INFORMATION & COMMUNICATION TECHNOLOGY IN EDUCATION

(An Edited book for UG & PG Students of Education)

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Unit -II ICT Tools in Education

Unit -III Connecting to the World

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Chapter-11

Subject Tools of ICT: Concept Mapping Software and Digital Storytelling

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Abstract

The chapter as cited above is review-based and thematic in nature. Through this chapter, an attempt has been made to give wide detail of ICT-based subject tools such as Concept maps and Digital storytelling. For this, firstly a huge description of the concept and its uses in the education sector were given. After careful consideration, it was concluded that these subject-based tools enhance the quality of teaching and learning by providing meaningful ideas or concepts about any topic. It has been found that such tools not only provide meaningful but easy understanding of an idea in a creative way that remains in the memory throughout.

Keywords: ICT, Cmap, Digital storytelling, Education, Teaching and learning

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Introduction

Today, technology is developing at a fast rate and has occupied all areas of life, and so is education. Education is one of the most important areas where technology is being used widely. Merging technology with education has given a new direction to teaching and learning. The impact of new technology in educational contexts has been positive as new technologies have provided opportunities to enhance not only knowledge but also skills and, in this way, consequently raised the standard of level of education. But this can only be achieved by the engagement of students in such technologies for better educational outcomes that may lead to enhancement of achievement and motivation. Such technologies work as a pedagogical approach to engage learners in deep and meaningful learning. Subject-based tools in ICT can create a constructive learning environment.

Cmap and Digital storytelling are among such technologies that have paved new ways for teaching and learning thus making it meaningful and related to life. Both come out as divergent from traditional teaching which catches the interest of the students making them study and gain that too in a new and interesting way. In addition to this, such technologies can provide in-depth knowledge of any concept or idea. Moreover, they can develop some other skills other than adding up knowledge. Let's learn about two such technologies- Concept mapping and Digital Storytelling in detail.

Subject tools of ICT

ICT plays an important in different contexts of education such as teaching and learning, assessment, and many more. There exist some ICT tools which make the subject matter easier to comprehend and learn that too in an interesting way thus making the learning meaningful. Also, the different approach of these subject tools gives a new experience than that of traditional teaching methods. These tools provide instruction in such a way that one can create a link between bookish knowledge and reality. Moreover, this ICT keeps the students motivated to learn and also helps in the development of various other skills such as communication.

1. Concept Mapping

Concept maps are the result of the research of two American psychologists Novak and Gowins (1984) in human learning as well as the construction of knowledge. C-map tool is a potential pedagogical approach for teaching and learning in different educational contexts which includes teaching and learning ESP. This freeware tool came into the existence around 2000 and picked up its speed later on. It is a software cum environment that aids users to represent and publish their knowledge using concept maps among peers and colleagues. It turns out to be an effective means of representing and communicating knowledge as well as a powerful and impactful classroom tool that helps students in summarizing the subject of study and organizing thinking. This result in meaningful learning (Coffey et al., 2003). It is seen as a concept learning environment that enables students to visually represent their knowledge individually or collaboratively (Drapper, 2015:221) C-map tools are the

client-server-based software that was developed at the Institute for Human and Machine Cognition (IHMC) for supporting the construction of concept maps to all the users of all ages and facilitate collaboration and sharing during that process.

The concept map is the graphical representation of a concept where the words known as linking words are linked to one another by arcs and enclosed within boxes and thus defining a relationship between the concept. Propositions are the statements about some object whether occurring naturally or constructed and contain two or more concepts connected by linking words thus forming meaningful statements. The concepts in concept maps are arranged in a hierarchical arrangement with the most general or inclusive concept at the top while the most specific or less general are arranged below. Therefore, the concept map is constructed to seek an answer to a particular question known as a *focus question.*

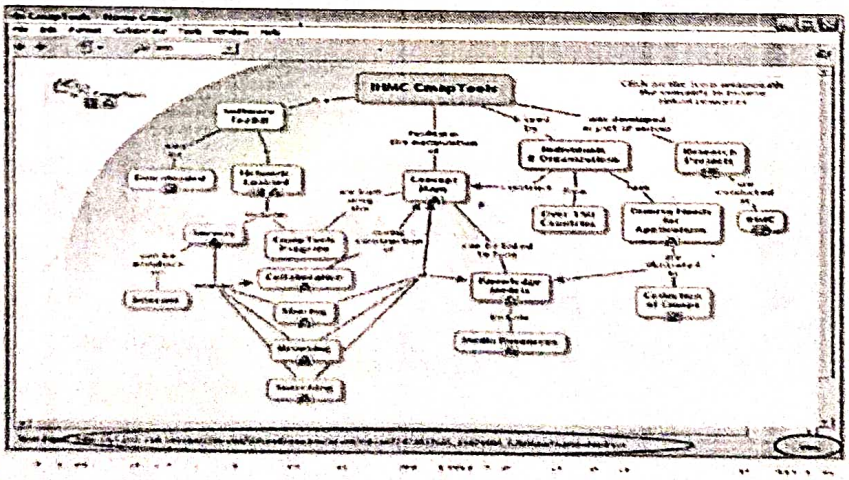

Figure 1. Concept map about Cmap tools (from https://cmap.ihmc.us/docs/theory-of-concept-maps)

Cross-links are another characteristic of concept maps. It is defined as the linkage between the different segments of knowledge. It helps to know how a concept in one domain of knowledge is related to a concept in another domain on the map.

Psychological Basis of Concept Maps:

Before the age of three, children learn by recognizing the regularities in the world and labeling them these regularities (Macnamara,1982). This way of learning concepts is knowns as the discovery learning process. But after attaining the age of three, new concepts and propositional learning is mediated mainly by the use of language and thus regulated by the reception learning process. In this, new meanings are gained by asking questions and understanding the relationship between the old and new concepts and propositions.

The material to be understood must be clear in concept and presented in language and examples related to previous knowledge. Concept maps help in achieving this aim by identifying large general concepts already known by learners before instruction on more specific concepts and helping in creating a sequence of learning tasks that can be useful in developing a conceptual framework. The conceptual framework by concept maps leads to meaningful learning.

To understand any concept that requires prior knowledge, the concept maps fulfill this condition by providing a hierarchical framework for any concept from general to specific knowledge.

It is also important to learn meaningfully and motivation is the condition over which the teachers have indirect control to learn meaningfully. This indirect control is the instructional strategies and evaluation strategies. Both instructional strategies and evaluation strategies emphasize relating new knowledge to learners' existing knowledge thus fostering meaningful learning. Typical objective tests and short answer types require meaningful learning (Bloom,1956; Holden 1992).

Purpose of a Concept Map:

Dig topic in detail: Making a concept map on any topic requires a deep study of the topic with an overall concept and then working upon it to identify sub-topics. This can only be possible if a detailed study of the knowledge is made rather than gathering surface-level information. (Boogard,2021)

***Organising Thoughts*:** Concept maps helps to make sense of a concept in a visual and easy-to-understand way. This makes the complex concepts easy to understand.

Remains in Memory: Many studies have revealed visual learning is far better than auditory learning.

Knowledge of any topic remains in memory for a longer time than it is attained visually because whatever we learn visually, there are 80% more chances of it being in the memory than if it is learned only by listening.

***Understanding Relationships*:** This is one of the biggest benefits of concept maps. Concept maps help to understand the relationship that exists between two ideas or concepts which would not have been possible to identify on their own.

Classification of Concept maps:

The basic essence of the concept maps remains the same. But there indeed exist different ideas or knowledge which cannot be represented by the same type of concept maps. As the idea differs same the way of its representation differs. So there exist a variety of concept maps. It is broadly classified into four types as follows-

i) Spider Map:

This map has been given this name as it looks like the web of a spider. In this map, the core idea of any concept or knowledge is written at the center and then branches outwards to the subtopic in a radial pattern. Further, subtopics can be branched out into smaller subtopics and so on. This type of concept map can be used when one wants to build a map on a single idea. In this, all the information regulates around the main idea or topic and is easy to be made.

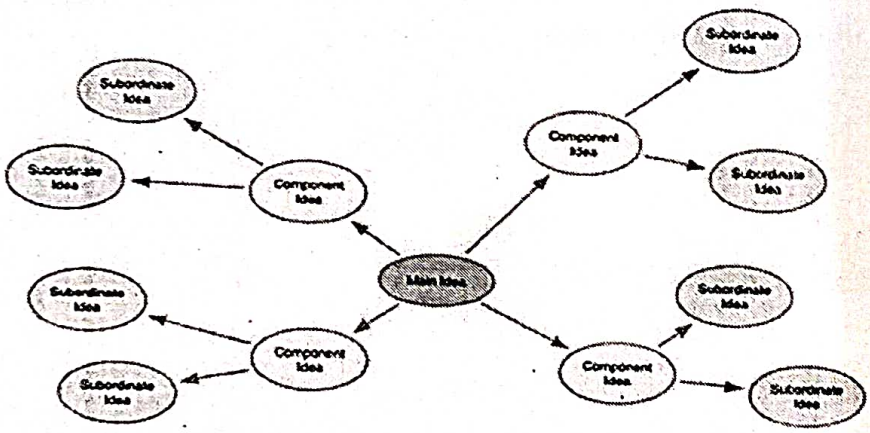

Figure 2. Spider Concept map

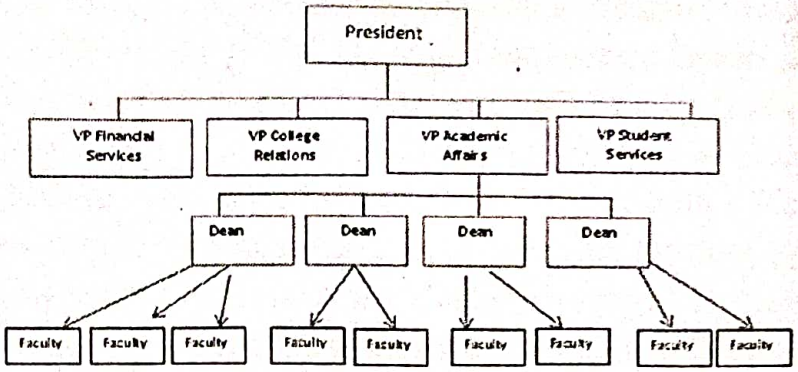

Figure 4, Hierarchy map

iv) System Map

A system map is the most complex of all the types of concept maps as it depicts different parts of a single concept and its relation with one another. '+' or '-' is used to signify the type of correlation. i.e., positive or negative respectively. These maps seem more like a web but they are different from the spider one as it is not essential that they start from center. Thus, these maps can be used to show the inner working of a system.

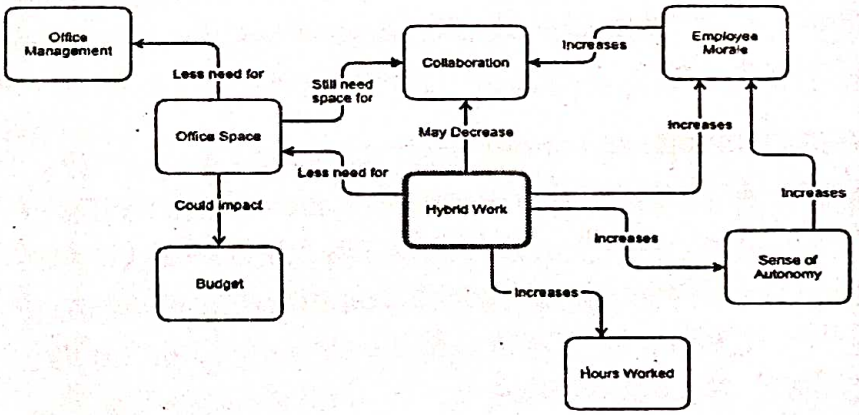

Figure 5. System Map

Applications of Cmap tools in Education:

Due to the vast efficiency of Cmap, it is widely used in educational fields including primary education, higher education, and the library. Computer-supported concept mapping technology is employed in engineering education in the field of electronics (Vodovozov and Raud,2015). Computer-generated concept maps can be included in the educational thesaurus and can also be used as a student's as well as an assessment tool by the instructors to comprehend the study material easily for the students and thus develop their new concepts.

Concept mapping has various applications in library settings based on both theory and practice. This includes the author's successful use of the technique in their work. The researchers established the fact that computer-based concept mapping results in meaningful learning and active engagement in the acquisition of knowledge. Concept mapping can be used the librarians to help the students in articulating their need for information and also in assessing their information. It can also be used in providing students with design courses and projects and in the organization of personal and institutional knowledge, organizing structure to collaborative activities and resources and electronic documents.

Cmap tools can be used in teaching. It is found useful to teach law, especially civil and criminal law. (Sierra Flora Dona and Carrasco,2010). Concept maps facilitated the construction of knowledge models and thus contributed to meaningful learning by assimilating and understanding the issues in the subjects taught.

Conceptual mapping is defined as one of the essential tools for the identification of the language acquisition process. The characteristics of Concept mapping such as conceptual development and instrumental abilities result in the comprehension of written text for the whole life (Giombini,2004). According to her, cmap tools turn out to be a writing system in practice working as a narrating system that facilitates complex communication by using several linguistic codes simultaneously.

Thus, Cmap tools is a valuable educational technology that sustains diverse educational needs.

2. Digital Storytelling

Digital storytelling can be characterized as a modern technique of storytelling that has been used by human beings for a long and thus comes out as the oldest and most important method of expression. Storytelling has been a process where students construct the meaning themselves and consequently knowledge by listening to stories (Behmer,2005). It has been a part of our heritage and tradition. But now it has been given a new face by combing it with multimedia. Thus, Digital storytelling is thus the combination of the old method of storytelling and the use of technology.

Digital storytelling is one of the applications that use technology in education and is described as a "modern form of the ancient method of storytelling (The Digital Storytelling Association,2011). It is also defined as a multimedia story in its short version which includes images, voice, and music (Benmayor,2008) Digital storytelling thus

includes all of these- creating stories through pictures, infographics, maps, creation of comic strips-combination of text and graphics, posters, audiovisual communication combining audio, visuals (still and moving) text.

Figure 6, Tools used to make Digital Storytelling

Digital Storytelling gives a new way of teaching thus providing variation from traditional teaching methods and making teaching interesting. DST makes the system in such a way that the level of education can be adjusted according to the person using the system. This will help in increasing the attention and knowledge of the student. The use of Digital storytelling in education makes the explanation more compelling as it is supported by stories. It turns the factual

bookish knowledge of acts into reality by creating a link between books and what exists in reality. Also, DST contributes to active learning which will consequently have a deep and better understanding of the subject matter.

Applications of Digital Storytelling in Education

The creation of Digital Stories turns out to be a powerful method of instruction as it brings changes in the mode of learning of students.

The use of digital storytelling (DST) saves the time and efforts of teachers. Moreover, Teachers who teach by using DST aid in the encouragement of students to get themselves engaged in discussion, and participation. It makes the content easy to comprehend even if it is complex or consists of larger units by presenting them in a form of a story which makes the concept easy to understand. Digital storytelling provides teachers a unique way to present their material which takes short time for its creation and aids the students in understanding difficult concepts most simply. Many researchers have concluded that its use in teaching helps students helps in retaining new information and acts as an aid in comprehending difficult material (Robin,2008). Thus, Digital Storytelling act as a bridge between existing story knowledge and the new material (McLellan,2006).

This tool helps the teachers to form their collaborative space of learning by forming their own stories for their students and connecting with peers in other schools. Thus, it can be said that digital storytelling enhances the instruction techniques of teachers and makes the learning interesting for students.

Digital Storytelling facilitates a constructive approach to teaching and learning. It turns out to be an important educational tool as it combines digital media with innovative teaching and learning practices. It helps in creating such a constructive learning environment for students by providing them with collaborative and face-to-face interaction among their peers which will help them in solving problems related to learning. It also facilitates an integrated approach to curriculum development and hence engaging learners in deep learning and higher order thinking skills.

Digital Storytelling (DST) helps in connecting school and community by providing learning outside the school. It also helps in connecting the factual content of the textbook with reality which makes the concept lively and thus provides deeper insight into it.

Digital Storytelling provides students the opportunity to learn to create their own digital stories. This is because students are given different tasks like preparing assignments which might include research on a topic, looking for pictures and videos, recording one's voice, and choosing among different views. So, in this way, an opportunity is provided to students to enhance their knowledge as well as academic skills. It helps educators to use digital storytelling so that they might support students' learning by encouraging them to organize and express their ideas and knowledge in an individual and meaningful way. Organizing the ideas meaningfully in a proper way helps in enhancing the communication skills of the students. Its emotionally toned images, videos, and effects make the learning interesting as well as easy thus binding them to learn. Digital stories can

be shared on the web too which provides the students with the opportunity to learn through the work of others as well as learn about cultural differences. This helps in the expansion of knowledge.

Storytelling helps in the learning of the curriculum of social studies as it turns out to develop an understanding of students of democratic ideals, citizenship, and cultures. DST also helps students in improving their efficiency of communication and sharing their experiences and motivating them to connect to their past and present (Sadik,2008). Construction of digital storytelling involves working with different multimedia tools like text, audio, images, web publishing, scanner, cameras, and sound effect which will make the students technologically efficient (Robin,2005).In this way, it provides challenges to students which helps increase their motivation to improve their performance as well as learning.

Hence digital stories can be seen as an ICT-based approach to curriculum development. It comes out to be a method of creating communication that is further strengthened by the use of easily accessible free and open software text, video, and audio editors.

Conclusion

It can be concluded that ICT tools such as Concept mapping and digital storytelling play an essential role in the meaningful understanding of subject matter by making the teaching process interesting and easy to understand in the instructional process. Moreover, these tools keep the students engaged in active learning and motivated

throughout the process and also help the students to retain what they all have learned in their memory for a long period. So, the merging of technology and education has paved a new innovative way to gain an education.

There is a need to adopt such technologies in education and also trained teachers for the same so they may turn it into an innovative pedagogical approach that will result in meaningful gaining of knowledge. This will help in raising the level of education and in enhancing the capabilities and skills of students.

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