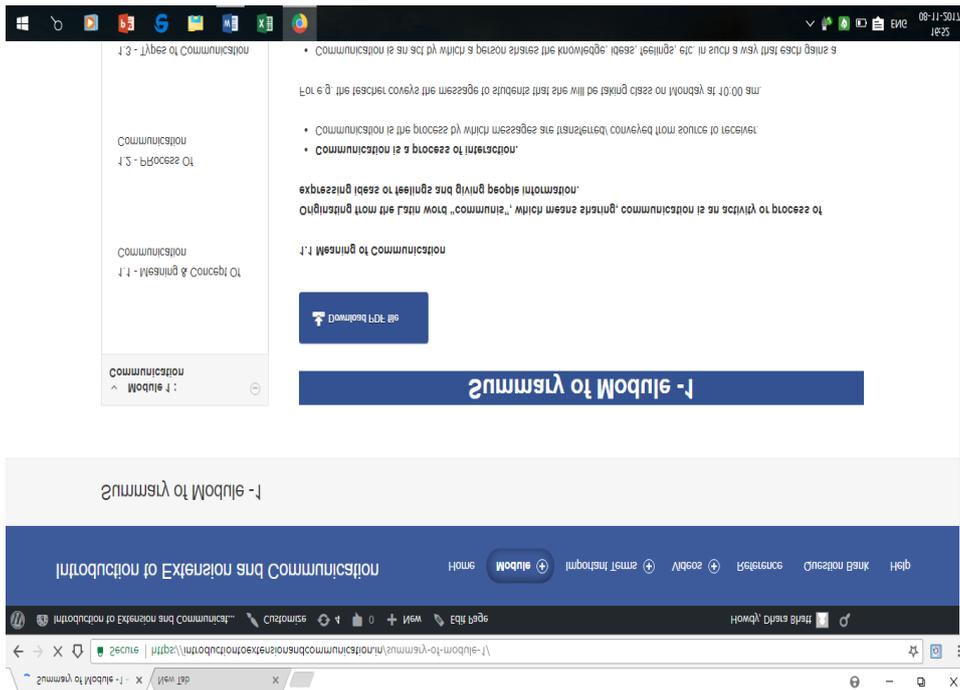


Figure: 20 Attractive Visuals for better Understanding

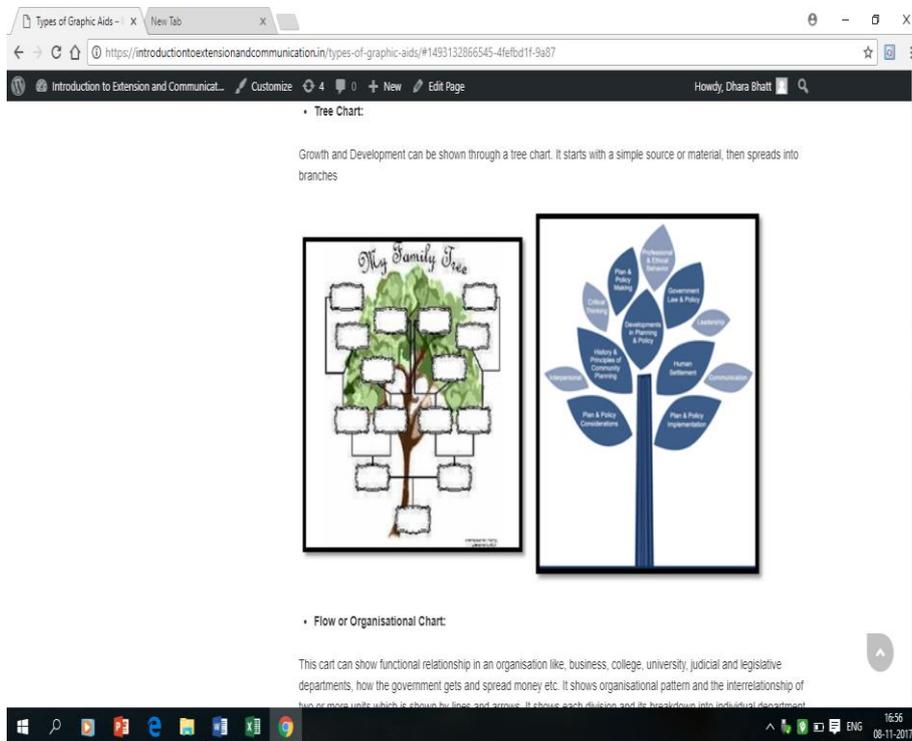


Figure: 21 Practical Understanding with Visual and Content

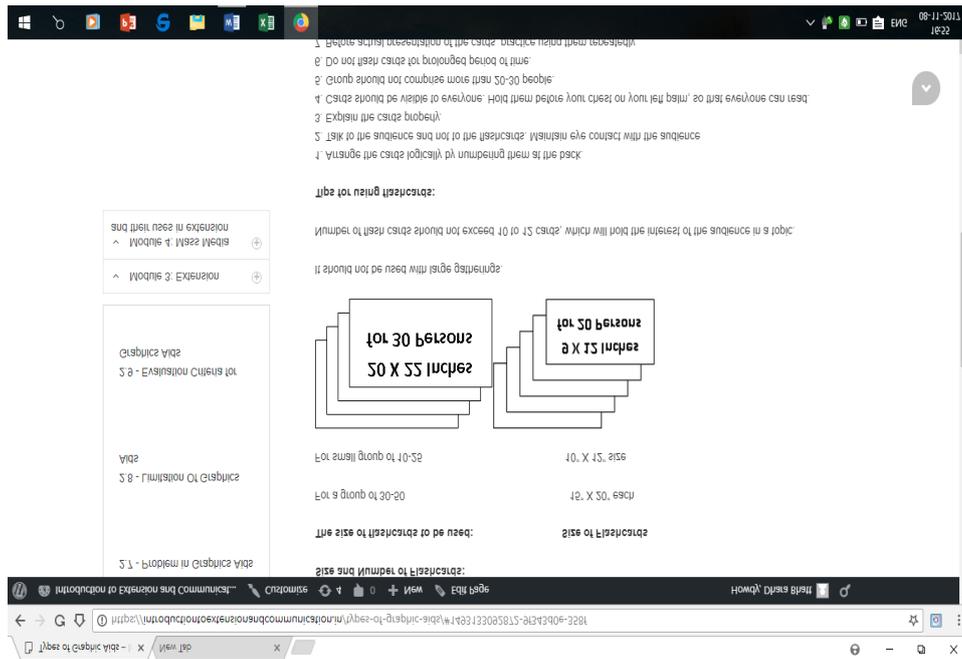


Figure: 22 Question Bank to Prepare for Written Exam

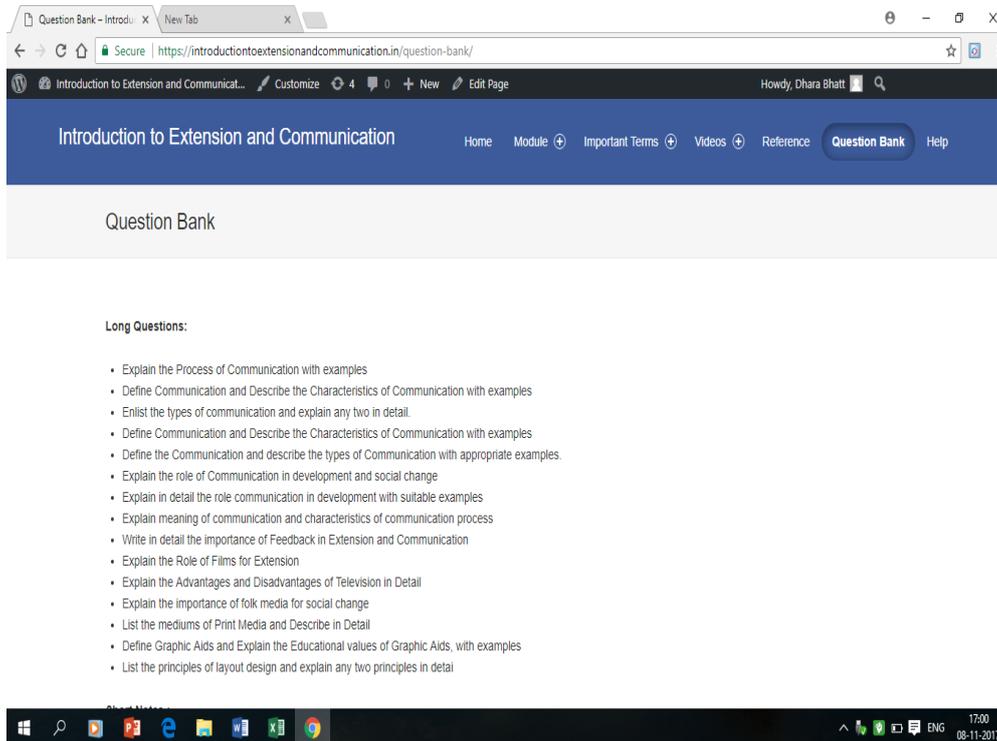


Figure: 23 Page end Menu for Smooth Functioning of Online Course

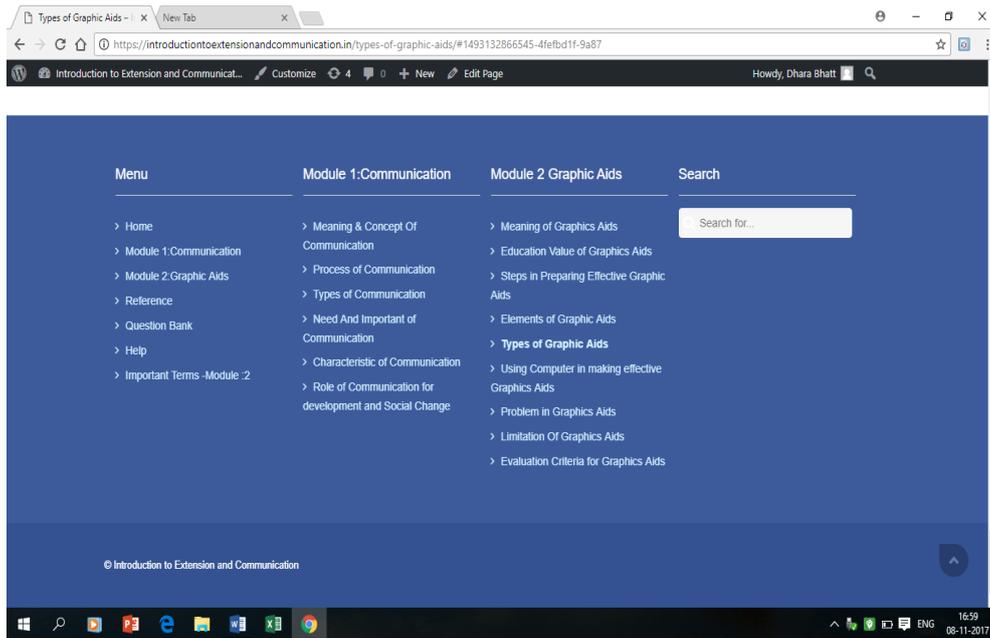


Figure: 24 Editing Pages on WordPress

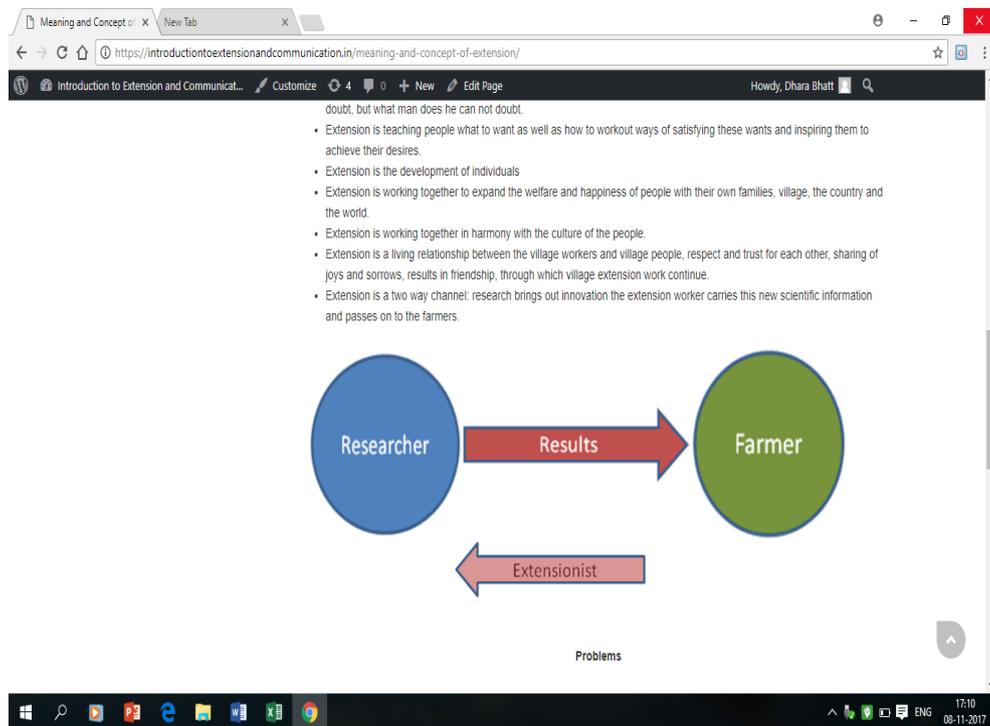


Figure: 25 Help Desk for any query during learning of Content

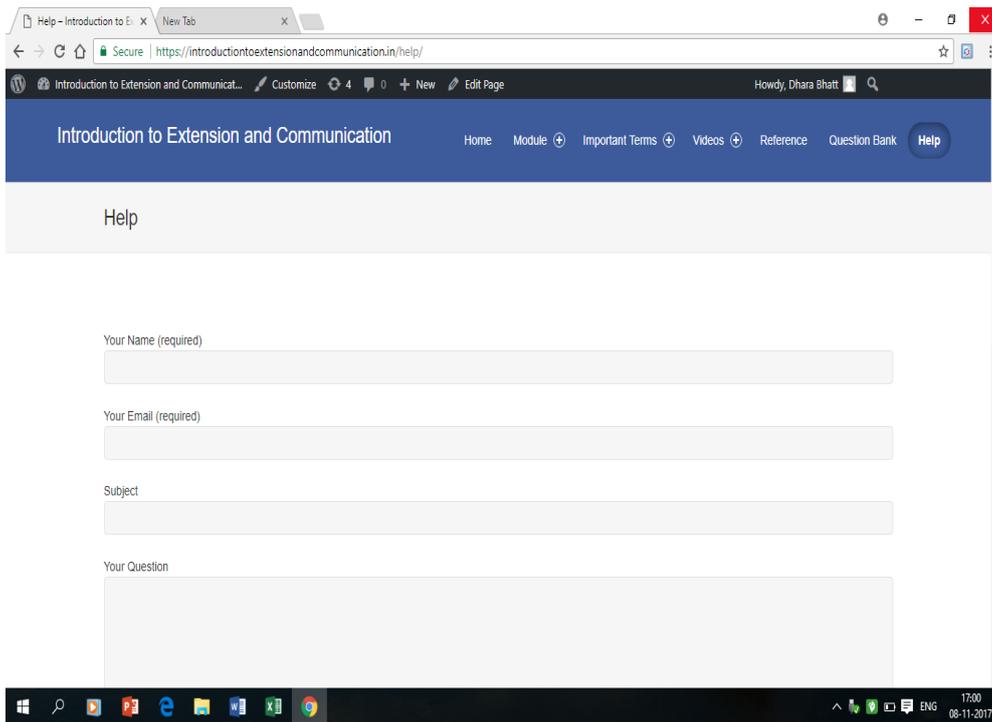
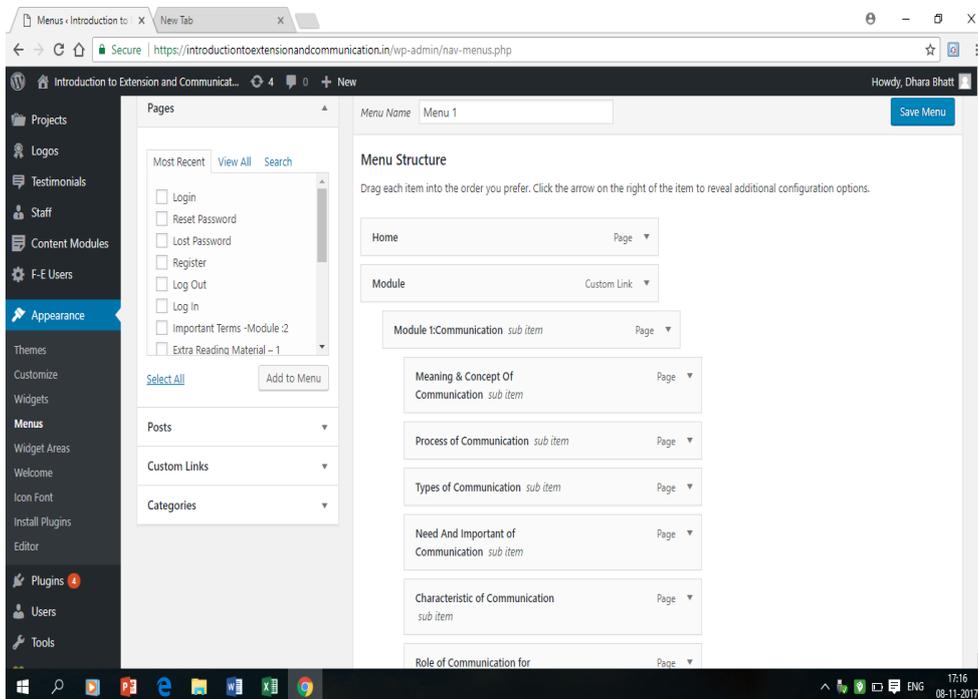


Figure: 26 Editing page and Page Design



3.3.2.5 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.

Table: 2 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 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.

Table: 3 Description of Research Tools

| Sr. no | Section | Aspects |
|---------------|--------------------------------|---|
| I. | Profile | Background Information |
| II. | Usage of Computer and Internet | Computer related information about: Usage Accessibility Purpose Knowledge level |
| III. | Exposure to ICT | Exposure to ICT: Exposure to technology for teaching-learning Usage of technology Purpose to use technology |
| IV. | Budget for Internet Usage | Budget for Internet Usage: Type of Internet connection Gadget to use Internet Type of data plan Expense 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.

Validation of the Research Tools:

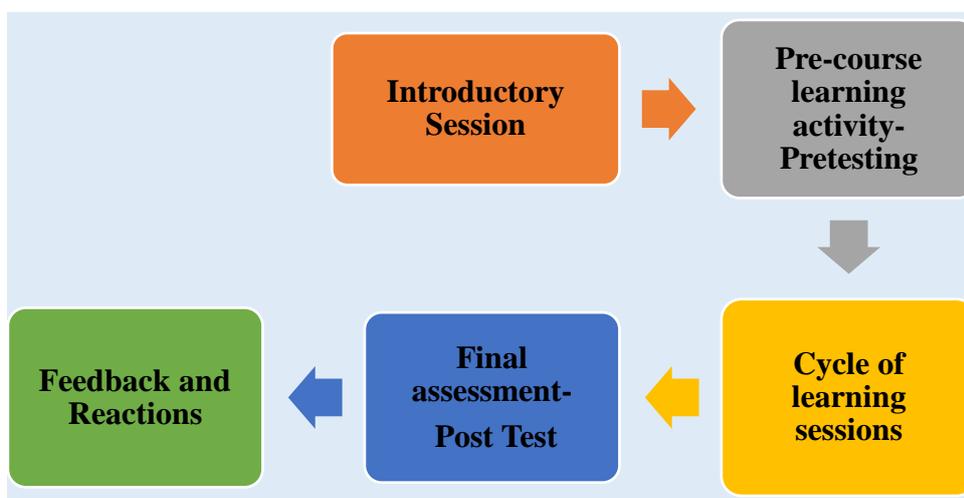
Judgment of the experts was used to validate the research tools. All the research tools were given to the five experts were from Department of Extension and Communication, Faculty of Family and Community Sciences, One Expert from Faculty of Education and Psychology, and one faculty from English department, 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.

3.4 Experimental Phase

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.

Figure 27 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:

Table: 4 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 | 29/7/17 | Saturday |

| | | | |
|------------|--|---------|----------|
| | <ul style="list-style-type: none"> • Intrapersonal Communication • Interpersonal Communication | | |
| 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 |

Table: 5 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 | Wednesday, Thursday, Friday, Saturday |
| | Educational values of Graphic Aids Concept of layout, Steps in Preparing Layout | | |
| Session 2 | Elements of designing Graphic Aids | 19,20,21,22,23 July 2017 | Wednesday, Thursday, Friday, Saturday |
| | Principles of Designing Graphic Aids Designing a Layout for Poster | | |
| 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 | 9,10,11,12 August 2017 | Wednesday, Thursday, Friday, Saturday |
| | Designing and Use of Flashcards | | |
| | Use of Computers for designed Graphic Aids Designing layout Flash Cards | | |
| 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.

3.5 Scoring and Categorisation

Demographic Variables

Table: 6 Level of Education of Parents

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

Table : 7 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 |

Table: 8 Categorization of variable Stream of Study

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

Table: 9 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 |

Table: 10 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 |

Table: 11 Minimum and Maximum Score of variable Usage of Computer

| Sr.no | Description of Variable | Minimum Score | Maximum Score |
|--------------|---|----------------------|----------------------|
| 1 | Frequency to use computer | 1 | 3 |
| 2 | Place to access computer | 1 | 3 |
| 3 | Sources to learn to operate computer | 1 | 3 |
| 4 | Years of access to computer | 1 | 3 |
| 5 | Use of computer programmes | 1 | 3 |
| 6 | Years of access to internet | 1 | 3 |
| 7 | Place to access internet | 1 | 3 |
| 8 | Purposes of using computer and Internet | 1 | 3 |
| 9 | Proficiency to use computer & internet | 1 | 3 |
| 10 | Time Spent to use computer & internet | 1 | 3 |
| | Total | 10 | 30 |

Table: 12 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 |

Table: 13 Categorization of variable Exposure to ICT

| Sr.no | Description of Variable | Categories of Variable | Scoring |
|--------------|-----------------------------------|-------------------------------|----------------|
| 1 | Exposure to technology | One technology | 1 |
| | | Two-four Technology | 2 |
| | | More than Four Technology | 3 |
| 2 | Comfort to Technology | Not comfortable | 1 |
| | | Moderately comfortable | 2 |
| | | Very Comfortable | 3 |
| 3 | Usage of Technology for Education | Half an hour to 1 Hour | 1 |
| | | 2-3 Hours | 2 |
| | | More than 3 hours | 3 |

| | | | |
|----------|---|-----------------------|---|
| 4 | Purpose of Using technology for educational Purpose | 1-3 purposes | 1 |
| | | 4-6 Purposes | 2 |
| | | More than Six purpose | 3 |

Table: 14 Minimum and Maximum Score of variable Exposure to ICT

| Sr.no | Description of Variable | Minimum Score | Maximum Score |
|--------------|---|----------------------|----------------------|
| 1 | Exposure to technology | 1 | 3 |
| 2 | Comfort to technology | 1 | 3 |
| 3 | Usage of technology for education | 1 | 3 |
| 4 | Purpose of using technology for educational purpose | 1 | 3 |
| | Total | 4 | 12 |

Table: 15 Categorization of variable Exposure to ICT

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

Table: 16 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 |

Table: 17 Categorization of variable Budget for the Internet Usage

| Sr.no | Description of Variable | Categories of Variable | Scoring |
|-------|---|--|---------|
| 1 | Owning Internet Connection | <ul style="list-style-type: none"> • Yes • No | 1 2 |
| 2 | Number of Internet Connection | <ul style="list-style-type: none"> • One • More than one connection | 1 2 |
| 3 | Kind of Internet Connection | <ul style="list-style-type: none"> • Prepaid • Post-paid | 1 2 |
| 4 | Speed of Internet Connection | <ul style="list-style-type: none"> • Low Speed(2G Limited, and unlimited) • High Speed(3G & 4G) | 1 2 |
| 5 | Budget for Internet Data pack | <ul style="list-style-type: none"> • Spending less(50-300) • Spending More(More than 300) | 1 2 |
| 6 | Find internet usage | <ul style="list-style-type: none"> • Expensive(Very Expensive, Expensive) • Not Expensive(Little Expensive, Not expensive) | 1 2 |
| 7 | Change for cost effective internet services | <ul style="list-style-type: none"> • Not changing or only it is free • Yes for Change | 1 2 |

Table: 18 Minimum and Maximum Score of variable Budget for the Internet Usage

| Sr.no | Description of Variable | Minimum Score | Maximum Score |
|-------|---|---------------|---------------|
| 1 | Owning Internet Connection | 1 | 2 |
| 2 | Number of Internet Connection | 1 | 2 |
| 3 | Kind of Internet Connection | 1 | 2 |
| 4 | Speed of Internet Connection | 1 | 2 |
| 5 | Budget for Internet Data pack | 1 | 2 |
| 6 | Find internet usage | 1 | 2 |
| 7 | Change for cost effective internet services | 1 | 2 |
| | Total | 7 | 14 |

Table: 19 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:

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

3.6 Plan of Statistical Analysis:

Table: 21 Different Statistical Measures Used for Analysis of Data

| Sr.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. | <p>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:</p> <p>Medium of instruction at school</p> <p>Stream of Study in H.S.C</p> <p>Educational Qualification of Parents</p> <p>Type of Computer and internet user</p> <p>Exposure to ICT</p> <p>Possession of Gadgets</p> <p>Budget for Internet Usage</p> | Mann-Whitney U Test (Non-parametric Statistics) |
| 4. | <p>Reactions of F.Y.B.Sc.(F.C. Sc) Students towards the Online course</p> <p>Features</p> <p>Aspects</p> <p>Problems</p> <p>Suggestions</p> | <p>Percentage</p> <p>Intensity indices</p> <p>Percentage</p> <p>Percentage</p> |