PREFACE

In a bid to standardize higher education in the country, the University Grants Commission (UGC) has introduced Choice Based Credit System (CBCS) based on five types of courses *viz. core, generic, discipline specific, elective, ability and skill enhancement* for graduate students of all programmes at Honours level. This brings in the semester pattern, which finds efficacy in sync with credit system, credit transfer, comprehensive continuous assessments and a graded pattern of evaluation. The objective is to offer learners ample flexibility to choose from a wide gamut of courses, as also to provide them lateral mobility between various educational institutions in the country where they can carry their acquired credits. I am happy to note that the university has been recently accredited by National Assessment and Accreditation Council of India (NAAC) with grade ''A''.

UGC (Open and Distance Learning Programmes and Online Programmes) Regulations, 2020 have mandated compliance with CBCS for UG programmes for all the HEIs in this mode. Welcoming this paradigm shift in higher education, Netaji Subhas Open University (NSOU) has resolved to adopt CBCS from the academic session 2021-22 at the Under Graduate Degree Programme level. The present syllabus, framed in the spirit of syllabi recommended by UGC, lays due stress on all aspects envisaged in the curricular framework of the apex body on higher education. It will be imparted to learners over the six semesters of the Programme.

Self Learning Materials (SLMs) are the mainstay of Student Support Services (SSS) of an Open University. From a logistic point of view, NSOU has embarked upon CBCS presently with SLMs in English / Bengali. Eventually, the English version SLMs will be translated into Bengali too, for the benefit of learners. As always, all of our teaching faculties contributed in this process. In addition to this we have also requisitioned the services of best academics in each domain in preparation of the new SLMs. I am sure they will be of commendable academic support. We look forward to proactive feedback from all stakeholders who will participate in the teaching-learning based on these study materials. It has been a very challenging task well executed by the Teachers, Officers & Staff of the University and I heartily congratulate all concerned in the preparation of these SLMs.

I wish you all a grand success.

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Vice-Chancellor

Netaji Subhas Open University
Under Graduate Degree Programme
Choice Based Credit System (CBCS)
Subject : Honours in History (HHI)
Course : ICT in Education & Reading and Reflecting on Text
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Unit 1 ❑ ICT in Education

Structure

1.1 Objective

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1.3 ICT in Education: Meaning, Nature and Scope

1.4 Web

1.5 Free and Open Source Software (FOSS)

1.6 Open Educational Resources (OER)

1.7 Summary

1.8 Self-Assessment

1.9 References

1.1 Objective

After completion of the Unit, the learners will be able to-

● understand the concept of ICT in Education

● gain knowledge on Web 1.0 and Web 2.0

● comprehend and categorize Free and Open Source Software

● know and identify Open Educational Resources

1.2 Introduction

Information and Communication Technology connects each nooks and corners of the world in general and stakeholders in particular. Education system is not an exception one. This quantum jump of technology towards academia has its history by the invention of Gutenberg's printing machine, which was the greatest revolutionary event. Still this technological development is taking place after the invention of computers and associated technologies. With the advent of computer and associated technology, accessibility and usability of resources have undergone through a vital change, which is rather a positive sign

for the society. In view of foregoing, this unit will focus on implementation of different embedded tools and techniques of information and communication technologies for the quality education system and for its continuous development.

1.3 ICT in Education: Meaning, Nature and Scope

Technology is a combination of tools and techniques; it is not a new thing. If we look back into the ancient world, when wheel was invented, that was also a technological invention of a society. So far, from that time to the present age time has gifted a lot of contrivances to carry forward our life in a changing environment. With the "advent of technology and web, the entire education system is gearing up from its static point to a dynamic state. The future of education system in the last century is not simply about reaching more people, but about improving the quality, sustainability, granularity and diversity of educational opportunities. Let's start with few formal definitions of Information and Communication Technology.

Basically, Information and communication technology is combination of three words, viz., Information, Communication and Technology. However, the term Information Technology (IT) is generally about practices of computers with its peripheral devices like printers, scanners, floppy disk etc. And after intervention of Internet along with its peripheral provisions like computer network, world wide web, email etc. Term Information Communication Technology (ICT) has come into the practices (Anderson, 2010). So, we may say world wide web connects the dots between people and computers. Gradually, it increases use and access of resources worldwide, communicated by others. In this context a statistic given by IBM is worth- mentioning that "Our current output of data is roughly 2.5 quintillion bytes a day" (IBM, 2016). Therefore, in a nutshell information communication Technology is a flow/process to identification, collection, organisation and dissemination of intellectual thoughts (information) by using computer/Internet and peripheral devices (Technology) in a communicative, participative and collaborative way to all (Communication). It is veiy much clear that like other equipment, computer is also a tool for us to promote educational system. And provision of World Wide Web (WWW) enhance this process by connecting each and every nooks of the world. Even better to say, this digital inclusion emerges the scope and coverage of SDG4, "Quality Education" (for further reading see: <https://www.un.org/sustainabledevelopment/education/7utm source= hootsuite>). ICT tools are proving indispensable supports to every level of education especially higher education. Components of ICT are stated below through a figure as depicted by UNESCO (Figure 1)

for understand-ability of the ICT. Until and unless we are not aware of these components, we might not be able to explore/ use different provisions of technologies in education sector.
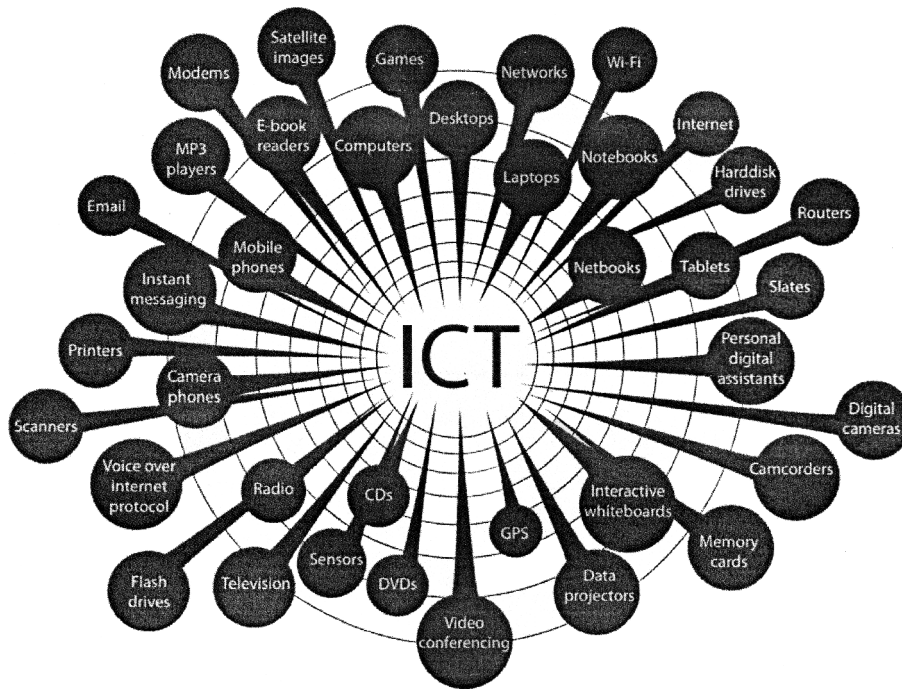

Figure l: Components of ICT (Anderson, 2010)

ICT environment is changing rapidly. Whether its tools or about its techniques or by it variety of contents. Computers are connected worldwide through Internet in general and world wide web in particular. Web is a platform of interlinked hypertext pages containing data (text/numerical) accessed over the internet.

1.4 Web

From the inception of the Web by Tim Berners Lee (1989) there were immense progress had been made. As a result, there are now of six versions already been developed as Web 1.0, Web 2.0, Web 3.0, Web 4.0, Web 5.0. Next section is going to focus on this issue relating to web. Journey of the web was started as a system of interlinked pages made of html language. Basically, that system was static by its nature. Now we are towards the mechanism of Internet Information Services Manager (ISM) in Internet Information Services (IIS) 6.0 (Satff@Mircosoft.com, 2014) which is actually considered as a web

6.0. Table 1 will give you an idea on varieties of different web versions.

Table l: Differences between Web 1.0-4.0

Web 1.0	Web 2.0	Web 3.0	Web 4.0
First Generation of Web	Second Generation of Web	Third Generation of Web	Fourth Generation of Web
Static	Dynamic	Personalised	Ubiquitous web
Read-only	Read-Write	Sharable web	Read-write-execution-concurrency web (Aghaei, Nematbakhsh & Farsani, 2012).
Directories	Tagging	Semantic Web	Open, Linked and Intelligent web
Client to Server	Peer to Peer	Peer to Peer	Peer to any other
HTML	XHTML	XML	RDF
Navigate the web	Content creation	Semantic mark-up and web services	Web application

From the above table it is very much clear that Tim Berners Lee started the journey from few interlinked pages which is now triggering the web with its advance technology based on semantic mark-up services. As a result, with the advent of upgraded software, low cost hardware and interventions of web technologies strengthening entire educational system as a whole. Fig 2 also is an instancte, which shows different features and characteristics of different flavours of web technologies.
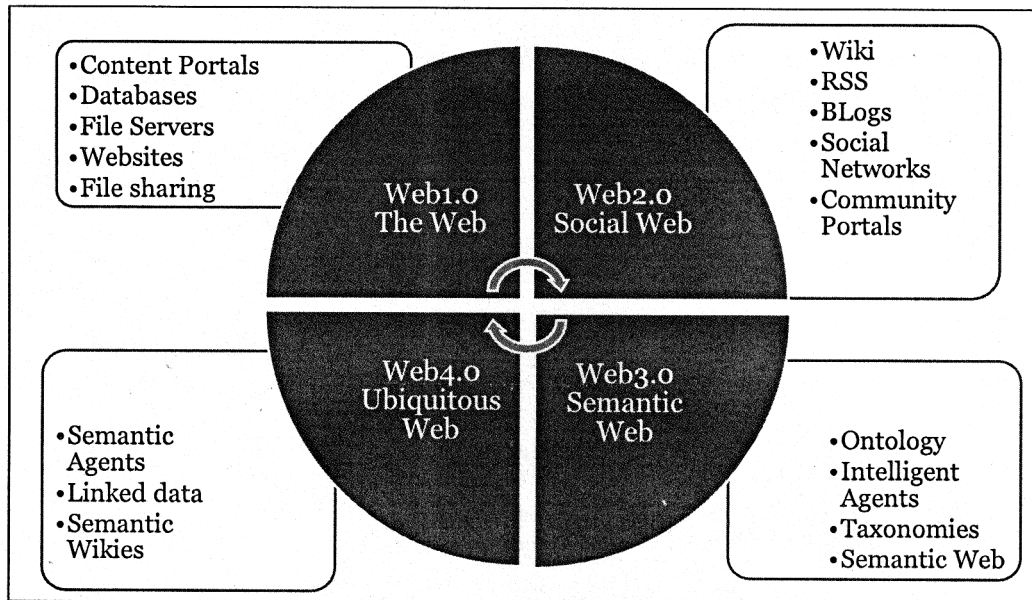
Figure 2: Differences between Web versions Source: (Abarca, 2016)

This section already shows different aspects of ICT which are as product and as services may affect the attire of teaching-learning process. Generally, as an end-user, in current situation we are enjoying products and services of web 2.0 technologies. Therefore, implication of web 2.0 in educational sector makes a unique term that is Education 2.0. Education 2.0 is application of Web 2.0 tools and technologies to education.

1.5 Free and Open Source Software (FOSS)

Free and Open Source Software (FOSS) is a brunch of software distribution where source code and binary code of a software is freely available without free cost. According to OSI (Open Source Initiatives)—

"Open source promotes software reliability and quality by supporting independent peer review and rapid evaluation of source code. To be certified as open source, the license of a program must guarantee the right to read, redistribute, modify and use it freely". Linux operating system, Mozilla, web browser MySQL (RDBMS) are some example of open source software.

Open source platform or in broader sense principle of open practice strictly follows open license for its each and every products whether its a text document or its a software. So before approaching next section lets have a clear idea about open license. License is

a documentation which specifies do's and don'ts of a particular piece of work. It generally gives you permission up to which extends a work maybe used by the users. Simultaneously it also restrict you for forbidden works. Open license is such kind of documentation which gives priof permission to reuse, remix, revise, redistribute actual works of a creator and after reuse remix and revise user can retains right for further distribution. But user have to acknowledge actual author for actual work.

Table 3: OER Distribution terms

Reuse	Use the content in its unaltered form
Revise	Adapt, adjust, modify, improve, or alter the content
Remix	Combine the original or revised content with other OER to create something new
Redistribute	Share copies of the original content, revisions or remixes with others
Retain	Keep access to the materials after the learning event

There are varieties of open license. All among Creative Commons license is quite popular as it has six provision of licensing. Make easily sharable materials with the provisions of open licensing systems like creative commons; updated materials which can be edited, augmented, customized, combined and reformatted by anyone; amplify access of learning resources; assist with both teaching and learning Protect intellectual works from plagiarism.

In nutshell, we need open license to protect content contributors right in such tech-sawy world where content can so easily be copied and shared.
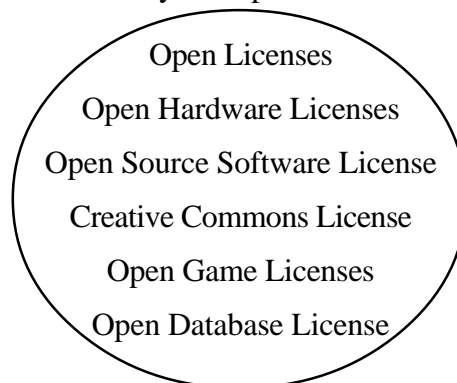
Open Licenses

Open Hardware Licenses

Open Source Software License

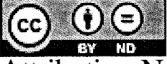Creative Commons License

Open Game Licenses

Open Database License

Figure 4: Open Licenses Diagram

The concept of open licensing was first admired by Richard Stallman with General Public License (GNU PL). Which gives permission to free use, study, modification and sharing of computer software code as a licensed public good. "FreeBSD" license, MIT

license, Mozilla Public License 2.0 are of same kind for software distributions. Open Access initiative is legally free in all sense which incorporates provision of open license. In case of open access publishing Creative Commons (CC) license is broadly used. Creative commons is a non-profit organisation. It allows six types of licenses to content contributors for offering permission to use as follows:

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Attribution-Noncommercial CC BY-NC	Copy, Adapt or modify, Distribute, and License to others
Attribution-Non Commer-cial-ShareAlike CC BY-NC-S	Copy, Adapt or modify, Distribute, and License to others on the same terms as the original work.
Attribution-NonCommercial-NoDerives CC BY-NC-ND	Copy, Distribute verbatim copies only, and License to others.

Contents with such licenses are free to reuse, remix, revise, redistribute and to retain. Contributors already given permission to users for repurposing in terms of acknowledging their contributions towards academic society. This is the main flavour of open license. For democratisation of knowledge, accessibility of educational resources without any barrier is very much required. Open license is supporting strongly to achieve this goal. In next section we will discuss about the educational resources published and available in open platform which is widely known as Open Educational Resources (OER).

1.6 Open Educational Resources (OER)

The term Open Educational Resources (OER) is educational resources to reuse, remix, revise, re-distribute and retain without any legal, technical, economic and social barrier. Education is a matter of transmission and sharing. OER is a small part of open Education Practices which includes open access journals, open data, open thesis and dissertations, open books, open source software etc. Main motto of openness to achieve democratization of knowledge. Educational system includes pedagogy, instructional system design and technology to students without barrier of person, time, place, and pace. OER promotes flexible learning to achieve equitable quality education, they even could be flexible in accessing higher education without/less entry requirement rigidities and most importantly without time and pace constrains. '

Usually in present practices, some printed Text/ Self-Learning Materials, audio/video files are received by the learners and within a time span they have to submit their assignments and finally they could appear in final examination (Abeywardena, 2012). But the time has changed towards interactive and collaborative environment where students could choose educational resources as per their level of cognition, age and facilities they have. Even assessment procedure is a very important issue to rectify from current practice to evidence-based technology to assess their level of achievements.

Technology is at our door-step. Teaching-learning technology is under-going through a paradigm shift from program-based learning to Self-Learning and presently to Meta-learning/ resource based learning. In such system Open Educational Resources have tremendous potentiality to improve the quality, efficacy and efficiency of education with its quality of free availability and adaptability. "OER describes any educational resources (including curriculum maps, course materials, textbooks, streaming videos, multimedia applications, podcasts, and any other materials that have been designed for use in teaching and learning) that are openly available for use by educators and students, without an accompanying need to pay royalties or license fees." Several OER initiatives were there for education, institutions where open licensed content can be produced in various medium. WOU OER Repository; OER Asia; OER Commons; OER Online Archive; Open

Educational Resources (OER) Africa; GLOBE; Creative Commons; Copyright Licenses; Oasis: COL Open Access Institutional Repository; The Orange Grove; RRU Open Educational Resource. Figure 5 is an instance of institutional OER repository through which learners can browse, search and retrieve required documents (Institutional/university publications like SLMs, A/V lecture, previous years question answers etc.) without any technical, legal and economical barrier. This repository basically follows CC- BY-NC-SA open license to promotes its resources.
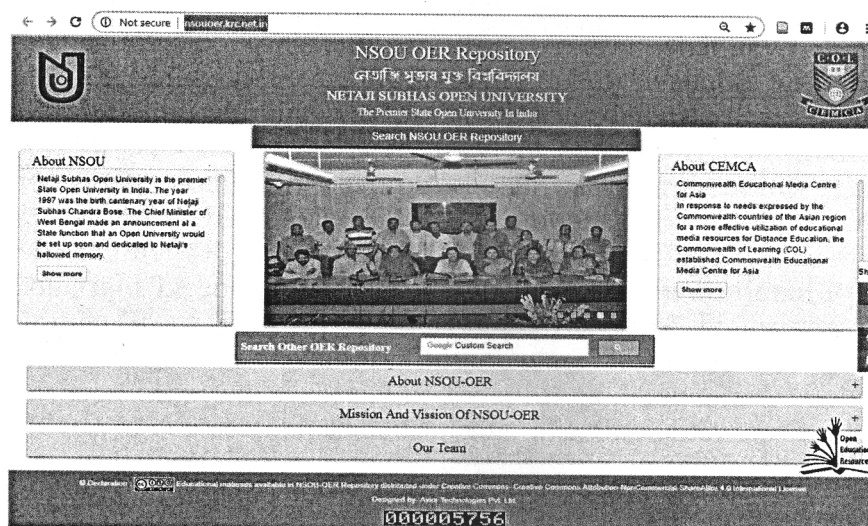

Figure 5: NSOU-OER Repository

In this digital era, Massive Open Online Course (MOOC) can achieve principles of economy of scale to a large number of students across the world. OER is a cost effective provision for education systems to reduce cost of materials and time of courses.

1.7 Summary

The Information and Communication technology to be precise has become a driving force behind economic growth and a developmental tool as well. ICT is an extended term for Information technology which is a technological source to make information available at the right time, right place in the right form to the right user. Earlier, one had to wait for the newspapers to get the information across the world. Now with the smarter technology, information can be accessed from anywhere using smartphones and gadgets. All this is made possible with the help of Information and Communication Technology. Information technology has been influencing our lives in the recent years in the fields of education too.

ICT has opened more accesses, shortened a long distance and made everything became closer as well as it has benefited us with more effective and useful time. Skill and competence to the ICT tools like Web 1.0 and web 2.0, FOSS could eventually provide all stakeholders of education sector with simpler and easier and quality life. The Open Educational Resources (OER) are teaching, learning and research materials in any medium - digital or otherwise - that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions.

1.8 Self-Assessment

1. Define ICT

2. Explain Web 1.0 and Web 2.0

3. What is FOSS ? Give examples.

4. Mention the features of OER.

5. Delineate the significance of ICT in education system.

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Unit 2 ❑ Approaches, Stages and Competencies

Structure

2.1 Objective

After completion of the Unit, the learners will be able to-
● outline the approaches in application of ICT in education
● enumerate the various stages of ICT usage
● delineate the pedagogical usages of different aspects of ICT
● integrate teacher competencies in the domain of ICT in education

2.2 Introduction

Now the main issue is how to adopt/adapt such circumstances-to carryout-1 teaching-learning process as a whole. This issue is pertinent for learners as well as for teachers also. Because entire education community may not be fully aware of the technological needs, implementation and usefulness. We have to set our mind to integrate such technological interventions in our educational system. Cause being, the exponential growth of communication channels and computer systems, ease of use, and diversity of information transfer allow teachers and students to have access to a world beyond the classroom. Let us see what are the approaches and competencies of ICT in educational sector penetrating the entire system.

2.3 Approaches in adoption and use of ICT in Education

Emerging, Applying, Infusing and Transforming

Requirements may vary from institutions to institutions based on situation, culture, course and infrastructure. There are different approaches in ICT development as identified involves integrating ICT across the curriculum.

They are as follows:

Emerging: It is the beginning stages of ICT development. In this stage of exploration, the administrators and teachers try to evaluate the possibilities and consequences of using ICT in the teaching-learning process. This stage begins with few initiatives like opt computer equipment/software. The focus is on understanding the technical importance of ICT like the use of word processing, locating information on CD-ROMs etc.

Applying: It comes after understanding of the influence of ICT to the curriculum and the teaching-learning processes. In this secondary phase/ at the applying approach phase, administrators and teachers use ICT for tasks already carried out in curriculum. Teachers largely dominate the learning Emerging Applying Infusing Transforming Technology Pedagogy - 3- environment. Schools at the applying approach phase adapt the curriculum in order to increase the use of ICT in various subject areas with specific tools and software such as drawing, designing, modelling and application specific tools., adapt the curriculum in order to increase the use of ICT in ICT - Use and Abuse various subject areas. At this stage, teachers use ICT for professional purposes; focusing on improving their subject teaching through ICT applications.

Infusing Approach: This approach involves integrating ICT across the curriculum. In this approach, it is seen that academicians are engaging their self to employ a range of computer-based technologies in laboratories, classrooms, and administrative offices to improve their own learning and the learning of their learners.

Transforming Approach: In this final stage, ICT becomes an integrated part of all school activities. The focus of the curriculum is learner-cantered and is now thoroughly integrated with all subjects. ICT is also taught as separate subject at the professional level and incorporated into all vocational areas. This is the phase of specialization where teachers specialize in the skills of using the ICT tools. This helps in making the process of teaching more learner centric and thus the school becomes a centre of learning for the community.
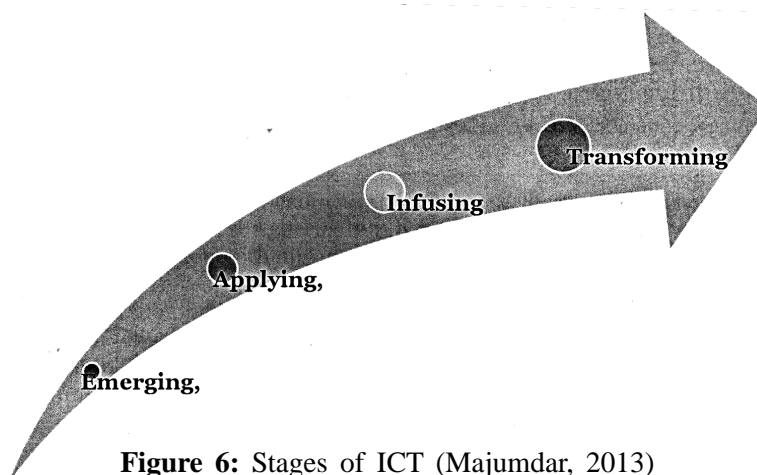

Figure 6: Stages of ICT (Majumdar, 2013)

In continuation to this, you can consult table below for a comparative discussion on different approaches of ICT implementation.

Authors, years	Stages of ICT implementation			
	I.	II.	III.	IV.
Petrauskas (1990)	Early/elem entary	Experimental	Planned / Widespread	Harmonious application
Fullan (1996)	Material, media	Change of behaviour, methods		Change of content
Fullan (1996)	Initiative	Implementation		Institutionalisation
Coughlin (1999)	Entry	Adaptation		Transformation
Urbonaite (2000)	There are no computers or at least 5?6, or not a powerful class, informatics is taught	Have 6?12 more power-ful computers with multi-media equip-ment, informa-tics is taught	Have 10?20 computers with the possibility to use the Internet, profiled teaching of separate subjects	
Strategy of ICT implementa-tion in educa-tion (2000)	Readiness	Modernisation of libraries	ICT integration into curriculum	Development of education networks
McCormick, Scrimshaw (2001)	More effec-tive us of ICT	Extension of activity by new methods		Activity transformation
StaR Chart project (2001)	Early	Developing	Advanced	Target

Andresen (and Brink (2002)	Scenario 1. Presentation of curriculum /content by linear multimedia	Scenario 2. Presentation of curriculum/content by non-linear multi-media (e.g., hypertext)	Scenario 3. Presentation of curriculum/content by teaching ?oriented target programs	Scenario 4. Training of a pupil to create one?s product of multimedia
Anderson and Weert. (2003)	Introduction/discovery of ICT media	Application/Learning how to use media	Involvement/Understanding how and when to use media	Transformation Specialisation for professional activity
Juceviciene (2002)	Access of teachers and pupils to computers.	Diversification and efficiency increase of traditional educational process	Expansion of learning/teaching possibilities using websites, the Internet, intranet	Transformation of learning/ teaching
Strategy of ICT implementation of vocational education (2004)	Emerging	Applying	Infusing	Transformation
EnGauge project (2004)	Awareness	Adoption	Exploration	Transformation
UNESCO (2005)	Emerging	Applying	Integration	Transformation

Adopted from Stages of ICT implementation (Chreptaviciene, Virginija; Kondratas, 2005)

2.4 Stages of ICT Usage

Information and Communication Technology (ICT) is considered as a permeating tool that will strengthen the socio-economic development of a community as well as of the country. Awareness on ICT application in educational sector may improve implementation as well as quality. To enhance awareness on ICT application first step may start with

learning how to use, how to imply and what to do with ICT applications in educational sector. It is necessary for teachers and learners both. ICT skilled teacher are able to develop a high quality skills and knowledge based society (Anderson, 2010). By following Mazumder's model we can say
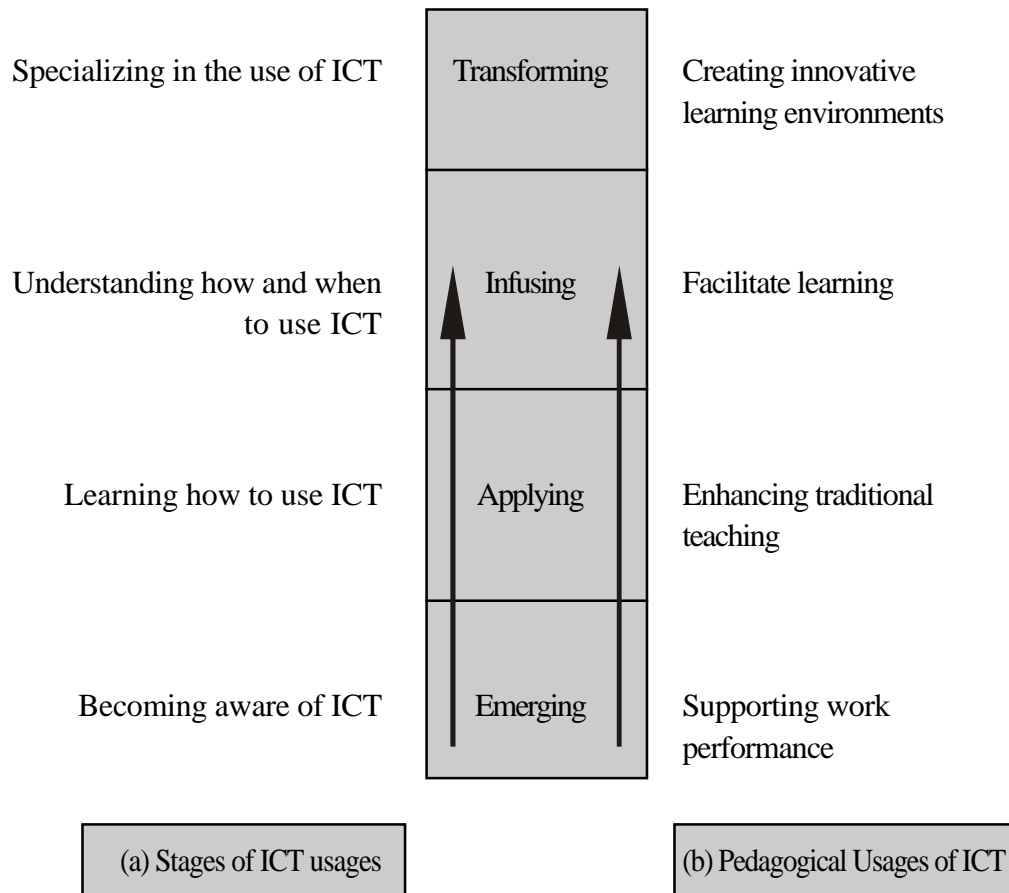
Specializing in the use of ICT	Transforming	Creating innovative learning environments
Understanding how and when to use ICT	Infusing	Facilitate learning
Learning how to use ICT	Applying	Enhancing traditional teaching
Becoming aware of ICT	Emerging	Supporting work performance
(a) Stages of ICT usages		(b) Pedagogical Usages of ICT

Figure 7: Majumdar's model of ICT mapping

In conclusion, we may recite following lines for better understanding of teaching-learning process with the help of ICT. Learning and teaching for a new generation of young people who are growing up in a digital world, are comfortable with technology, and need their schools to reflect these realities. It envisions a journey that takes us through learning about ICT, learning with ICT, and learning through ICT (cited in Ledesma, 2005, p. 3)".

2.5 Pedagogical Usages of ICT

Supporting Work Performance:

Appropriate use of ICT can transform the whole teaching-learning processes leading to paradigm shift in both content and teaching methodology. ICT has the potential to transcend the barrier and space. ICT integration in the field of education has impacted hugely in improving the quality of education. It is widely believed that ICT integration will help us in making education more accessible and affordable. Increasing role of ICT will make education more democratic thereby improving the quality education services available to even students sitting in far- flung remotest corners of the country.

Enhancing Traditional Teaching:

The new environment of interactive learner-centered approach of ICT has completely meta-morphosised the process of education i.e., delivery and dissemination. The technological creativity of learner will help generate sharing of knowledge to perform tasks in a better way and to develop their capacity and skills to keep pace with the rapid changes.

Significance of ICT pedagogy:

We must not allow the ICT related opportunities to slip out of our hands. We must empower our youth with the latest technology to tap the latest skills and hidden potential of our youth population. There is considerable hope that technology can expand and improve education in all levels with special reference to design and content of instructional materials, delivery, and assessment and feedback.

In technology enhanced learning (TEL) teacher's role will be more challenging and definitely different from what is presently the traditional class room teaching. In the new role he will be more a director/coach or a facilitator, because the Educational Technology enhances the quality of teaching and learning by arousing inquiry, curiosity and exploration. ICT will afford opportunity to the individual for self-paced learning, which caters to learners' abilities & aptitudes.

learner's abilities and aptitude.

Innovative learning environments:

Innovative Learning Environments (ILEs), which combine flexible use of spaces, furniture and technology with greater collaboration and flexibility in relation to teaching and the curriculum, are becoming more common.

The attributes of technology rich learning environments that support innovation and collaboration are- strong, engaging and motivating storyline, teachers have been able to construct robust interdisciplinary modules where students are gaining digital literacies, collaborative problem-solving, creativity and many other skills, while interacting with the latest technologies.

An Effective Learning Environment:

- Today's learners seek a learning environment that is not as obsolete as traditional classrooms but that is specifically engineered to support thinking.

- They prefer the learning environment that pushes their learning capacity with altering strategies and teaching practices.

- They want to be a part of an impactful learning setting that provides a sense of achievement while they can be adaptive and interactive with fellow learners as well as instructors.

- In brief, they want to be active and engaged players throughout the learning course.

Source: https://raccoongang.com/blog/what-makes-good-learning-environment/

Engaging in Interactive Games and Activities:

An effective online learning platform is the one that establishes strong interactions and promotes collaborative learning culture. This means that it is imperative for instructors to maintain positive relationships with the learners while also ensuring healthy association among the learners. This can be done by using the best way of encouraging group activities. Introduction of non-competitive games and activities break down the cliques within a learning environment. This also assists the new and shy students to have a sense of belonging.

Such activities promote communication and collaborative working environment and establish cooperative learning structures.

Using technology to innovate learning environments:

Technology can be an enabler in the strategic design of environments to produce desired changes in pedagogy and learning. However, it is essential to remember that it is how the technology is used rather than the technology itself that impacts learning. Rather than the mere integration of technology into existing teaching practices, technology use within the context of ILE supports attempts to reframe the nature of education in profound ways.

Technology has several important roles to play in supporting innovation. It provides tools and infrastructure as well as access to ideas and opportunities. It has been shown to motivate students and build their capacity and capability to make changes. It is also useful for organising, analysing and presenting large quantities of assessment and evaluative information to inform pedagogical development.

In order to ensure an innovative and learning-centred approach to technology, it is important to reflect on and inquire into the potentialities of technology to support visions of pedagogy and learning. Opportunities to develop teacher capacity are crucial, as are opportunities and inspiration for innovation, the reorganisation and creation of new learning materials and activities, and the redesign of curricula models.

Source: https://theeducationhub.org.nz/ile-and-technology/

2.6 Teacher Competencies: Integration of Content, Pedagogy and Technology

We have so far discussed a lot of ways to use technology in the classroom. As teachers, we feel a push to incorporate technology into our classrooms because of the new outcomes that demand it. The TPACK model gives us a new framework for the integration of technology in education and how we can structure our classrooms to provide the best educational experience for students while incorporating technology.

TPACK is essential to enabling teachers to implement ICT in their teaching, as it enables teachers to select and use hardware and software, identify the affordances (or lack thereof) of specific features and use the tools in pedagogically appropriate and effective ways.

The TPACK Framework:

TPACK stands for Technological Pedagogical Content Knowledge. It is a theory that was developed to explain the set of knowledge that teachers need to teach their students a subject, teach effectively, and use technology. We'll get into more details in just a minute, but let's look at where this started.

Use of TPACK in the Classroom:

Keeping technology as a separate knowledge set causes problems, but when we understand the framework of TPACK, we can integrate technology into the content and pedagogy of our classrooms. The integration will help our students learn more effectively.

Mishra and Koehler suggest that TPACK should guide curriculum development and teacher education. They explain how TPACK should change the way we plan our daily

lessons. They describe a planning process where—

- We first choose the learning outcomes that we will be working on that day or during that class session. The learning outcomes are the content.
- The second step they propose is choosing an activity type. The activity type is the pedagogy or how are the students going to learn the content.
- Finally, we can choose technologies that will support the activity type and aid the students in learning.

The simplest idea at play in TPACK is that a person who is a world-renowned expert in a subject might not be a great teacher because they lack the pedagogical knowledge to make the subject accessible and understandable. To be a great teacher, we have to combine our knowledge of the subject with our knowledge of how to teach. With the increasing focus on technology, we need to also learn how to combine technology with our content and pedagogy to create an effective learning environment.

TPACK Framework:

- The Technological Pedagogical Content Knowledge (TPACK) framework describes the kinds of knowledge required by teachers for the successful integration of technology in teaching.
- It suggests that teachers need to know about the intersections of technology, pedagogy, and content. Specifically, how these areas of knowledge interact and influence one another in unique and specific contexts.
- In terms of teaching with technology, it suggests that it impacts not only what we teach but how we teach.

Descriptors of TPACK:

The TPACK framework looks at content knowledge (CK) as the "what" that is the subject matter (arts, English, mathematics, science, etc.) teachers teach, pedagogical knowledge (PK) is the "how" that tells how the teacher will make the content more accessible (via direct instruction, inquiry, group discussion, debate, modelling, etc.). Then, technological knowledge (TK) as the "partner" answering the question of what tools (laptops, projects, smart boards, multimedia, simulations, etc.) will be selected to make the content more accessible to the students.

The TPACK framework goes beyond seeing these three knowledge bases in isolation and goes further by emphasizing the kinds of knowledge that lie at the intersections between three primary forms:

- Pedagogical Content Knowledge (PCK),

- Technological Content Knowledge (TCK),

- Technological Pedagogical Knowledge (TPK), and

- Technological Pedagogical Content Knowledge (TPACK).

TPACK-Outcomes:

Researchers argue that pedagogical use of technology and effective technology integration using pedagogies for specific subject matter requires developing sensitivity to the dynamic, transactional relationship between these components of knowledge situated in unique contexts. Individual teachers, grade-level, school-specific factors, demographics, culture, and other factors ensure that every situation is unique, and no single combination of content, technology, and pedagogy will apply to every teacher, every course, or every view of teaching. From the figure below, the outer dotted circle of the framework is thus renamed as the "Contextual Knowledge" (i.e., the teacher's knowledge of the context) and define it as everything from a teacher's awareness of available technologies, to the teacher's knowledge of the school, district, state, or national policies they operate within. This also makes the outer circle another knowledge domain that teachers must possess to integrate technology in teaching. This, in turn, implies that contextual knowledge is something that we (as teacher educators) can act on, change, and help teachers develop. Since CK is taken (for Content Knowledge) and another CK would be confusing; therefore, the outer dotted circle is named as XK for "contextual Knowledge" distinguishing it from CK.
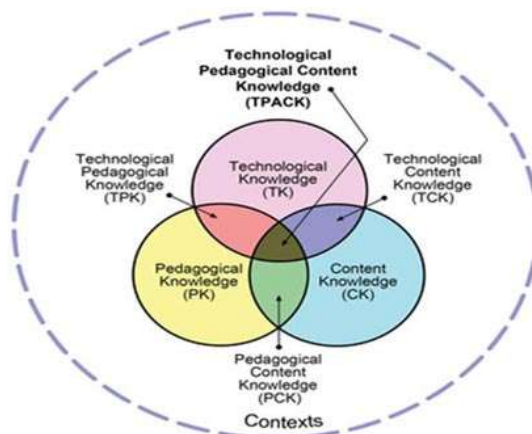
Fig: TPACK-Illustration

Source: https://en.wikipedia.org/wiki/Technological_pedagogical_content_knowledge

Domains of TPACK:

TPACK domains and related subdomains address the complex nature of teaching effectively with appropriate technologies. While the different domains and subdomains can be explored as separate skill concepts, domains and subdomains were conceptualized to work in synergistic reciprocity meaning that the knowledge is not entirely separate indicating the intersectionality of each area.

Accordingly, the TPACK model consists of three (3) main domains, each containing one (1) subdomain. The purpose of the subdomains is to unpack the broader domain concept by understanding intersections among the three primary knowledge anchors for the overall framework. The main domains are-

1. Technological Content Knowledge (TCK);

2. Pedagogical Content Knowledge (PCK), and

3. Technological Pedagogical Knowledge (TPK).

The three subdomains are—

1. Technological Knowledge (TK);

2. Content Knowledge (CK); and

3. Pedagogical Knowledge (PK).

In 2019, Mishra proposed a revised TPACK diagram to emphasize the context in which technology integration occurs by retitling the outer circle as Contextual Knowledge or XK.

Technological Knowledge (TK) addresses how teachers demonstrate professional knowledge of technology. TK considers what is required for teachers to integrate technology tools and resources into their course content and instructional practice. The technology component of TPACK in Technology is most beneficial for learning when it brings a change in professional teaching practice and in designs for learning. For teachers, TK not only addresses knowledge about technology but also knowledge of the skills needed to use technology to effectively plan instruction, including with science teachers.

TK involves understanding cross-platform applications and capabilities as well as how to configure those applications to realize instructional objectives and student learning outcomes. Content Knowledge (CK) is situated within the following definitional parameters of a teacher's knowledge about a particular subject matter and how it is taught and learned.

TPACK and the teaching-learning climate:

For educators, effective content instruction that engages students in higher-order activities using authentic, real-world examples facilitated through technology is the cornerstone of teaching and learning in the 21st century.

Thus, educators must not only be thoughtful in the instructional techniques they use to present content but also strategic in the technology selected to teach the subject matter as it may result in positive or negative results in long-term learning and knowledge retention. Pedagogical Knowledge (PK) addresses how teachers demonstrate professional knowledge of pedagogy. PK refers to the specific knowledge about teaching such as approaches or methods of how teachers teach a particular topic or how to scaffold a concept to the diverse interests and abilities of learners. For teachers and educators, an effective teaching method that engages students in higher-order activities using real-world examples facilitated through different learning styles is the cornerstone of teaching and learning in the current era.

Accordingly, educators must be thoughtful in the instructional techniques to teach the subject matter as it may have a great impact on long-term learning and knowledge acquisition. Choosing the right technology to enable higher-order thinking within the content, long-term knowledge retention, and facilitate student learning outcomes are paramount within the CK construct. Finally, Context Knowledge (XK) is the umbrella domain that refers to how teachers contextualize implementation based on the overall teaching and learning context.

TPACK, or Technological Pedagogical Content Knowledge, is a model that helps teachers consider how their knowledge domains intersect in order to effectively teach and engage students with technology.

2.7 Summary

This unit reflects on the various approaches of ICT in education. The integration of ICT and its various facets is the prominent part of success of ICT in the teaching learning process of any educational institution. Taking the aspects of resources, competencies etc. ICT integration is planned and developed in any Institution. The unit highlights on some such approaches of integration. Followed by this, comes the stages of adoption of ICT in education, i.e., emerging, applying, infusing and transforming. The basics of understanding the stages in the use of ICT is dealt with clear objectives. The last but not the least, teacher competencies is central to adoption of the ICT tools and its application for a quality output in teaching-learning-evaluation climate of an education system.

2.8 Self-Assessment

1. Describe any one approaches in application of ICT in education.
2. What are the different stages of ICT usage in education system?
3. Enumerate the teacher competencies required for ICT usage.

4. Outline the pedagogical significance in the different aspects of ICT in education.

5. Mention the stages of adoption of ICT.

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https://en.wikipedia.org/wiki/Technological_pedagogical_content_knowledge

https://theeducationhub.org.nz/ile-and-technology/

Source: https://raccoongang.com/blog/what-makes-good-learning-environment/

Declaration: Contents taken from OERs are mentioned within the text as 'Source'. The write up is mostly taken from Wikipedia. The references are drawn as attributed there.

Unit 3 ❑ ICT Tools

Structure

3.1   Objective

3.2   Introduction

3.3   Computer software

3.4   Web 2.0 tools

3.5   Assessment tools: Rubistar

3.6   Summary

3.7   Self-Assessment

3.8   References

3.1 Objective

After completion of the Unit, the learners will be able to-

- describe various computer software related to education
- gain an understanding of the available Web 2.0 Tools and their uses in education
- comprehend assessment tools and their uses in education

3.2 Introduction

Organizing and managing time in and out of the classroom is essential for teachers to perform all their necessary tasks, prepare their lessons well in advance, and create truly effective classes.For this reason, ICT tools help you to create presentations quickly, prepare classes, and organize your material in a virtual space, among others. With these ICT tools, teachers can:

- Create online presentations.
- Concept maps and collaborative learning
- Make collaborative documents.
- Organize tasks.
- Propose activities that encourage student participation.
- Even evaluate them in an original and fun way.

With this backdrop, you will be introduced with various ICT tools in this unit. The subsequent sections will deal with relevant computer software used in educational settings. Web 2.0 tools forms a pivotal tool in this contemporary times, also known as social digital technology. You will be introduced with interesting assessment tools that can be efficiently used by the teachers for effective outcome. This unit will not only increase your awareness on the in-vogue ICT Tools but also develop interest to gain confidence in using them. The understanding, identification and basic use of various ICT tools in the teaching learning assessment system forms the crux of this unit.

3.3 Computer software

Software is a set of integrated program as a set of instruction. There are different kinds of software available in the market on the basis of availability, license and cost.

Parameter	Restricted	Open
Proprietary	Cost, Availability, License,	Use without modification and
Software	Source Code	Binary code
Open Source Software	Not restricted	Cost, Availability, License, Source code, Customisation, Augmentation and Repurposing

By following this table, different kinds of word processing software are available in open source and proprietary domain. Few examples are as follows:

Word software like Microsoft Word, WordPerfect, Lotus Word Pro, iWork Pages are available in proprietary software and OpenOffice, WPS Office Free, LibreOffice, Apache OpenOffice, SoftMaker, FreeOffice, Google Docs. Focus Writer, KOffice: The Integrated Office Suite etc.

Application of word processing software:

Spreadsheets and word processors, these two software come under the application software which are widely used in the computer program. Word processing software is generally dealing with the textual interpretation and design of the thought contents. Whereas, spreadsheet application is processing different kinds of number crunching and data analysis. Now next section will carry forward about two widely used word processors, among which one is of proprietary software that is Microsoft word processor and another is from open source software, Open Office.org. But before that let us start with the intrinsic features and purpose of the word processor software.

Word processor:

Word processor software are used to articulate thoughts of content(s) as a text document in different forms like articles, reports, or any other literary work and in different formats like .doc/docx, .pdf, .ppt/.pptx etc.
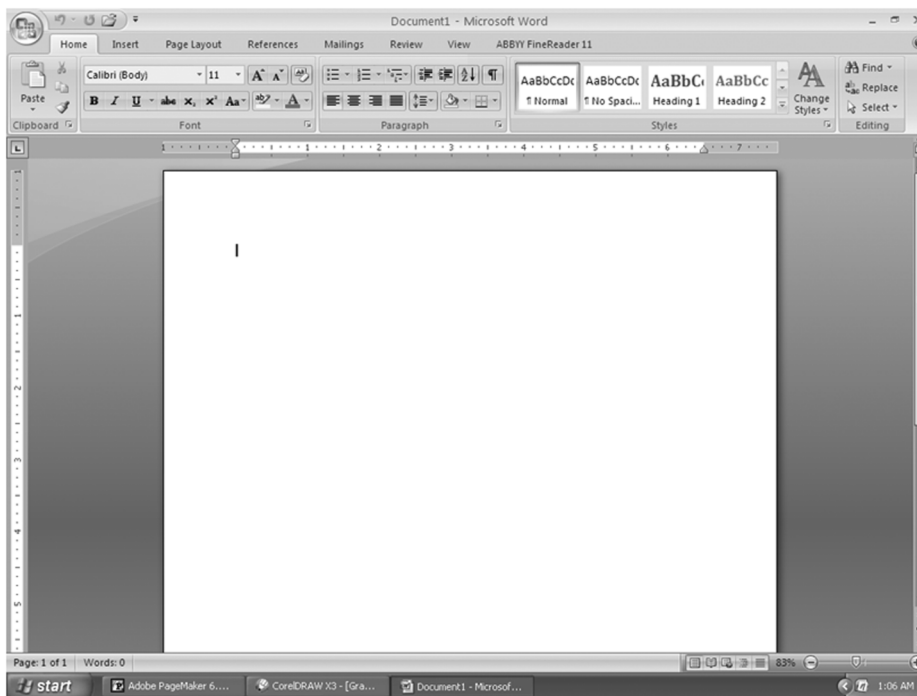
Figure 8: MS Word

These word documents slightly have embedded with the powerful application enabling users to pick out controls over headings and sub-headings of huge content. Users might be able to control/navigate MS word for text alignment and page margins, font size, style, and typeface etc. (See figure 4).
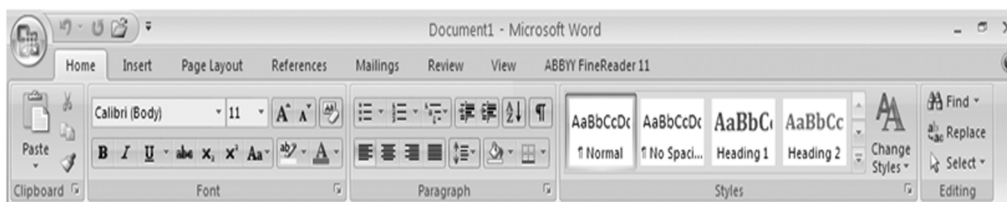
Figure 9: MS word features

Tools of benefit to writers, including word count, header and footer, page number,

insertion of pictures tables, shapes, smart art, charts, equation, symbols so on and so forth to sharpen text contents (See figure 5).
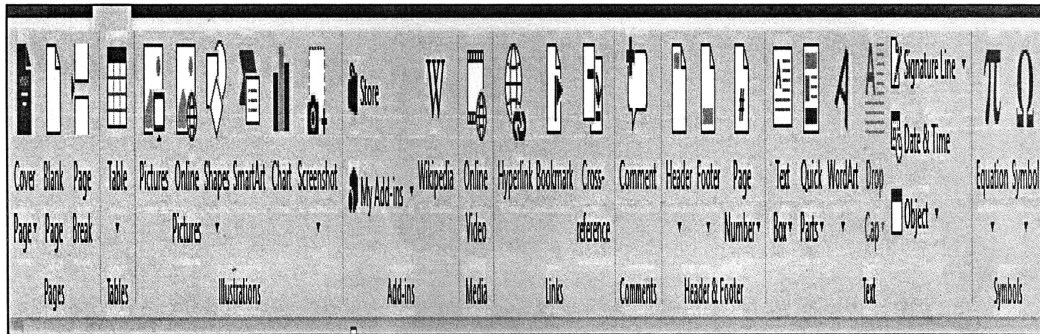
Figure 10: MS word Tools

Even new versions of MS word are able to manage references as embedded text by following specific reference style manual (See figure 6). Integration between reference management software and word processor is also possible.

Figure 11: MS word Reference integration

Now we will concentrate on the use of Excel application in next section. We know that word, excel and PowerPoint presentation are three essential flavor of MS Office and open office which are widely used in educational sector to do scholarly communication.

Same types of actions and executions possible through using Openoffice.org or Libreoffice. Here are some snaps of open Libreoffice as an example to be looked into in figure 10.
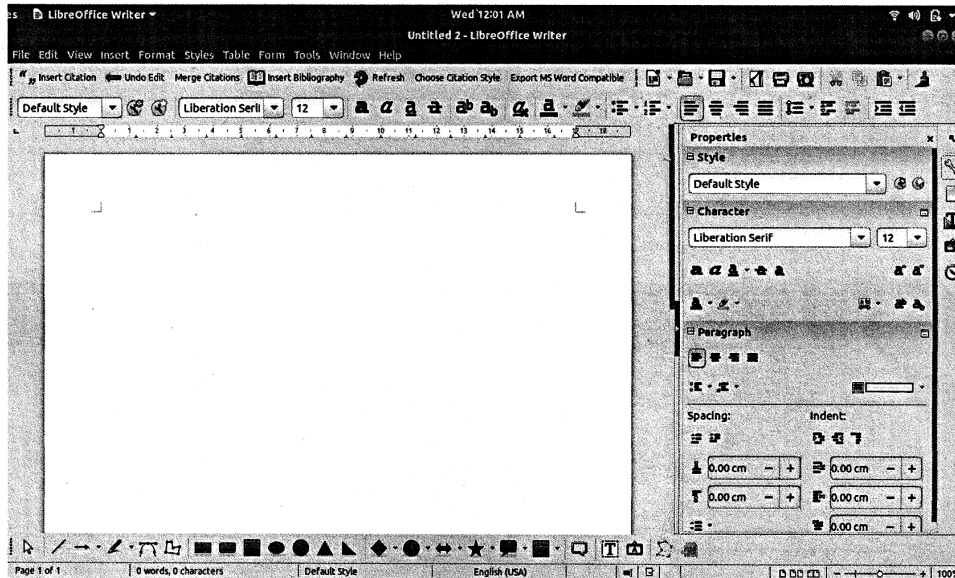
Figure 12: Libreoffice interface
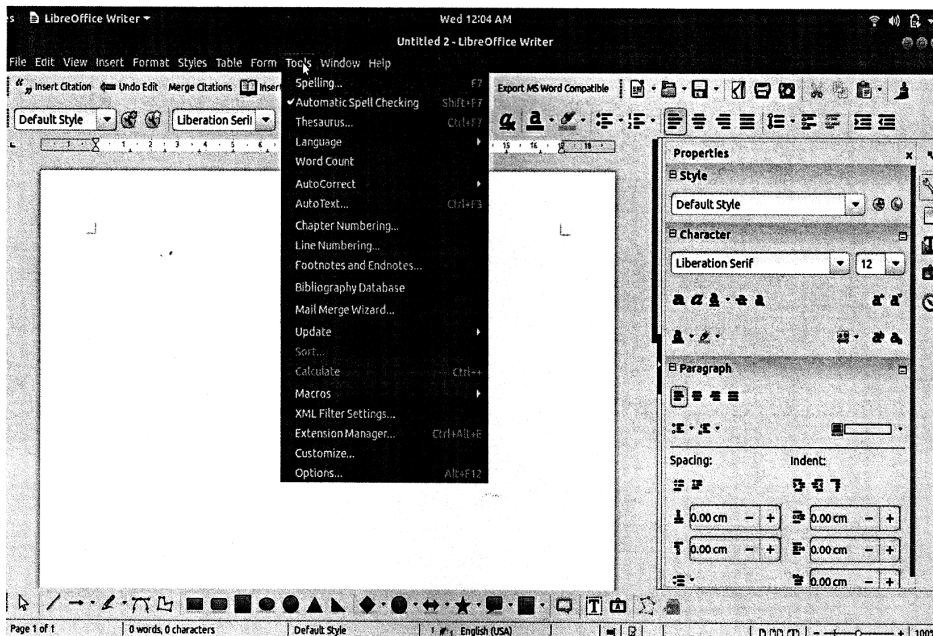
Figure 13: Tools of Libreoffice Interface

Spreadsheets

A spreadsheet program a dedicated tool to manage numbers in different aspects viz. entering, editing, and exporting with intervention of mathematical formulas.

Spreadsheets are designed to automate the management of large amounts of numerical data and to apply calculations as required. They are used for everything from account and sales reports to sports leagues. The strength of a spreadsheet application lies in the ease with which it can hold and manage rows and columns of figures, and the speed with which it can calculate formulas, produce charts, and filter out particular values.

Spreadsheet programs are built around a grid of cells that typically hold numerical data but which can also contain text, dates, and other content.
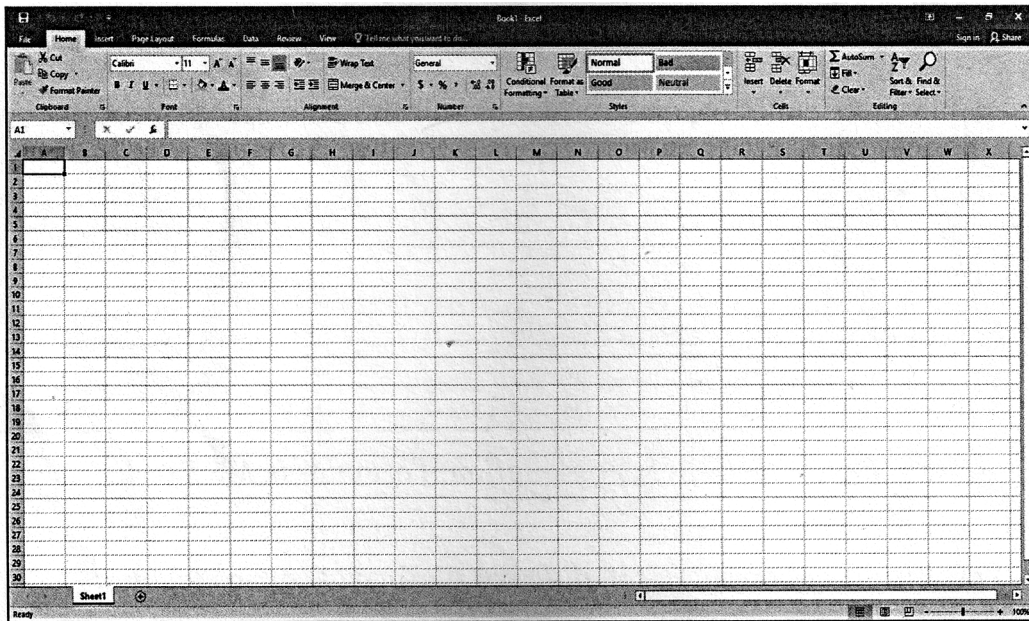
Figure 14: MS Excel interface

Generally, spreadsheet application is incorporated with few tools for filtering and sorting data, executing calculations to group of cells, and producing charts as a result. Data representation is enriched with Column or Bar Chart, Line or Area Chart, Pie or Doughnut chart, Hierarchy chart, Statistic chart, Scatter (x,y) or Bubble chart, Waterfall or Stock Chart, Combo Chart. Surface or Rader Chart, Pivot Chart including few Sparkline which are especially mini charts to be placed in a single cell, each representing a row of data in one's selection (See figure 8).
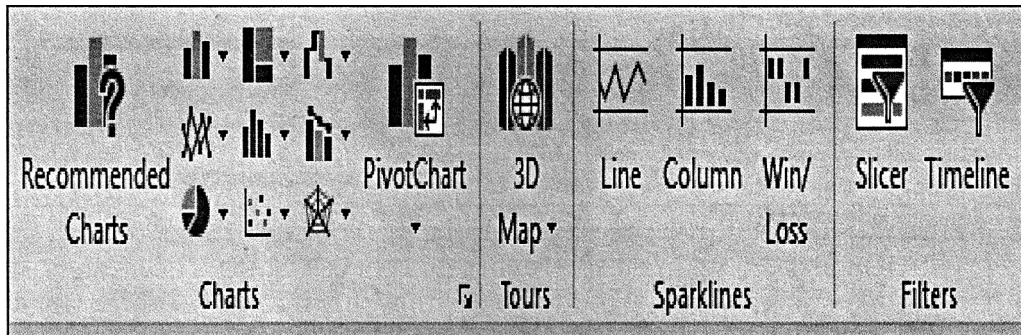
Figure 15: Data representation through chart

Formatting options are usually limited. But ability to format numerical data as currency, fractions, and percentages is possible. Numeric navigation with the help of different formulas are possible in MS Excel.
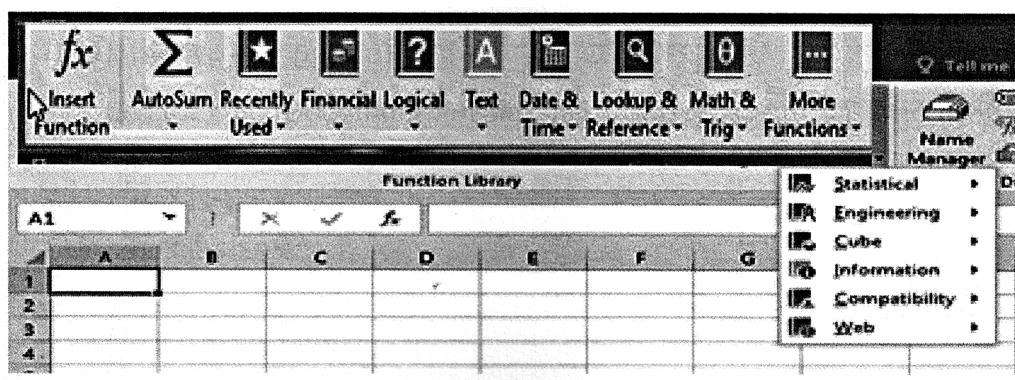
Figure 16: Data Representation: Formulas in MS Excel

These results are executable in different file formats are as follows:

● Open and edit Excel and PowerPoint binary files (.xls, .ppt) as Microsoft OOXML files (.xlsx, .pptx).

● Open and edit OpenDocument Format files (.odt, .ods, .odp) as Microsoft OOXML files (.docx, .xlsx, .pptx).

● Open and edit Comma Separated Value (.csv) files in Excel as Microsoft OOXML files (.xlsx).

● Open PowerPoint OOXML files (.pptx) that have legacy objects, no longer supported in this version of Office.

- Open and edit Rich Text Format files (.rtf) as Microsoft OOXML files (.docx).

- Print Excel and PowerPoint files.

- Export Word, Excel, and PowerPoint files as Open Document Format files (.odt, .ods, .odp)

- Export Word files as tagged PDF (.pdf)

Example of as follows from LibreOffice calc (excel) in figure 10.
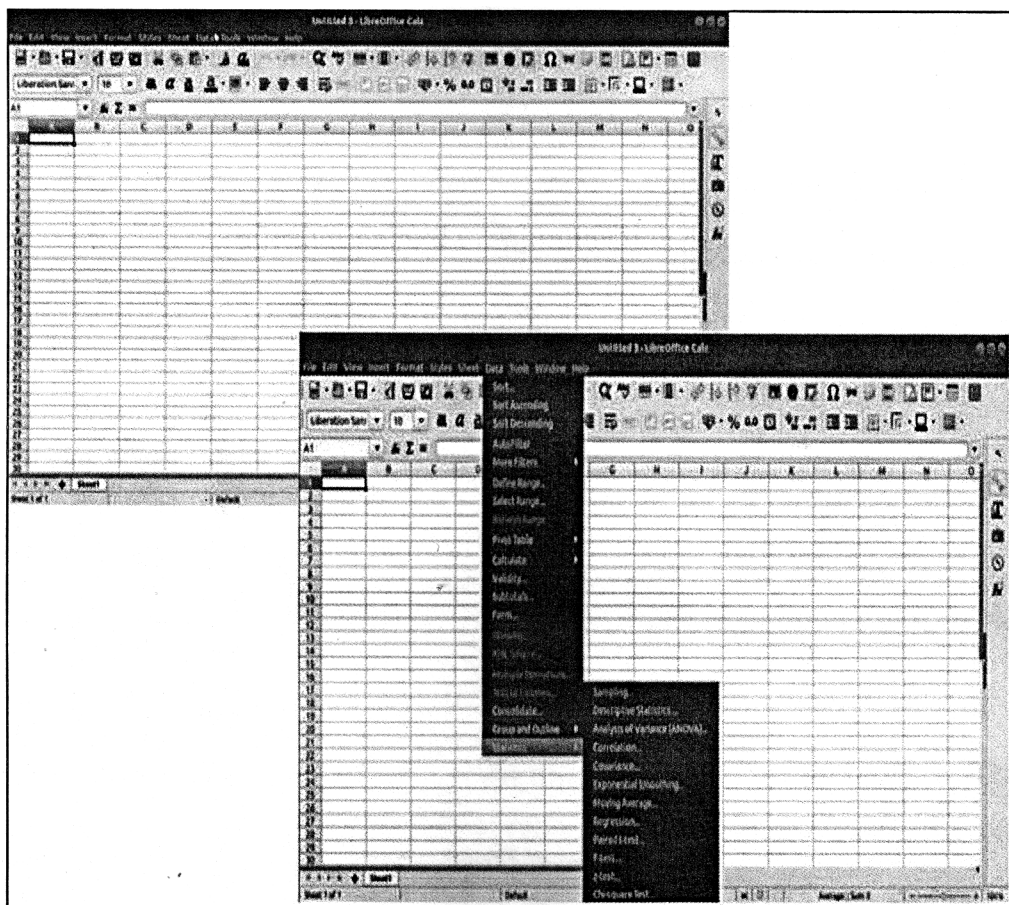
Figure 17: Libreoffice Calc

Excel sheet is mostly used in data representation to conduct scholarly communications. It is a logical application to curation and representation of data.

3.4 Web 2.0 tools

Technology is being used to motivate learners to extend their learning beyond classes. Aforesaid services, tools will help us to achieve technology- enabled learning.

After gone through section 1.2 you are now well acquainted with world wide web and different versions of Web. In academia there are lots of scopes to use maximum number of services to enrich the entire educational system

for further development of the pedagogy. Perhaps result of such web 2.0 implementation in education sector called as Education 2.0. This section is going to focus on different services and tools of Web 2.0 technology which are involved to strengthen the pedagogy. In education we can use such web 2.0 technology in various aspects. To create content in a collaborative platform, to deliver those contents, to communicate learners in face to face mode as well as in distance mode in a participative way. Here, broadly we can segregate web 2.0 tools in two parts viz. content Development platform, Content delivery platform and Communication, collaboration and social networking tools. We are starting with tools and technologies.

Tools and Technologies for Connecting with learners:

E-mail: Learners can generate and send their personal communication with the faculty to keep themselves up to date by e-mail. They can send mail by attaching document (which is limited size of 2MB). Individual teachers can send e-mails when there are trying to interact with learners immediately. E-mails can be sent individually or in group. It is very easy to make groups of addresses in the most common e-mail programs. Now-a- days LMS are incorporated with the automatic e-mail so that learners' get informed about contributions, forum postings or administrative news by the system automatically.

Website or Blog: Blog or Weblog is a user-generated website, or web page on hired web space or can use free hosting web sites to generate and distribute information which are selected by users in reverse chronological order. It is a mechanism to share knowledge, understanding and opinions with other people of a domain expert. Generally, dealing with the current events or general views of authors own. It is a type of website also. Most popular free blogging services are from Google and wordpress to provide information.
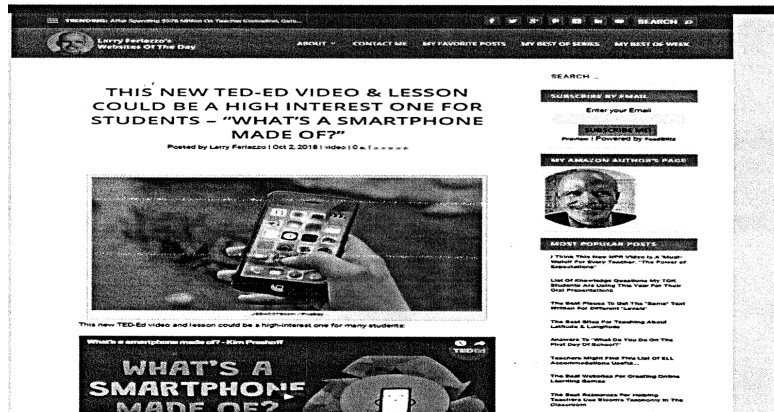
Figure 18: Screenshot of edublog

RSS Really simple syndication, a way of aggregating web content in one place. Users have to subscribe to sites with RSS feeds and the aggregators collects new content and sends it directly to desktop. So the content of many sites is visible in one place, usually a personalised service to keep update by accessing specific pages in a single click. Atom, Feed reader are some of example of RSS feed reader.
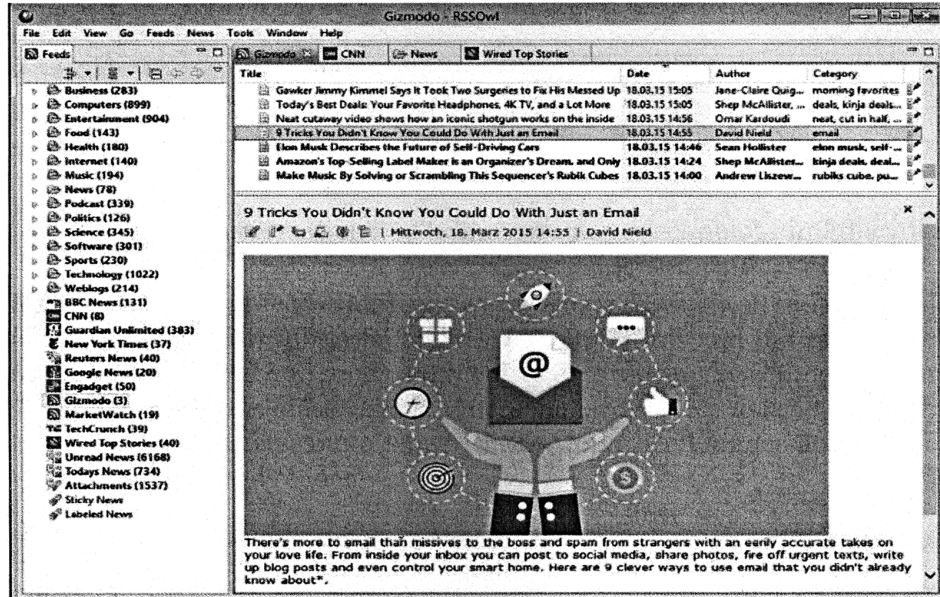

Figure 19: RSS feed

RSS can have made you able to instantaneously see/access when new posts are added to pre-installed RSS and Atom feeds by clicking the browser icon. One can manage

his/her own feeds, reload feeds, and export feeds so that s(he) can import t and save them for future.

Online Survey: online survey is a wonderful platform to get quick feedback from learners. Google form and survey monkey are few applications through which we can prepare a set up to get the information from learners, teachers and persons are associated with subject domain/ academia. Even scholars can also use such tools to collect required data for their research work. These tools are enough efficient to analyse data automatically to provide outputs on the basis of collected data.

Figure 20: Survey Tool

Online Bookmarks: It is a Web based service, allows user to locate, classify, rank, and share Internet resources by tagging sites. It can organise Webpages with tags. It also facilitates others to access one's personal collection if the actual user permits that particular user. Personal account generation is also mandatory here.

Virtual Learning Environments: A virtual learning environment (VLE) is a system, customised to support teaching and learning environment.

This system is incorporated with entire educational system including lecture deliberation through audio/video platform, wikis, presentation, text based Self-Learning Study materials

(SWLMs) in pdf or doc file, Self-assessment through multiple questions, self-evaluation, peer assessment, tracking tools, communication/update news from the administration through automatic email, instant messaging, blogs, RSS, discussion boards, etc. Each and every Learner Management Systems (LMS) has its own inbuilt communicative, participative and collaborative platform to interact with the learners. MOODLE is an example of successful and popular open source Learning Management Software.

Social Networks: Social networking tool is a Collaborative, Communicative and interactive platform that organise social interaction between community member where members can share their knowledge easily. Few applications like Facebook, Twitter or MSN Instagram may be used to communicate with learners, so that teachers get connected with the learners who are sporadic by their nature. It is possible to make groups in Facebook and share information with the learners. They can share pictures, important information, etc. User authentication & Personalization is main strength of these services.
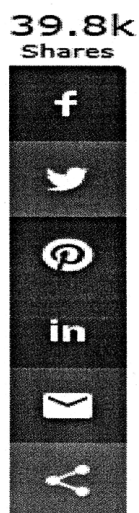
Figure 21: Social Network

Online Groups and Forums: Communication platform to get connected in a broader approach. This platform made easy to communicate with a large number of learners in a single click, using forum and e-mail groups like Google groups and Yahoo groups teacher/ learners can create specific group of domain specific/institution specific services to communicate each other.

SMS and Instant Messaging: This tool is made for sending information in one-to-one basis or one-to-any basis. Instant messaging service like whatsup, messenger, viber is few very popular service through which learner can take help in distance mode. Even they can share file too by using such IM tools.

In spite of such services there are a bunch of web-extension service for Education. Reference management software is an important tool for higher education to communicate research outputs. Mendeley and Zoteroare two free and Open source reference management software through which scholars can easily handle and manage a huge number of references. Not only that, these two software has provision to be incorporated with MS word, open office, Libre office etc.
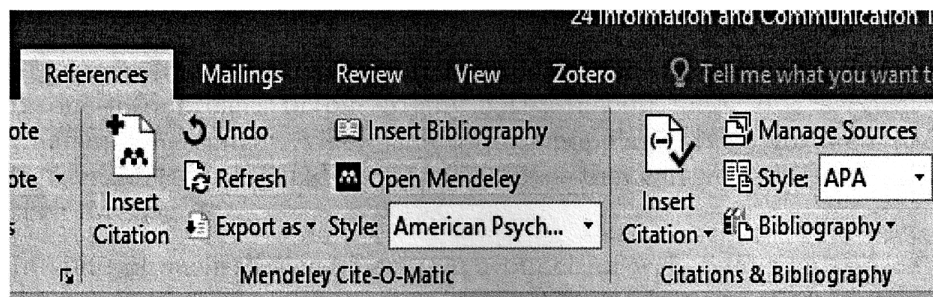
Figure 22: Managing References through MS word

These web 2.o compliant applications made education quite easy to handle and flexible. Thus, such platform naturally saves teachers as well as learner's time, and help teachers find the best facilities to offer. In an educational system teachers are acting as a bridge between resources and learners. In addition to this, technology and application of web 2.0 boosted up existing situation only. Education with such tools and technology along with internet, can provide ready-references to the learners. As a results learner will not remain just only consumer of the pedagogy they will become producer of the pedagogy.

Photograph Sharing Utility are able to organise and publish a bunch of photographs online. Photograph can be described and commented upon by generating and using personal account. Instagram, Flicker are two most popular example of photo sharing utility.

Web Aggregators: Web Aggregating services is a service which facilitates users, accessibility and use of more than one web2.o compliant service in one web page. Its enabling maximum benefits to user as well as to service provides. User are able to combine two or more than two services by selecting them as per requirements. For example, AddThis, Add To Any. Main specification of this aggregator is anyone can use all services either provided by same provider or by different provider by creating one free account only. User have to choose and pick services first. Then, it will provide a code to use such services through your web page, operator can perform a single authentication gateway for all provided services. Such service also facilitates Share Buttons, Follow Buttons, List building etc. for robust performance.
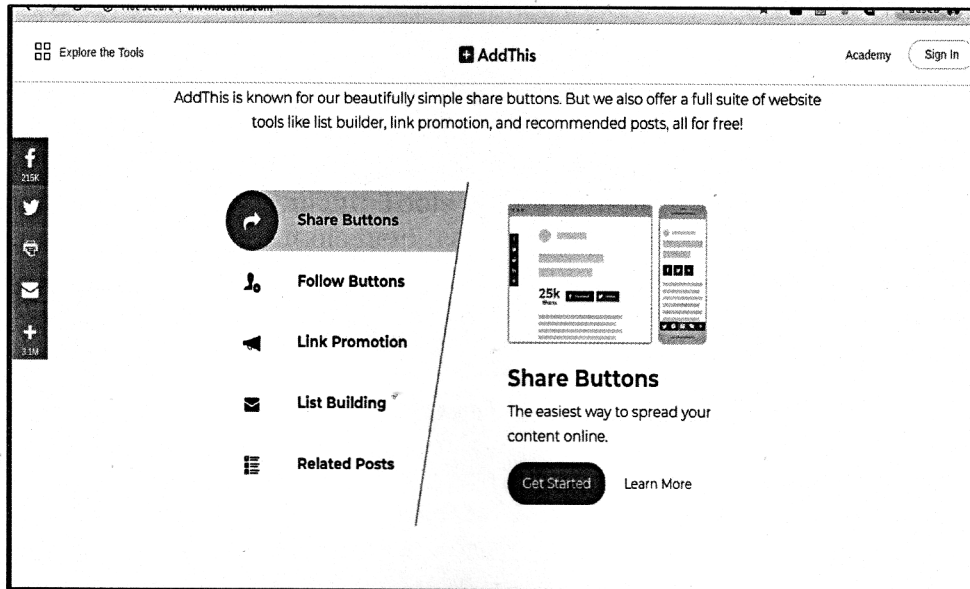
Figure 23: Web Aggregator

Apart from such general tools, entire web2.o service is segreted in three layers for educational purpose, Content Development Tools, Content Delivery tools, Assessment Tools and Content Communication Tools. Content Development tools help teachers to develop their thought content for the transmission to their learners. Content Delivery tools are those through which teachers are able to deliver their contents to the learners. And after that, through assessment tools teachers are able to measure learners progress. Communication tools are helping teachers and learnbers to communicate, interact with each other. These are as follows:

Content Development	
Services	Tools
Concept Mapping	MindMap, SimpleMind, MindNode
Read/Write web	Blogs, Wikies
Blogging Platform	Aol Lifestream, Blogger, Live Journal
Image development/Editing	Canva

Animated Presentations	Adobe spark
Interactive video/Audio	Wirewax, Audacity
Presentation	PowerPoint
Screen Capture/recording	Green shot, Cam studio
Online Survey	Google Survey

Content Delivery	
Services	Tools
Lectures	Audio/Video lecture,
Virtual Learning Environments	Edmodo, Schoology, Educlipper, Google Classroom, Google Communities, Edublogs, Kidblog, Moodle, PBWorks, and Wikispaces.
Document Sharing	Dropbox, We Transfer
Question-Answer system	AnswerBase, Quandora
Gamification	MamboJo, Growth Engineeering
Live Broadcasting	Periscope, Google duo, Facebook chat
Webinar	WebinarsOnAir, Livestorm, Webinato, GoToWebinar, Zoom

Tools

Categories	Services
Instant Text messaging	Emails, AOL Mail, Bentio, Messenger, Email App

Social Bookmarking sites	Bobrdobr, BonzoBox, Bookmerken, Cite U Like, Connotea, cootopia, Delicious,
Social Networking	Facebook, Flaker, Formspring, Friend Feed, Hedgehogs
Mashup	Podcasting, Vodcasting
Social News	DigaCultura, Digg, Digo, Dig This Webhost, Gabbr, Hacker News, Hotklix
Photograph Sharing Utility	Flicker, Instagram

Communicative Collaborative and participative services	
Categories	Services
Discussion Forum	Blackboard discussion, PhpBB
Messaging Tools	Skype, Messenger, Flock
Team Communication	Slack, Facebook, Workplace
Video Discussion	Voice Thread, Flipgrid, Recap, Vialogues, Flipgrid
Virtual meeting	G0T0 Meeting, Meeting Burner, Meetin.gs, Yugma ZOHO meeting, Skype, Facebook

3.5 Assessment tools: Rubistar

In ICT-enabled educational tools, Rubistar is the most powerful tool which is easy to use also. It was developed and hosted by ALTEC, a non-profit organisation, run out by the University of Kansas, USA.

"RubiStar is a tool to help the teacher who wants to use rubrics but does not have the time to develop them from scratch. While many teachers want to use rubrics or are experimenting with writing rubrics, they can be quite time-consuming to develop."

Rubistar is an online tool for teachers through which teacher can use existing rubrics for use in math, writing, reading, science, music etc. Even they can customise those rubrics

for their dedicated purpose. Teachers can modify such rubrics at any level. It facilitates scoring guide with preseted criteria for students'/learners performance and able to evaluate the level of their performance on the basis of pre-sated criteria. For such output, Rubistar has its own mechanism to define level of the students' performance with incorporated numerical scores.

To avail this service, we need to create an account for personal use at Rubistar website (see webpage). Main steps to create a rubrics are depicted as follows:

Step 1 Getting started

↓

Step 2 Choosing a customizable rubric

↓

Step 3 Entering rubric information

↓

Step 4 Selecting rubric content

↓

Step 5 Modifying the rubric

↓

Step 6 Finishing the rubric

↓

Step 7 Printing the rubric

↓

Step 8 Creating an offline-browser document

↓

Step 9 Downloading an Excel™ spreadsheet
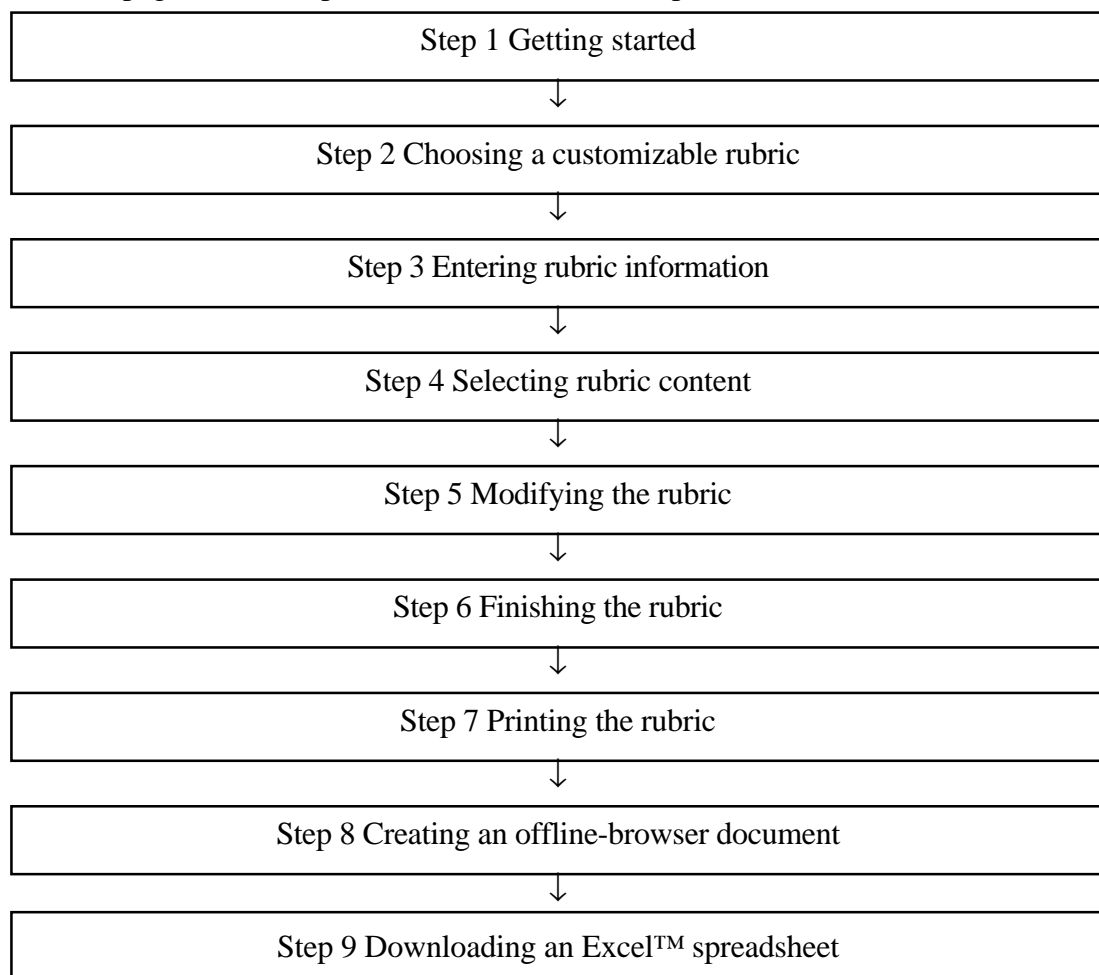
By clicking on the option in Create account, after filling all fields it will automatically show a notification that you are in the system and your account has already been created.
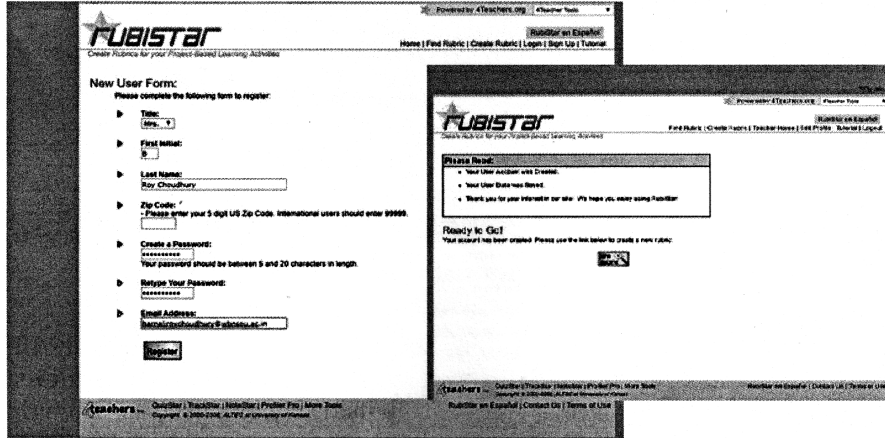
Figure 24: Rubistar

Start New Rubric with green button.
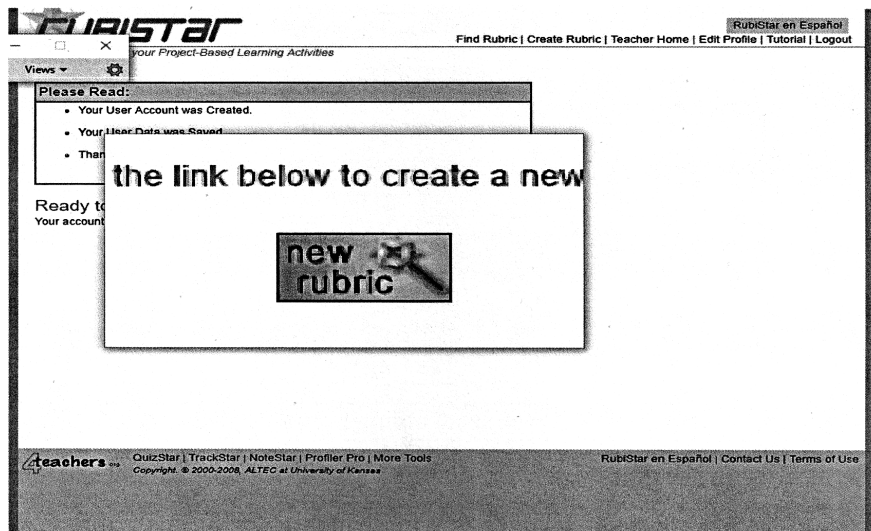
Figure 25: Rubistar: create Rubric

Then choose required rubrics like 'Oral Projects', 'Products', 'Science', 'Research & Writing' etc. (see figure).
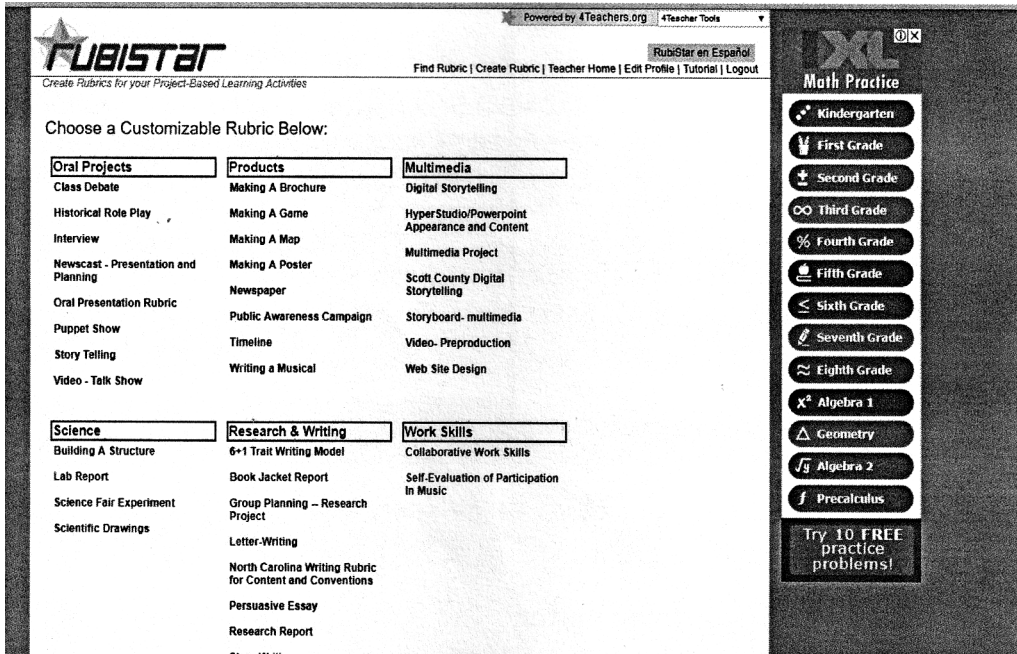
Figure 26: Rubistar: create Rubric on Research Topic

For example, we want to create a rubric on research report.
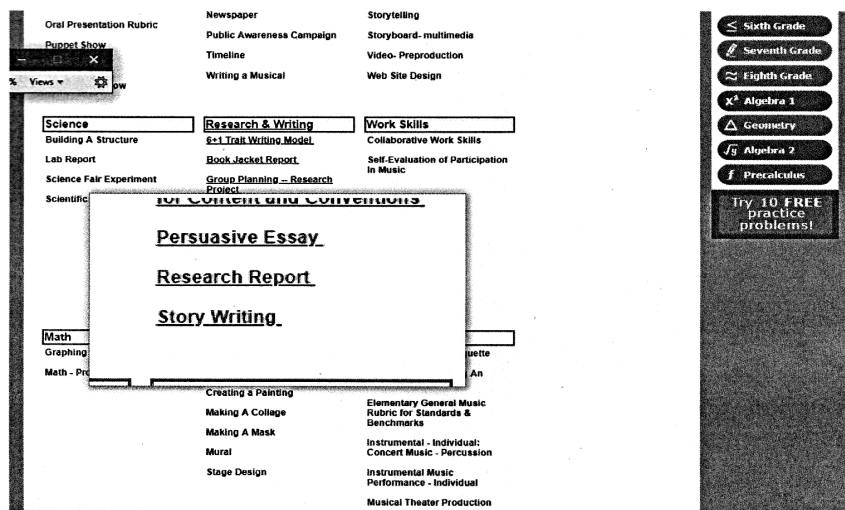
Figure 27: Rubistar: Choose Rubric template

Then fill up entire rubrics with proper descriptions (Figure 28)
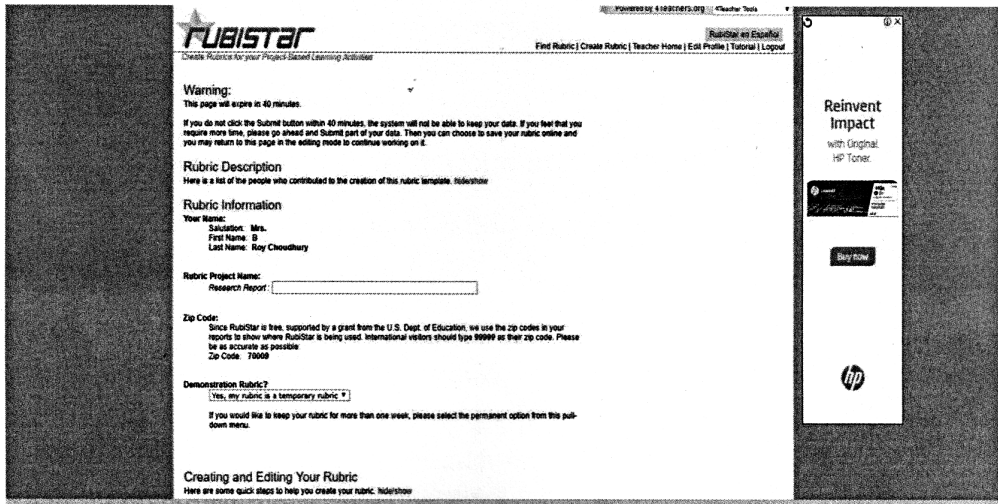
Figure 29: Rubistar: Rubric Description

Once description is ready then website will auto-generate boxes with dropdown list at level of 1,2,3,4 rating. See figure 27

Figure 30: Rubrics

After choosing and modifying rubrics, finally click on the submit button and it will offer ready for download or printing. Results will be as shown in Table:

Figure 31: Ready to print Rubric interface

CATEGORY	4	3	2	1
Required Elements	The project was done by the student. Pertains to the time frame studied. Requirments are exceeded.	Required elements are met.	Some of the required elements are not included on the poster.	Several required elements were missing.
Use of Time	Good use of time. Could tell student took time to ensure project was professional and attractive.	Used time ok. Focused on getting the project done and not especially concerned about attractiveness of project.	Could tell time was not used well. Project either looks hurried and unfinished or student claimed minimal time used.	Did not take time to do the project with thought and concern.
Content - Accuracy	many details and facts are accurate and displayed on/ in the project.	accurate facts are displayed on/in project.	Some facts are accurate others are not.	Facts are not accurately displayed on/in the project.
Mechanics/neatness	The project is exceptionally neat Capitalization and punctuation are correct throughout.	There are 1-2 errors in capitaliza-tion or punctuation. Project could use some cleaning up.	There are several errors in capitaliza-tion or punctuation. Project needs to be neater.	There are more than 5 errors in capitalization or punctuation. Project was thrown together.
Graphics - Originality	Several of the graphics used on the project reflect an exceptional degree of student creativity in their creation and/or display.	One or two of the graphics used on the poster reflect student creativity in their creation and/or display.	The graphics are made by the student, but are based on the designs or ideas of others.	No graphics made by the student are included.

So in nutshell, rubrics is a tool to assess learner's development with the assignment given and it is also a tool to assess learners progress with the subject.
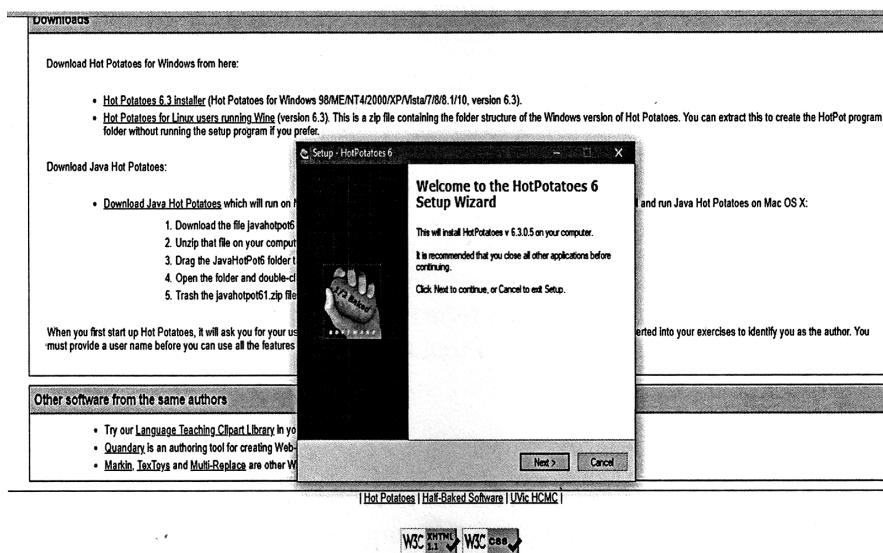
Hot Potatoes

Hot Potatoes is a Web authoring tool suite which enabling you to create interactive

multiple-choice, short-answer, jumbled-sentence, crossword, matching/ordering and gap-fill exercises for the World Wide Web by using which includes six applications viz. Jcloze, Jcross, Jmatch, Jmix, Jquize and Masher. The last application, i.e., Masher collaborate all exercise in one unit. Hot Potatoes is generally fit for any project for which you are seeking for. It is not open-source. It is only a freeware. That means this software is not released under any open license platform even you are not entitled to modify this software as per your requirements. You can only download, install and use this software at free of cost. Hot Potato was created by the "Research and Development team at the University of Victoria, Humanities Computing and Media Centre". Commercial aspects of the software are handled by Half-Baked Software Inc. Hot Potato was first released in version 2.0 in September 1998, at the EuroCALL conference in Leuven, Belgium. Hot Potatoes has been freeware since October 2009.

Main task is to do in hotpotatoes is to enter your data, may be texts, questions or answers, the programs will automatically create the Web pages for teachers. Then they can post them to the Web site, every aspect of the pages can be customized. Creators name will be shown into exercises to identify as the author of the exercises. Hot Potato is downloadable from Hot Potatoes 6.3 installer (Hot Potatoes for Windows 98/ME/NT4/2000/XP/Vista/7/8/8.i/i0, version 6.3).

Interface of Hot Potato installer will appear as shown in figure

Figure 32: Hot Potato Homepage

Click on the Install Button to 'Install' it properly.
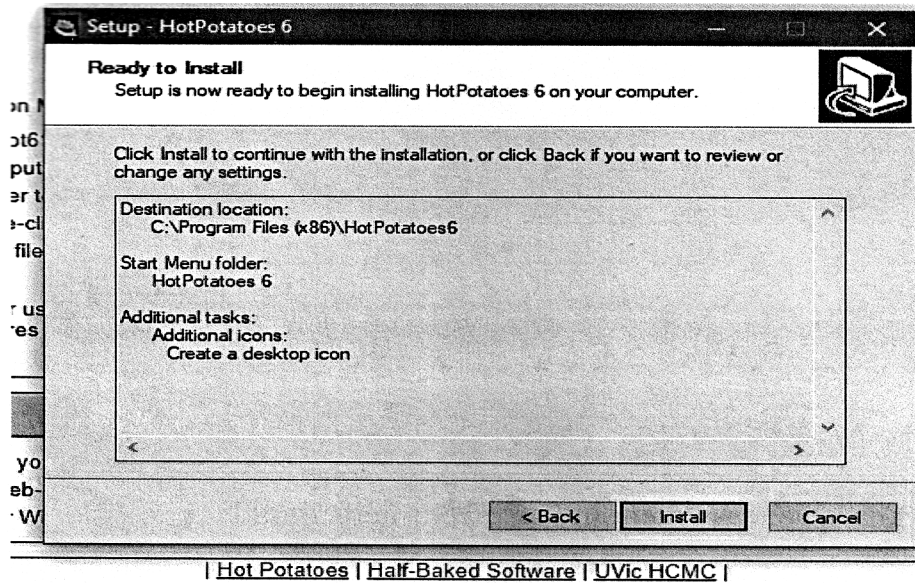

Figure 33: Hot Potato Installation

Contributors name is mandatory for completion of Hot Potato installation (Figure 32).
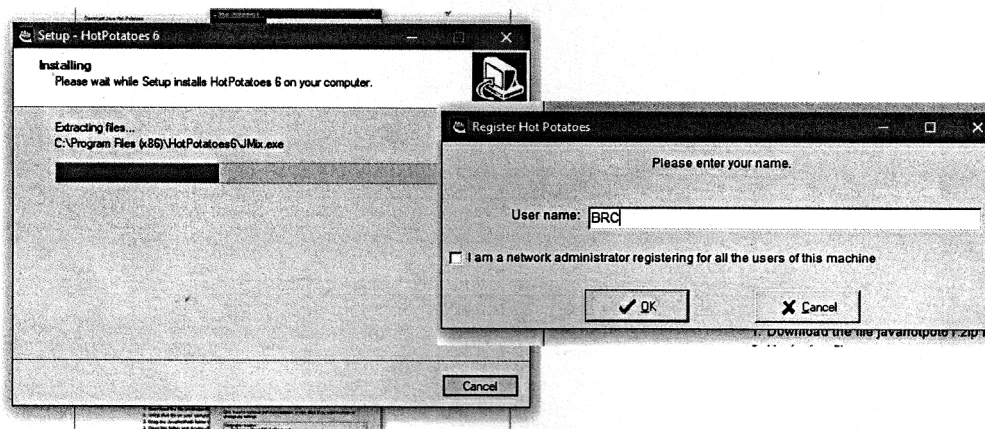

Figure 34: Register in Hotpotato

Hot Potato is ready to use. In this stage choose option as per the requirement. Five applications are there to create content as follows:

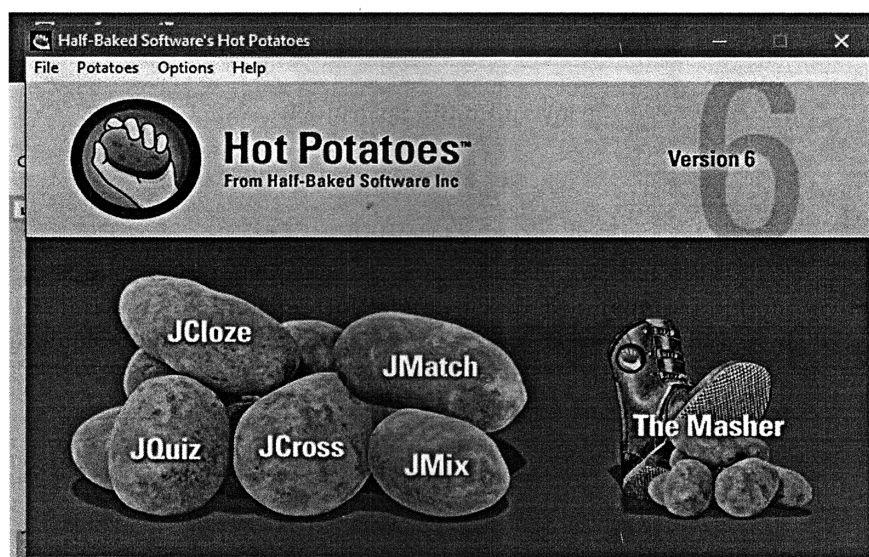| Application(s)	Function(s)
JMix	Multiple choice
JQuize	Short-answer Quiz
JCross	Crosswords
JMatch	Matching
JCloze	Cloze texts can be used for any type of fill in exercises, with or without wordlist at the top and with or without extra clues given. Learners are trained in understanding as well as spelling.
JMasher	jumbled sentence to order something

Figure 35: Main Interface

To start a program using Hot Potato click first on required option, say for example-Jquiz
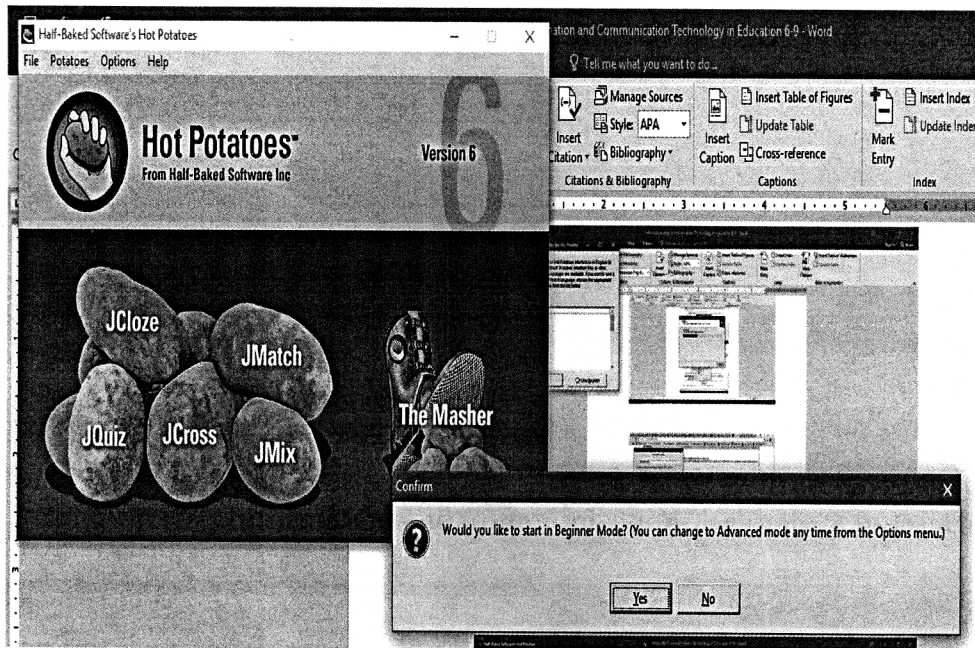

Figure 36: Choose option to work upon

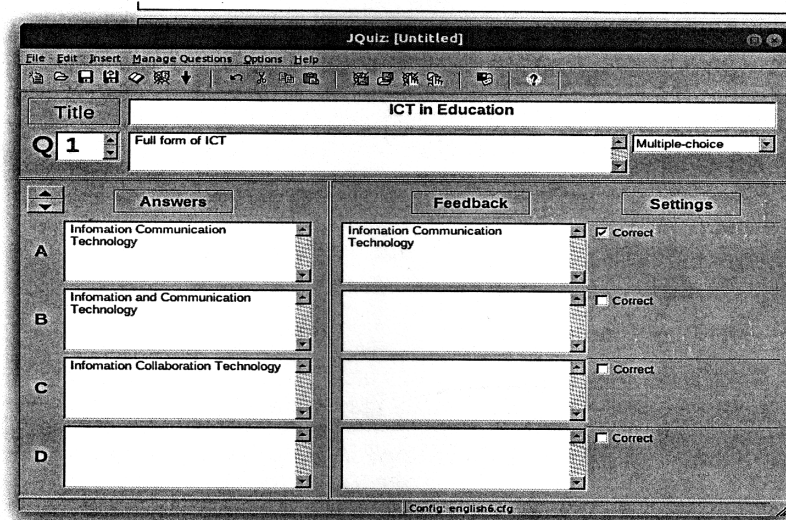First, create 'data file' which has a Hot Potato XML extensin (like, jew or, jel).

Figure 37: Hot Potato Quize

This file is only usable in Hot Potatoes program. If one has knowledge of html and java programmings(he) can modify it later. At final stage this file is ready to be exported to web-based exercises (.htm file) which can be displayed anywhere on the Web.
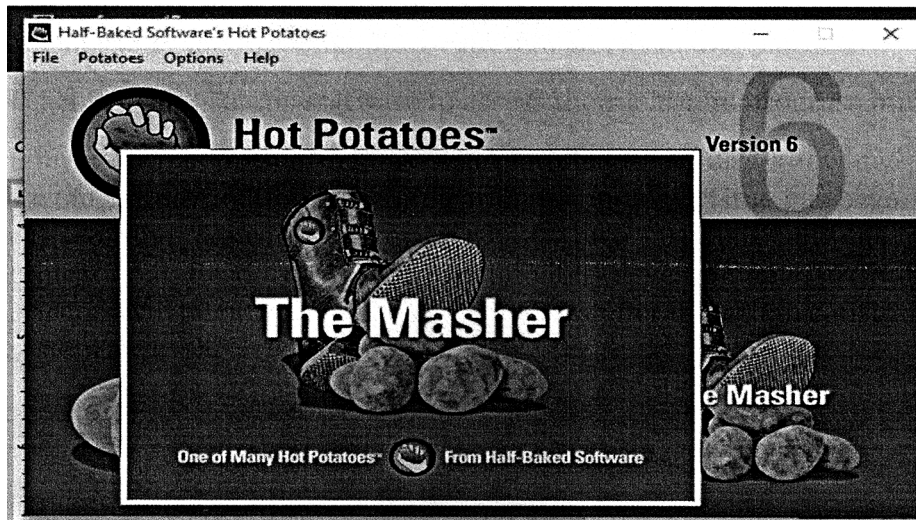

Figure 38: The Masher

Masher is a place to collaborate different works in one place.

Teachers can use this software to assess their learners progress minutely.

Education is representing a robust platform to acquire knowldge with the advent of Information communication technology. Time has began to start with online education like MOOCs which are basically using Open Educational Resources for its sustainable development. In thus a way, learners will be producer of the learning system rather than consumer of the system.

3.6 Summary

Information Communication Technology (ICT) tools contribute to high quality lessons since they have potential to increase students' motivation, connect students to many information sources, support active in-class and out-class learning environments, and let instructors to allocate more time for facilitation. This unit focuses on some pertinent ICT tools and software that has truly contributed to the enhancement of quality in teaching learning and assessment milieu. Today, the use of ICT tools such as laptop computers, electronic pads, smart phones, along with the broadband internet, interactive Web 2.0 technologies and cloud applications have enhanced both, teaching and learning in the different stages of education.

3.7 Self-Assessment

1. Name the computer software required to use ICT in teaching-learning evaluation system.

2. Reflect on some notable Web 2.0 tools in education.

3. What is the importance of social technological tools in present day education system?

4. Give few examples of widely used ICT tools in education.

5. Identify the various ICT assessment tools and their application in educational institutions.

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Notes