

CHAPTER 1

INTRODUCTION

Technological resources are ubiquitous today and touch us on all walks of our life **(Haughton et al, 2015)**. More than half of the global population possess the latest digital technologies/gadgets specially the smart phones, internet facilities, and enjoy in the online world **(MISR, 2018)**. This rapid technological development and advancement has changed the decoration of our life now. Today everything or every facet of our life that was previously done with extra labor is to be done now more effective, more faster, and more practical with the proper and effective application of scientific discoveries and innovations. The utilization of digital material resources in contemporary world blanket all the important fields of our life like business, trade, commerce, financial institutions, industry, education, administration and shopping, travelling, social networking, and several other important fields of our life too. Today, no one can abscond from the utter need of these latest digital technologies in our daily life. The use of technology has made our life much more easy, fast and comfortable and reduced our effort. Today, no one can be of the opinion or think of a life without technology **(Essays, UK, 2018)**. In similar way, the significance/magnitude of these digital material resources in the sub-system of education is of no exception. Over the past years, online infrastructure facilities had made a key significant part in education; verily it is providing numerous opportunities for all the persons who are involved in our system of education - especially to improve and enhance the students learning capabilities **(Meenakshi, 2013)**. Information and communication technology (ICT) is/are basically used to operate, store, manipulate, and retrieve information which smooth the path for effective teaching and learning within and outside the traditional/conventional teaching learning

settings. ICT stimulates individual learning, and also provides the opportunity of distance learning. Individual responsibility (self study) for studying inside or outside schools hours, planning, organizing, and preparing the content/lessons to be taught and scheming of the content/learning materials such as delivering the lessons/topics/contents offline and online and smoothening or resource allocation, proficiency and advising which are of prime importance for teachers, are highly made available by the use of information and communication technologies. Information and communication technology (ICT) has the potentiality of appealing teachers and learners in instructional activities in order to improve and increase learning outcomes as well as opportunities for students to solve their more complex problems that improve their cognitive skills. These online gadgets mostly used for teaching and learning environment (**Ovaiwe & Oshio, 2011**) includes tools/devices like Wi-Fi/internet, radio, television, cellular phone, smart phones and computers, projectors and much more in its bucket. Information and communication technology (ICT) is used to designate a broad horizon of services, applications and technological tools using numerous types of gadgets, equipments and software programs running over telecommunication network system, for gathering/collecting and using information. These latest online equipments and gadgets encircle all the material resources which in one or the other way help us to the location of authentic sources of information, to store this valuable data and use whenever is required, to exchange our thinking, concepts in a systematic manner, and is a comprehensive supplication of locating, identifying, computing and communication, Moreover, the latest online technological resources encircle all those gadgets used for the purpose of informing and communicating voice, video & information. All these latest and advanced technologies, especially along with digital technologies and the Wi-Fi/internet had made a tremendous role and contribution in the field of education worldwide and

became very much inseparable in the field of education (**Eunjoo & Russell, 2002**). Information and communication technologies (ICT) provide the students and teachers a wide range of opportunities to expand the curriculum. Considering contemporary needs in education, a modern day classroom without these latest digital resources and technologies would be in-complete today. To put it all in a nutshell, modern digital resources in classrooms is to enhance better understanding and opportunities to students and teachers, and also to enhance the effectiveness of pedagogical strategies in which they are engaged, and this will improve their performance (**Sarkar, 2012**).

Impact of ICT in teaching-learning

Modern digital technologies have dramatically changed the pattern of classroom environment today. Educational technology (ET) has the possible potentiality to boost the learning environments and enhance the learning outcomes of learners through their active attentiveness, collaboration & immediate follow up process (**Jhon et al, 2002**). In addition, Information and communication technology (ICT) lift high order thinking skills, and also smash on student's attitude, interest and several other characteristics associated with them (**Educational Testing Service, 1989**). However, the limit to which Information and communication technology (ICT) facilitates improve the teaching-learning process is highly dependent on teachers skills, knowledge, confidence, willingness and competency. Knowledge has exploded and we are in the 21st century age, the old traditional/conventional methods of instruction/teaching are becoming obsolete and outdated. New methods need be adopted is a dam need of modern times. (**Mbodila, 2013**) rightly propounded that the conventional/traditional educational system do not transform and produce the skillful manpower whom they are capable and suitable for our fast growing

business and industrial environment. The study also pinpointed that no educational institution can survive in the twenty-first century without acquiring and adopting the new, latest and innovative technological resources in our teaching-learning process and cannot assert that they prepared their students for the future challenges/problems of life. **(Richard, 2015)** study supported the above mentioned results by mentioning that by the ICT usage, learners are open to face the opportunity developments which are based on accurate understanding and learning. The methodology/ pedagogy of teaching-learning can be dramatically modified by the power of technology integration and also can “revolutionize” the whole education process, **(Kohler & Mishra, 2008)**. Worthwhile teachers use the latest digital technological resources in order to smooth the process of teaching-learning. It should be remembered that though technology usage in our pedagogies may not be effective in all situations but it is a very significant in case of providing important examples and demonstrations. **Ali et al (2013)** mentioned that ICT has the power/potential to provide learners all the necessary skills required for effective learning, evaluation and synthesizing skills. The significance of education in almost all walks of our life has tremendously increased with the support and usage of information and communication technologies (ICT). During the period of past 20 years, the use of ICT has fundamentally revolutionized the education in whole at all levels. ICT acts as a powerful and intensive tool to change many of the educational practices in higher education institutions (HEIs). The incorporation of modern digital tools in our educational process is very highly emphasized by the latest learning theories. This concept basically emerged as a result of economical, social and pedagogical pressures (Organization for Economic Cooperation and Development, 2011). This can boost the teachers and students to lead the education system in order to meet the requirements of this technological world. The incorporation of technology in teaching-

learning process and in overall education attests to provide a progressive change i.e. from being highly teacher centric to student centric (**Muianga et al, 2018**). Modern digital technologies have dramatically changed the pattern of classroom environment today. Educational technology (ET) has the possible potentiality to boost the learning environments and enhance the learning outcomes of learners through their active attentiveness, collaboration & immediate follow up process (**Jhon et al, 2002**). In addition, Information and communication technology (ICT) lift high order thinking skills, and also smash on student's attitude, interest and several other characteristics associated with them (**Educational Testing Service, 1989**). However, the limit to which Information and communication technology (ICT) facilitates improve the teaching-learning process is highly dependent on teachers skills, knowledge, confidence, willingness and competency. Knowledge has exploded and we are in the 21st century age, the old traditional/conventional methods of instruction/teaching are becoming obsolete and outdated. New methods need be adopted is a dam need of modern times. (**Mbodila, 2013**) rightly propounded that the conventional/traditional educational system do not transform and produce the skillful manpower whom they are capable and suitable for our fast growing business and industrial environment. The study also pinpointed that no educational institution can survive in the twenty-first century without acquiring and adopting the new, latest and innovative technological resources in our teaching-learning process and cannot assert that they prepared their students for the future challenges/problems of life. (**Richard, 2015**) study supported the above mentioned results by mentioning that by the ICT usage, learners are open to face the opportunity developments which are based on accurate understanding and learning. The methodology/ pedagogy of teaching-learning can be dramatically modified by the power of technology integration and also can "revolutionize"

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Integration of ICT in teaching and learning

Incorporation of technological material and ICT resources in our classrooms is one of the prominent and an emerging practice in education. Technology incorporation (blending) has become a key significant dimension of successful and effective teaching and learning. Blending of latest digital technologies in education provide the opportunity

learning 24*7. Basically, the foundation of incorporating the technological dimension in the educational sub-system is the result of different learning theories developed from time to time. Most importantly, the latest learning developments of Constructivism and Connectivism highly emphasize on the integration of technological aspect in modern day educational process. The core idea behind the integration is to enhance the learning outcome of our students and the creation of the environment, where learners can construct their own knowledge. The International Society for Technology in Education (2008) “recommended on the incorporation of digital resources, as these digital infrastructure facilities have the potential of making the learners to think in a constructive and connective ways, enhance the standard of education and mostly the process of actual classroom teaching-learning whether inside or outside”. **Churma (1999)** has notified the significance of these latest digital resources in the process of teaching and learning from administrators, teachers and learners perspectives. The researcher accounted for teachers – Technology integration helps very much in supervising the curriculum, the adoption of latest digital technology components like word processors, electronic grade books, software applications, electronic communication, spreadsheets, social networking sites and so on, these digital technologies actively engage the learners in learning effectively. As far as learners are considered, the technology integration should lead to the proper development of reading and writing skills, effective research skills, problem solving and rational and higher order thinking skills. Moreover, the visual or optical portrayal leads the learners from concrete to higher level of learning i.e. abstract learning. The technology intersection is very much significant in the traverse of thoughts and ideas and their associations, testing of hypothetical ideas and construction of authentic knowledge and it goes further more to computing, calculating and memorizing, but highly focusing in the application of thoughts

and ideas, testing the significance of results and synthesis of knowledge and information. The move from the traditional/conventional classrooms of oral teaching-learning process to the classrooms including pencil and paper, and then to an online version i.e. in the shape of latest technologies like computers, software and applications, and the Wi-Fi/internet discouraged many teachers holding strong beliefs in traditional ways (**Sarkar, 2012**). Modern digital technologies importantly the internet online world brought dramatic changes in the educational concept i.e. there is a successful shift from the teacher dominated learning to learning-centric. The role of teachers shifted from mere information givers to facilitators of knowledge and a kind of learning environment which primarily concentrates on problem solving. Information and communication technology (ICT) made asynchronous type of learning easy for us. Now online learning can be accessed 24*7 by us. Our learning is not wholly dependent on printed materials, but the development of internet facilities can provide us a wide range of learning resources anytime and anywhere in the world. (**Sarkar, 2012**). Initially, the literature depicts that the primary focus was on the simple use of audio-visual aids in classrooms especially at primary level. The learning theories of Connectivism and Constructivism had changed our teaching-learning process and classrooms now. Also, the latest advancements and developments in the information and communication technologies (ICT), all levels and fields of our educational system undergo a progressive change. However, the initial emphasis was on the use of technological tools in order to make the classroom interesting. But after the development PCK model by **Shulman (1986)** and the latest techno-integrated models of teaching i.e. TPACK model by **Kohler and Mishra (2006)** and substitution, augmentation, modification and redefinition (SAMR) model by **Putendera (2013)**, the major focus of teachers is on the productive incorporation of technology resources in the educational

process rather than just using the technology, as there is a variation between the two concepts- technology use and technology integration. Basically, these latest techno-integrated teaching models concentrate and encourage the prospective teacher to hold sound technology, pedagogy and subject knowledge, and more importantly the incorporation of these three aspects of education. This incorporation will develop the educational process in accordance to the 21st century, which is highly focused on learning in a connective manner. Technology use in classrooms is just the use of technology especially the audio-visual aids and graphical materials without any functional improvement in the teaching-learning process. But when we talk of technology integration, it means much more. Technology integration is a wider concept than technology use. Technology integration primarily concentrates on full-time, daily operation of technological tools especially the latest digital ones within lessons. Technology integration emphasis on the regular, frequent and daily usage of technological resources especially the digital ones in refining the everyday classroom teaching-learning (**Vannatta & Banister, 2007**). The teacher is most important ingredient for success when using and integrating technology. Teachers are the key and central in facilitating the technology-integrated environment, without teachers, learners vulnerability to technology will remain ineffective (**Mandell, Sorge & Russell, 2002**).

Ways of integrating technology in classrooms

Numerous procedures are where teachers can integrate technology, especially the latest digital ones, in their classroom teaching. It depends upon the quality of teachers that how effective the integration would be. Some teachers integrate interactive Smart Boards in place of traditional chalk or black boards in their classroom. Now digital boards have been

introduced in our country. The content of teaching subjects can be placed on the display of these smart boards for learners. These smart and interactive boards had a finger touch screen technology as we see in our smart phones. Many educational institutions take necessary steps to offer simple procedures for their teachers to incorporate technology in their classroom teaching with extra support by technology departments and funding, some educational institutions lag behind because of little budget reasons. Teachers in such institutions can use technology in their classroom teaching but in a traditional approach. Some teachers encourage their students to sign up - in Google accounts - for receiving electronic mails (e-mails) or text message alerts like Messenger, WhatsApp chats to receive online assignments and reminders for certain kinds of activities, tests and projects. Many learners respond very well to these types of online communications and some show disinterest. Publishers and advertisers provide wide range of online books and learning materials which are very effective in teaching the content to our students. Most teachers take benefit from these online resources and also permit their students to use them. There are many of online, ancillary websites and computer software and their applications which allow teachers to assess their students' knowledge, information and understanding of content. Classrooms of today provide a wide range of access to computers and other technological sources to their teachers and learners in order to make the classroom more active. Integrating these latest digital technology tools in the classroom teaching and in daily lesson plans can be a challenging task for many teachers, as it requires the extra effort and dedication from teachers' side. However, some teachers integrate effectively as they found it very much fruitful and interesting. Rapid developments and advancements in technological field made the blending of technology in modern day classrooms very much easy. Flipped learning - where online video lectures are viewed by learners anytime and

anywhere. Technology incorporation refines the methods of teaching and learning. Beginning with the simple and irregular use of audio-visual aids and graphical materials in classrooms, as the information and communication technologies (ICT) advanced and developed with a greater pace, the ways of incorporating these technologies in modern day classrooms changed the scene. Computers can be used by teachers 1. to distribute and provide assignment work to their learners 2. to develop visual content which helps in easy learning and longer retaining 3. to use word processors and spreadsheets application 4. to learn complex things on these computers in easier ways. Learners can incorporate technology tools like Word Processor for the purpose of writing down the notes, checking the spelling of their writings through computers auto spell-check feature. The disclosure of W3C 2.0 and 3.0 technologies, So Net and collaborative media applications like blogs and wikis, online video repository, YouTube, iTunes U and Big Think and so on are highly influencing our education. The exposure of smart phones such as the iPhone along with internet gave rise to mobile learning i.e. new route for lesson delivery. Online 2.0 tools viz., Blogs, discussion forums, Wikis, Podcasts, and So Net sites are converting the conventional teaching and learning domain into social and personalized. Another way of incorporation is to create a website or blog with the help of Word Press say for example. Teachers can create classroom websites (Google websites) where they can distribute assignments to their students and assign them in grades in online mode. If any educational institution has no website sever to organize or manage this online service, in such cases **wordpress.com** or **blogger.com** are useful. Blogs are very simple to incorporate in teaching-learning process and uploading data to a blog, because of their hypertext markup language (HTML) editors. The incorporation of video conferencing offers the people in different geographical locations, an opportunity to learn through online streaming lectures.

These conferences are very economical in terms of travel costs and time. Mobile technological appliances help learners to learn anytime and anywhere. Online educational applications like 'PIAZZA', mobile devices, iPods, tablets, or other online devices can be integrated to access content/subject materials and online posting of questions and doubts. Latest digital technologies and other smart electronic devices along with internet access allows students and faculty and other personnel linked with educational sector to perform a wide range of online work, activities, assignments and tasks like administrative workloads, developing and distribution of class notes, online video lectures, etc.

Integration and TPACK strategy

Integration of technology in teaching according to TPACK is basically grounded on the Shulman's (1986) theory of Pedagogical Content Knowledge (PCK). PCK is the integration of content knowledge-specific knowledge of teachers about their subject of teaching like English, Mathematics, History, Geography etc and a station of pedagogical component i.e. knowledge about "how to teach" including specific teaching methods like discussion method, problem solving method, demonstration method etc. According to Shulman, a teacher is effective in his classroom teaching only if he/she is capable of successfully integrating these two knowledge domains. Kohler and Mishra integrated the technological knowledge domain in the PCK and developed the important technology integration model TPCK or TPACK – "technological, pedagogical and content Knowledge". This emphasis that teachers can successfully blend technology in teaching only if they have these three (3) knowledge domains i.e. technological, pedagogical and content or subject of teaching, and importantly skill of integrating these three domains effectively. Suppose a teacher is interested to teach 'Respiration' to 9th class students

through TPACK model. The objective of this lesson is to explain the concept of respiration, its types and mechanism – how it works. Teacher walks the students through the concept of respiration and breaks them into small groups for collaborative purpose, so that learning will take place in a constructive way. Students are also required to participate in a quiz based on the content via a specific learning management system. After that, a synergistic question that provide a image of a respiratory system with unresponsive spaces and learners were required to check the right responses from an answer key. Each group will be provided a recording device to describe the types of respiration and what are the important organs involved in it. Lastly, students have to develop and online their videos and watch each other’s videos and leaved comments. Each group is then required to form a memento of their work. This can be done through Google Drive, a flowchart, or a video explanation. Finally, students have to make their cases (artifacts, flowcharts or videos) using Padlet, Evernote or other similar tool. In this manner, the incorporation and synergize of three (3) aspects of TPACK is possible.

Integration and SAMR strategy

The SAMR model developed by Dr, Ruben Puentedura explains the technology integration in terms of degree or level. It is based on four levels of intensity of incorporation. In “Substitution” level – technological tools play a role of alternatives without much improvement, ‘Augmentation’ level focuses on technology integration with minimal improvements, ‘Modification’- level make a level of intensity stronger than the previous to levels discussed. Here, technology calls for learning in a new way or new design. The strongest level of technology incorporation is Redefinition. Here, technology focuses on the development of some innovative learning way that was not possible earlier.

Suppose, the lesson is writing a short paper .Conventionally, students write with pencil and paper. The substitution is Word Processor replaced pen/pencil writing. Augmentation is Word Processor along with some more improvements like text2speech function. Modification is the use of Word Processor and text-to-speech along with qualitative responses in terms of collaboration, it will enhance the quality of writing of learners. Last level is that instead of writing, learners pass on their creative ideas through online digital technological resources.

Challenges of integrating ICT in teaching

Synergizing of technological aspect especially the latest digital ones in modern day teaching-learning is quite challenging. Numerous factors come in the effective execution of this way. This is quite surprising that there are still some teachers who wish to keep up with the conventional pedagogies in modern day classrooms. Conventional methods of instruction and pedagogies should be refined; this will improve our teaching-learning process. A report of the ‘7th international conference on networked learning 2010’ put forth that there exists some factors, related to the personal life of teachers, which are quite challenging in ICT usage 1) teachers personal belief/faith about incorporating ICT in their teaching profession 2) personal use of ICT 3) acceptance and rejection of innovative things. Some challenges are in the way of curriculum 1) achieving the curricular goals, syllabus coverage before deadline time period and administrative outlook (**Chanlin, 2007**). Among the factors mentioned above, strong impediment is the effective curriculum implementation itself and achieving the goals. Most educational institutions curriculum does not incorporate latest information and communication technologies (ICT). A study (**Charalambos et al, 2010**) depicted that 71.7% of teachers responded that time is a main

impediment in ICT preparation for instruction; from this survey study it is quite obvious that the intersection of latest digital technologies is a time intense activity, requiring extra time and effort. This is perhaps the pure reason that technological tools are not often incorporated in modern day classrooms. The operation and execution of information and communication technologies (ICT) -based activities require a bit extra time in comparison with the conventional ways. Studies (**Khalid, 2009 & Chanlin, 2016**) mentioned the barriers of teachers' attitudes, beliefs, time insufficiency, inadequate confidence, and opposition to change. Another important recommended factor is the institutions lack of sufficient technological resources and in some cases institutions with no resources. In the 21st century knowledge has detonated, this extensive knowledge and the proper way to obtain such knowledge is pivotal to improve the development of our increasing multiplex society. With the root age of the internet, information and communication technologies (ICT) facilities have erupted with intensive knowledge which can be easily accessible to anyone, anytime and anywhere in the world- as the case of today's online learning is. Besides, the very significant factor affecting successful techno-integrated teaching is peer support, parental attitude and administrative outlook (**Bingimels, 2009**). Let us discuss these above mentioned issues that highly affect the teachers' strategies to incorporate technology into their teaching profession:

ICT policies

Techno-integrated teaching-learning process is heavily dominated and affected by the countries prevailing ICT policies and strategies. A rapid and tremendous incorporation of latest analog tools into teaching domain demands the effective ICT policies and their implementation. Effective ICT policy implementation for any educational system is highly

important in order to revolutionize it and to develop innovative strategies. Unless and until an effective policy exists and stakeholders have a clear cut planning and strategy, it is heavy to incorporate ICT in teaching-learning process effectively and successfully and to bring about desired changes, modifications and improvements in the field of research and quality of education (UNESCO, 2007).

ICT Infrastructure

According to **Lee & Lee (2014)** limited or insufficient technological (ICT) resources within educational institutions is a great impediment for successful technology incorporation in classrooms. For instance, insufficient computer facilities and software in classrooms can heavily limit the teachers' technology usage. **Agyei (2013)** posited that insufficiency in technological resources is a strong hurdle to (ICT) technology incorporation in numerous under developed nations. Research studies (**Bingimeals, 2009 and Agyei, 2013**) have postulated that technological resources are key important part of effective techno-integrated teaching. In addition to the above, unstable power supply and improper preservation of the available technological facilities sum up to the problem of ICT infrastructure availability.

Lack of skills

Absence of technology skills act as a strong impediment in effectively using them. Noticeably, ICT users in developed countries hold strong technological skills than in developing ones, referring to the key barrier on the prospective build out of developing and under developing countries (**MISR, 2018**). (**Chanlin, 2017, Ramorah, 2014 and Bingimeals, 2009**) identified that there is a lack of training and skills in teachers which are necessary for incorporating the three knowledge domains i.e. TK, PK and CK. Teacher trainees educational program of teacher education departments (TED) of universities provide

a very minimal opportunities for teacher trainees to learn the basic digital skills (computer skills) required for the effective integration of ICT facilities into teaching. Research (Agyei, 2013) has propounded that such teacher education courses have not satisfactorily imitated the incorporation of technology domain in their courses. In order to make an effective and successful integration or incorporation of digital technologies in classrooms, the prospective teachers must hold sufficient knowledge and skills to perform this job (Agyei, 2013). According to Webb and Cox (2004), one of the key essential factors affecting teachers' effective techno-integrated teaching is the lack of technological knowledge (TK) and lack of skill about how to operate these technological resources. This breakthrough has recently been developed by "Mishra and Koehler (2006) and Harris, Mishra, and Koehler (2009)", who propounded that there is a proneness for teachers not to incorporate the three (3) knowledge aspects viz. TK, PK & CK and this proneness may end to tedious technology incorporation.

Lack of time

Bingimeals (2009) mentioned that lack of time or time insufficiency is a key significant factor affecting teachers for effective technology incorporation in their actual classroom settings. Teachers are bound to their timetable and syllabus coverage in a timely manner. Educational institutions show resistance to change, provide minimal time for the effective synergize of analog resources and a very less attention in spending the time on the learning of new innovative teaching strategies (Mumtaz, 2000).

Connectivity and Accessibility

Networking factors include instable internet/Wi-Fi connectivity and internet breakdown/ disruptions. This problem is serious when teachers integrate the technological resources which are functioning only in online manner. Students also have a limitation in

the internet/Wi-Fi usage inside and outside their classrooms. Although teachers and students could access online resources personally, but there is very minimal internet/Wi-Fi being used by teachers in their actual classroom teachings.

Lack of training

The concern of technological aspect to be incorporated in teacher training programs has received a very significant attention. **Lilian et al (2016)** postulated professional development has a key significant impact on how effectively ICT can be integrated in our classrooms today. ICT intervention programs improve the techno-integrated teaching competency among teachers (**Sharma & Sharma, 2018**). Moreover, Researches (**Lee & Lee, 2014, Yousuf & Balogan, 2014 and Qasem & Vishwananthapa, 2018**) recommended that refresher courses, orientation and training programs had improved the teachers' techno –integrated teaching competency.

Status of Higher Education in India

Higher level of education occupies a key pivotal role in the progress of any society, community or country, as it is viewed as a powerful and very efficient tool/means to build a knowledge-based society. This is considered the highest level in our education system. University Grants Commission (UGC) and other constituent bodies – the Indian higher education governing autonomous units- recommend there well established facts, standards, norms, advises the government for enhancing its quality. According to “All India Survey on Higher Education (AISHE)” (MHRD, 2017-18), the key aspects and features of higher level of education in India are highlighted in the table 1.

Table 1: Status of higher education in India

| | | | |
|----------------------------|------------------|-------------------------------------|---------------|
| GER | | 25.08% | |
| Total enrollment | 36.6 millions | Male | 19.2 millions |
| | | Female | 17.4 millions |
| HEI | 50,864 | Universities | 903 |
| Central | 46 | Under state legislative act | 05 |
| State public universities | 365 | Institutions of national importance | 101 |
| State private universities | 263 | Deemed universities | 123 |
| Colleges | 39950 | Govt. | 22% |
| Govt. aided | 13% | Private | 65% |
| Standalone inst. | 10011 | Technical | 3239 |
| Nursing | 2676 | Teacher training | 3691 |
| PGDM institutes | 269 | Institutes under Ministries | 136 |
| Teachers | 12,84,755 | Male | 745047 |
| | | Female | 539708 |
| Professors | 114160 | Tutors | 64266 |
| Associate professor | 139443 | Temporary | 66858 |
| Assistant professor | 888427 | Visiting teachers | 11591 |

Source: AISHE 2017-18

Status of Higher Education in J & K

The state of J & K is a state in Northern India. The total area covered is 222,236 km². The total population is 12,541,302 as per 2011 census report. The human development index (HDI) of the state is 0.684 ranking 17th in India. The overall literacy rate is 68.74. The official language is Urdu and other spoken languages are Kashmiri, Hindi, Dogri, Punjabi, Pahari, Gogri, Balti and Ladakhi. The state consists of three divisions Jammu, Kashmir and Ladakh and is further divided into 22 districts comprising of 10 districts in Jammu and Kashmir each and 2 districts in Ladakh region. The key features of higher education in the state as per AISHE, 2017-18 are shown in the table as;

Table 2: Status of higher education in Jammu and Kashmir

| State | Jammu and Kashmir | | |
|-------------------------------|-------------------|-------------------------------------|------|
| Higher education institutions | 319 | | |
| Universities | 14 | Central universities | 2 |
| | | State public universities | 7 |
| | | State govt. Deemed universities | 2 |
| | | Institutions of national importance | 3 |
| Colleges (academic) | 131 | Government | 97 |
| | | Private | 34 |
| Standalone Institutions | 174 | Teacher education colleges | 151 |
| | | Other professional colleges | 16 |
| Total enrollment | 359230 | No. of teachers | 9773 |
| | | Male | 5737 |
| Universities | 76334 | Female | 4036 |
| Colleges | 211753 | Professors | 976 |
| Standalone institutions | 71153 | Associate professors | 1036 |
| Male | 177022 | Assistant professors | 6061 |
| Female | 182208 | Tutors | 433 |
| Regular | 255578 | Temporary | 1213 |
| Distance | 103652 | Visiting teachers | 54 |

Source: AISHE 2017-18

Need and significance of the study

In the modern era of digitization, technology- especially the latest digital ones and knowledge have taken centre stage/place in all our local, regional, national and international debates. Meantime, the ‘ICT’ has become an integral and intensive necessity of almost all dimensions of our life especially educational dimension. Whether it is our planning, teaching, learning, evaluation and assessment, these latest digital technologies are dramatically revolutionizing the scenario of educational system in India **Ghosh (2018)**. The country has taken up major and very significant initiatives in terms of content delivery and furthering the quality of education. For instance, ‘Gyan Darshan’ was successfully

introduced in the year 2000 for the purpose of telecasting learning programs for all types of learners. Followed by 'Gyan Vani' was another significant platform for telecasting wide range of courses in connection with IGNOU and IITs. UGC has also taken a country wide learning process i.e. on 1) Gyan Darshan 2) Doordarshan's National Channel (DD1), everyday programs on a wide range of learning courses are telecasted by the concerned authorities. IGNOU in 2005 launched 'E-Gyankosh' for the storage of content material and approximately ninety five (95%) of IGNOU's content material has been stored in it. The (NPTEL) launched by our government in 2001 is one of the significant joint initiatives of IITs and IISc primarily focusing on online learning. One of the remarkable initiatives was National Mission on Education through ICT, launched by the government to enhance ICT's potential in education. The government launched "National Mission on Education through ICT" scheme in the year 2009. This scheme is fully centrally sponsored scheme functioning under the MHRD and approved by the Cabinet Committee on Economic Affairs (CCEA). This mission primarily focuses on providing the online content to higher education learners in a wide range of courses. The ICT along with internet have changed the scenario of teaching learning from classroom boundary to the boundary of anywhere, anytime and anyone. The latest trend of Massive Open Online Courses (MOOCs) all over the world brought a new revolution in the field of education. These courses provide the learning opportunity to students from the top reputed institutions like Oxford, Cambridge, Stanford etc, and through the global popular MOOC providers like Coursera, Udacity, KhanAcademy etc. The teachers can provide the learning opportunity to the hundreds of thousands of people through these courses. Our country has also taken its own MOOC initiative SWAYAM. Moreover, the learning theories of constructivism and connectivism also changed the structure to modern day teaching-learning process. These theories very

much focus on the blending of latest analog ICTs in our TL system. In this context, this is very much significant to study the knowledge, skill and competency of technology integration in the teaching profession of our teachers. That is why this study has been designed by the researcher to study techno-integrated teaching of college teachers. Digital and analog technologies are playing a significant role in all our activities of daily life. The process of education has been revolutionized due to the evolution of the technological advancements all over the globe. One of the important dimensions of educational system highly affected is the teaching-learning process in modern day classrooms. Use of ICT in classrooms initially was confined to audio-visual aids and graphic materials. Now the stakeholders of education are very much prioritizing the effective incorporation of these material resources in educational system in order to improve the process and products of education. After the development of notion of PCK by Shulman, one of the latest developments in techno-integrated teaching was developed by Kohler and Mishra i.e. TPACK. TPACK is basically the synergizing of three (3) knowledge domains i.e. “technological, pedagogical and content knowledge”. “A teacher is not considered an ideal if he/she is competent enough in his subject or content knowledge, unless and until competent enough in technological knowledge, pedagogical knowledge and in the intersection of these three knowledge domains”. Besides TPACK, another important techno-integrated teaching strategy primarily concentrates on the intensity/level of technology blending is SAMR model of techno-integrated teaching developed by Putendra. In this context, the researcher is interested in studying this technology integration in the teaching profession of the college teachers. The researcher identified that there are studies mostly focusing on the use of computers and other electronic gadgets and audio-visual aids used by the teachers in their teaching process. Very minimal studies focused on assessing

the techno-integrated teaching concept i.e. integration of these three knowledge domains among teachers especially teachers at higher level of education. This concept basically is the assessment of three knowledge domains i.e. “technological knowledge, pedagogical knowledge and content knowledge and importantly the intersection of these three knowledge domains”. Moreover, little studies assessed the techno-integrated teaching of teachers but were confined to self-assessed tools used by researchers. However, the researcher is interested to extend it to the assessment of techno-integrated teaching of college teachers in their lesson plans and actual classroom settings. In addition to this, What types/kinds of ICT is used by teachers in modern day classrooms? This will be significant in the sense as it will provide the information overview to the stakeholders of education about what we have and what not in terms of the technological facilities necessary for successful techno-integrated teaching. Moreover, what challenges teachers face in the integration of these three knowledge domains in teaching in higher institutions? This will also be beneficial for the higher education authorities to address such challenges, if any, and provide opportunities and necessary trainings to teachers for improving their techno-integrated teaching competency. This study is significant in the sense of assessment as it extends from self-assessment of teachers’ techno-integrated teaching to the integration of their TPACK in their lesson planning and actual classroom settings. It will also provide the exploration of the challenges college teachers face while integrating these three knowledge domains. In addition to this, in my view this will be perhaps the first study which will be carried out in the division of Kashmir, so the case may be different. Further, the study is significant in the sense that the researcher will explore whether the existing theory of techno-integrated teaching (TPACK) is effective and applicable in our conditions or not. The researcher will propose a suggestive theory/model which will work in the

specific context of the research site and may be in similar other situations. In addition to above, the leading constructivist and connectivist theories, which lay high emphasis on the incorporation of technological component in our teaching-learning process, are of much concern. The study will be significant in the context of these learning theories, as the study will explore the techno-integrated teaching competency of teachers at higher level of education.

Statement of the problem

Education, all over the world, had made a remarkable progress with the incorporation of technological aspect especially in the educational field. The move from simple usage of “audio-visual aids and graphical materials” in classrooms shifted to the effective integration and incorporation of technology especially the latest digital technologies in teaching-learning process. Teaching with technology is a major concern in the contemporary world. In the present scenario, teachers along with their subject knowledge domain (CK) must have the competency in the way of their teaching and competency of integrating technology (TPACK) in their profession also. What is the level/intensity of technology integration in the teaching profession of higher education teachers and what are the issues in the path of integrating “technology, pedagogy and content knowledge” in the planning and execution of their content delivery is an important researchable area. In this context, the researcher was interested to carry out a study entitled as ‘**A study of techno-integrated teaching of college teachers**’.

Operational definitions of terms

Techno-integrated teaching

Technology integration basically means the incorporation of technology in the education especially in the modern day teaching learning process in order to improve the process and products of education. Technology integration allows the teachers and students to infuse different ICT tools in their general content areas in order to improve its efficiency. In this study, techno-integrated teaching is based on the Mishra and Kohler concept of TPACK i.e. integration of three knowledge domains by the teacher –“ technological knowledge, pedagogical knowledge and content knowledge”. Also, the intensity of technology integration in classrooms is based on the Putendera’s SAMR model i.e. four levels of technology integration- substitution, augmentation, modification and redefinition.

College Teachers

College refers to the higher educational institutions in which mostly undergraduate courses are offered. However some colleges offer teacher education courses, post graduation courses, engineering courses and sever other professional courses. College teachers simply are the teachers teaching these different kinds of programmes in these colleges. In this study, college teachers include professors, associate professors, assistant professor and temporary teachers and working in govt. academic degree colleges.

Research question

Following research questions were framed for the study-

RQ 1: What kind of infrastructure support is available for college teachers?

This was an exploratory research question for enquiring about available infrastructural support for teachers for techno-integration.

RQ 2: What are the issues faced by college teachers in the planning and execution of techno-integrated teaching?

This was a specific research question to investigate the results of quantitative study in depth by interviews and observation.

Objectives of the study

1.1 To study the TPACK knowledge of college teachers.

1.2 To study the component wise TPACK knowledge of college teachers.

2.1 To compare the TPACK knowledge of college teachers in relation to gender.

2.2 To compare the TPACK knowledge of college teachers in relation to locale.

2.3 To compare the TPACK knowledge of college teachers in relation to teaching experience.

2.4 To compare the TPACK knowledge of college teachers in relation to teaching subject.

2.5 To compare the TPACK knowledge of college teachers in relation to teaching position.

2.6 To compare the TPACK knowledge of college teachers in relation to educational qualification.

2.7 To compare the TPACK knowledge of college teachers in relation to region.

3.1 To compare the components of TPACK knowledge of college teachers in relation to gender.

3.2 To compare the components of TPACK knowledge of college teachers in relation to locality.

3.3 To compare the components of TPACK knowledge of college teachers in relation to teaching experience.

3.4 To compare the components of TPACK knowledge of college teachers in relation to teaching subject.

3.5 To compare the components of TPACK knowledge of college teachers in relation to teaching position.

3.5 To compare the components of TPACK knowledge of college teachers in relation to educational qualification.

3.7 To compare the components of TPACK knowledge of college teachers in relation to region.

Hypotheses

1.1 There is no difference in TPACK knowledge of college teachers.

1.2 There is no difference in components of TPACK of college teachers.

2.1 There is no significant difference in TPACK knowledge of college teachers in relation to gender.

2.2 There is no significant difference in TPACK knowledge of college teachers in relation to locale.

2.3 There is no significant difference in TPACK knowledge of college teachers in relation to teaching experience.

2.4 There is no significant difference in TPACK knowledge of college teachers in relation to teaching position.

2.5 There is no significant difference in TPACK knowledge of college teachers in relation to teaching subject.

2.6 There is no significant difference in TPACK knowledge of college teachers in relation to educational qualification.

2.7 There is no significant difference in TPACK knowledge of college teachers in relation to region.

3.1 There is no significant difference in components of TPACK knowledge of college teachers in relation to gender.

3.2 There is no significant difference in components of TPACK knowledge of college teachers in relation to locale.

3.3 There is no significant difference in components of TPACK knowledge of college teachers in relation to teaching experience.

3.4 There is no significant difference in components of TPACK knowledge of college teachers in relation to teaching position.

3.5 There is no significant difference in components of TPACK knowledge of college teachers in relation to teaching subject.

3.6 There is no significant difference in components of TPACK knowledge of college teachers in relation to educational qualification.

3.7 There is no significant difference in components of TPACK knowledge of college teachers in relation to region.

Delimitation of the study

The study was delimited to the teachers in government academic degree colleges of Jammu & Kashmir divisions only. The total number of which is 93 colleges, excluding the 4 colleges of Ladakh division. The study was delimited to the teachers' integration of technology in the planning and execution of content knowledge.