Information and Communication Technology (ICT) Based Teaching-learning Activities on Medical Program in COVID-19 with Prospects and Privileges

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Abstract

Information and Communication Technology (ICT) is enabling a concrete learning activity along with proved academic achievement. It is one of the most dynamic techniques, which can help to utilize the aptitude of recent science. E-learning and M-learning can further provide easy access to education for many and providing good teachers closer to students too. This article is an initial trial to review prior studies on ICT based teaching-learning activities for technological advancement in medical sector. The sector has improved in using ICT in their professional routines. A high-quality education can run only when it is supported by the institutions within the framework with a coherence to national and regional policies. Very few trials and setup has been built to run this. But further transformation is necessary to provide easy access towards them. This study adopted a narrative literature review study, involving recent relevant scholarly researches of medical sector and education development program, online monthly magazine and online websites with highlights on some very important integral issues- the perspective of COVID related E-learning, recent ICT Tools, Bangladesh towards new era of ICT, the key factors to achieve E-learning and M-learning and some needful as for security purpose. This expectantly will help to explore ICT state in Bangladesh on COVID-19 and some further steps needed to fetch the medical sector forward, towards this initiative to cope up with other countries, in a planned way. This study contributes to a better understanding of the under researched topic of; ICT in teaching-learning activities, which came forward at the time of COVID-19.

Introduction

Coronavirus has disrupted medical education and required intense and prompt attention from medical educators.[1] Using local digital settings and custom them in the best possible ways to facilitate their inter-communication with students and provide student learning in difficult circumstances was also tried in Bangladesh and Nepal context.[2] The new limitations of physical presence in COVID, have accelerated the development of an online learning environment, comprising both of distance education, and the introduction of novel ways of student assessment. At the same time, this prolonged crisis had serious implications on the

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lives of medical students including their psychological wellbeing and the impact on their academic trajectories.[3] Teaching is proceeding in online platform, with a lot of attempt and mistake and uncertainty for one and all[4.]

After the second world war, Finnish society experienced a remarkably rigorous and rapid modernization that affected teacher education. It was entirely parallel to the education system. The 1970s was the era of execution of the comprehensive school and the synchronization of teaching instructions.[5]

In recent years, online learning in the education sector has increasingly become prominent. Some study shows, online learning has the potential to reduce digital inequity[6,7]. The existence of a digital divide in online learning during the pandemic was found in China. Therefore, differences are found in equipment quantity and network quality, students' adaptability to online teaching, and their offline learning outcomes.[6,7]

E-learning proved to be as effective as traditional instructor-led methods such as lectures. Instead of a replacement to the traditional facilitator-led courses, it is considered as a complement to it.[8,9] An online learning course supports the pedagogical approach for guiding teachers in developing their technological pedagogical thinking and reasoning. So, they in turn are able to construct a systems pedagogical approach, with their own students. Pedagogical understanding is at the core of teachers' enhancement of their technological pedagogical reasoning and supports the transformation of their knowledge called technological pedagogical content knowledge.[4,10]

Traditionally students learn by attending lectures, doing reading assignments, and working in the library. The new mediating mechanism should be able to explain how these educational programs and policies are translated into student achievement and development.[11] Testing and liability are considered as a higher scheme of learning how to teach.[5]

the term resources in quantitative aspects, such as the belief that increasing the proportion of "high-quality" professors on the faculty is scholarly productive will strengthen the educational environment. student learning and development will not be impressive if educators focus most of their attention on course content, teaching

techniques, and other resources. student involvement encourages educators to focus less on what they do and more on what the student does: how motivated the student is and how much time and energy the student devotes to the learning process.[11] The use of ICT in education lends itself to more student-centered learning settings.[12]

Many countries like- European countries are aiming at constructing a digital environment, evolving the digital skills of the teacher and student, and acquainted with inventions in the learning method, by 2030.[13]

The perspective of COVID-related E-learning

Role of Medical Educators
This was further intensified by the unavailability of teachers who were also serving as frontline healthcare providers during the pandemic. The COVID-19 pandemic has undoubtedly obstructed all aspects of education. However, the impact was unique since medical educators played the dual roles of healthcare providers who were engaged in combating the pandemic on the front. Continuity in the medical segment has gained foremost importance in the light of the global emergency and has been affected by the social distancing norms in places, some were effective supplementary tools for a traditional.[11] E-Learning and online teaching instruction of higher education represent a vital facade in no getaway of teaching throughout the lock down period.[14]

The need for, design-based research development for the educational environment came forward in this situation and its concurrent testing for progression. Necessary tools should be integrated into their coursework. By assisting in planning curricula to meet student and teacher needs, aligning support and services to technology adoption to overcome present barriers, and informing the design and development of educational technology classrooms.[15]

Besides online classes, the instructors also provided content via videos to make simpler online classes. Some educational institutions provided single transmission videos [16] and also through practical classes through mobile learning.[1] to give relief to the students. As they suffered from stress

and anxiety, health problems (back and spine pains, eye pains) due to being locked indoors in COVID-19.[13,17]

The epidemic situation has made teachers and educational authorities acutely aware of the deficiencies in this area. It is necessary to equip all pupils and enable participation in the future.[16]

Technology and Education

Meaning of Education

Education is the method and technique of sharing scholarly material, thoughts, facts, and practices inside and outside the educational institution.[12]

Educational Technology

Educational Technology, is the implementation of instructional materials in a scientific manner, in which a teacher can make the education process interactive in innovative ways, for a better understanding of the instructions and improvement in student's behavior of students in a constructive way.[12]

Pedagogical approach

Pedagogical strategies encompass different focuses in teaching; either a focus on the teacher's knowledge and behavior or the student's behavior and understanding.

Developing digital applications, not in the form of text; but by integrating images, audio, video, and additional links to student learning resources hopefully to increase awareness to increase clinical teachers' teaching skills and the consequences.[18,19] Seven pedagogical strategies were explored to be applied in the medical sector: 1) Questions and answers, 2) Lecturing, 3) Piloting, 4) Prompting, 5) Supplementing, 6) Demonstrating, and 7) Intervening.[19]

The Theory of the Digital Divide suggests the social and economic change that the population and the nation are seeking and also their access to ICT.[16]

Digital inequality denotes both the variances of reaching towards ICT and the existing skills on it. It can bring a country toward the end of the digital divide.[1]

Internet of Things (IOT) is referred to the general idea of things, especially everyday objects, that are readable, recognizable, locatable, addressable through information sensing devices and/or controllable via the Internet, irrespective of the communication means.[21]

Use of ICT in the educational context
In-person uses
It means technological knowledge for searching for Information, reading a web address, evaluating the validity of information, downloading information, compiling them as per choice, discussion forums where our thought and remarks are most readily interchanged.[12] Teachers have recognized that; it is necessary for them to develop their professional skills, lifelong learning, and quality of teaching.[12]

Searching Information
Search engines/ tools
The support of information through collaborative communication tools (chats, e-mails, discussion forums, distribution tables, videoconferences, and tools on hypermedia websites, electronic magazines, weblogs, WebQuest, simulations, webcams, etc.) integration in a constructivist manner can help the most.[8]

Digital infrastructure to run classes
Levels of use of the internet
Different levels of use of the Internet in academic institutions, from level 0 to 5 level 0 not to use it, level 1 easily constructed items, inserted in a website level 2 power-point presentation saved as an HTML; using the web as a source of information level 3 regular access to the course web through E-mail level 4 The lessons are developed both in face-to-face and online learning environments. The course contents are available online; (chats, forums, tables…) Cooperative w9rk tools are used.

Level 5 All the course contents and the interactions are online. It is not different from the conventional idea of e-learning.[20]

Internet of Things (IOT) covers a verse area for example IOsH (Internet of smart health): Patients Surveillance: Monitoring of conditions of patients inside hospitals and in old people's homes, here an application-specific Module is served on an application server serving all clients.[21]

The goal of the Internet of Things is to enable things to be connected anytime, anyplace, with anything and anyone ideally using any path/network and any service. Growth to its adoption will minimize the relative expense in coming years.[21]

Experiences using online platforms

In spite of using different tools teachers were in touch with the limited number of digital tools to take the classes, like- Zoom meetings, Google Meet, and some message-exchanging tools like WhatsApp and Messenger mainly, which are very convenient. Others are in the form of video podcasts, and content material (in HTML)[22] Digital infrastructure was the main problem i.e., slow internet connectivity, and expensive data packages.[13] Skype calls, Impartus, Google Classroom, YouTube, and any other online teaching platform were also used.[16]

Technology as Teaching tools

New trends in teaching and assessment methods include computer-aided instruction, The digital technologies introduced in medical and dental education include Google Forms to collect students' answers, YouTube live streaming, google.[23,24]

Online collaboration, streaming video, pre-recorded videos, the university website, the weekly newsletter,[25] telegrams, real-time mobile video, offline mobile application, etc.[1] are the technology tools, seen to use in COVID.[24]

Interactive class by everyone's participation

the condition of the class is not conducive, and some students have not gotten their turn to do other activities beyond the learning scenario. Those constraints are limited interactive digital-based teaching material, and inadequate learning infrastructure to support the users of smartphones to be connected to the internet. Therefore, an interactive digital-based teaching material using an android-based Smartphone is developed aiming to improve the students' English learning ability.[26]

Expert validation

Expert Validation. At this stage, expert validation involves language and content experts, media validation, and education practitioners. Assessment from material experts is based on a CLIL-based book assessment checklist. In this assessment, there are 4 indicators: Content, Cognition, Communication, Language, and Culture. application developed can and is feasible to be tested in the field.[16]

Technology-enhanced courses

Program design using integrated technologies as learning tools

The use of open course learning management systems like MOODLE was reported in a variety of subjects.[27]

Mode of online classes in the pandemic:

• Distance learning • Webinars is like a seminar where students from different locations can connect with their teacher through the internet, can hear the teacher, ask questions and solve their difficulties. • E-Learning: Learning through electronic devices with or without the internet at any time at any place. • Live Classes: here students and teachers can meet at a specific time through the internet lively. • Video Conferencing: face-to-face interaction via the internet through the transmission of audio and video content.[27]

Delivery of content online in the form of

• Text • Data • Audio • Animation • Video • Picture • Graphics Challenges during content delivery online: • Every single teacher and student cannot be expected to be literate digitally. • Providing comprehensive contents are also not possible all the time. • Security of data of users is important • Institutes and schools are not technically equipped. • Sometimes teachers and students are not ready to equip themselves due to a lack of motivation. • Online platforms cause distraction also.[27]

Bangladesh towards a new era of ICT

"Right to Information Act of 2009"— by A2i= aspire to innovate, the initiative is aimed to afford ICT facilities within the access of general people. Some of the key milestones of a2i are:

• Students learning from multimedia

• Content developed by teachers

• Digital talking textbooks

The main reasons detected as far, responsible for the growth of ICT are-

1. Gov't policy and awareness

2. BASIS policy and advocacy- Vat for e-commerce reduced to NIL

3. Private sector movement at the heart

The main indicators of a2i— among the 66.8 million subscribers (BTRC Sept 2016), approximately 96% are mobile users; from which 10 million are found smartphone handler.[11]

The ministry of ICT played a remarkable role in the initiative to promote careers in digital technology through awareness programs to convert ideas into realism the programs are- Digital World, ICT Expo, National Hackathon, Connecting Startup Bangladesh, etc.[11]

As an emerging economy we have fundamental gaps in infrastructure. The hubs are providing that enabling infrastructure, and providing skills training in the IT sector. The impact will be less if certain areas of the country does not have surrounding ecosystem mature enough to support viable startup, and accelerator activities. Like-universities, international tech companies, media, entrepreneurs, etc., which allows the place to build a successful tech hub.[11]

Muktopaath is an initiative of Bangladesh government where the national curriculum is directed to be operated through Zoom. The special thing about the site is that a guideline to how to operate zoom is instructed as a training program, with a self-evaluation.[24]

ICT in medical education in Bangladesh

In recent studies, 88% students were familiar to m-learning,[23,24] whereas 76% were familiar to it earlier[8].

Effectiveness of technology

Effectiveness of technology is not only gain in knowledge but also about how the students learn and interact with the tools and hence how did technology help students learn. So, we can only improve the quality of education worldwide for our students if we provide our teachers with the required skills, knowledge and experiences[16]. Effectiveness of e-learning and its needful is also measured in clinical subjects.[26]

The key factors to achieve E-learning

The major challenges and constraints in transitioning to online education include poor network, deficiency of digital skills, lack of technological support from institutions among others.[2]

Barrier to use technology

The barrier in adopting simulators and virtual reality could be entrenched in its high cost of procurement and maintenance.[27]

Challenges of use of Education Technology in India Despite early implementation of technologies in Education system, India still faces teething problem for the new technologies in education. Some of them are: • Not enough or limited access to computer hardware & computer software in education institutes • Lack of time in school schedule for projects involving use of technologies • Lack of adequate technical support for education institutes • Not enough teacher training opportunities are there • Lack of knowledge about ways to integrate technologies to enhance curriculum • Education technologies integration is not a priority • Students and Teachers do not have access to the necessary technology at home.[11]Online teaching is implemented quickly during the outbreak of COVID 19, students' anxiety needs to be relieved in various ways to ensure that they can actively and effectively engage in online learning.[16]
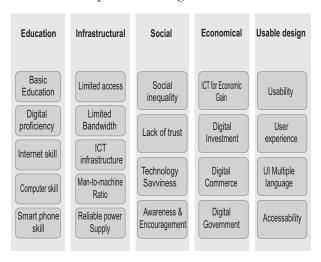
M-learning

We saw a high growth rate in ownership among households in lower economic standing (illiterate, without electricity, low and lowest wealth index), likely a result of competitive pricing and innovative service packages that improve access to mobile phones as the mobile phone market matures. In contrast, as market saturation is rapidly attained in the most privileged demographics (literate, secondary schooling, electricity, high wealth index).[3]

Ideally, instructional designers should now consider focusing on new opportunities to improve performance and augmenting skills, not just on knowledge transfer. The flexible approach proposed by our framework takes both instruction and performance support in consideration for the mobile learning task.[2]

Factors found: People with less schooling, deficient power supply, and poor economic state are fighting on the basis of their precise interest since they are frequently the lowest and the last to obtain the necessary access.[1]

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It was found that awareness about the benefits of ICT, support from government and top management along with the economic support are important factors adopting ICT in rural small-medium enterprises in Bangladesh.[1]

Education	Infrastructural	Social	Economical	Usable design
Basic Education	Limited access	Social inequality	ICT for Economic Gain	Usability
Digital proficiency	Limited Bandwidth	Lack of trust	Digital Investment	User experience
Internet skill	ICT infrastructure	Technology Savviness	Digital Commerce	UI Multiple language
Computer skill	Man-to-machine Ratio	Awareness & Encouragement	Digital Government	Accessability
Smart phone skill	Reliable power Supply			

The key factors to achieve E-learning and M-learning and some needful as for security purpose

Policies

A defined and innovative education policy is crucial for a nation at different levels, as education is at the leading point to the economy and societal progress. The new and innovative initiations can work only when the institutions will get support from government. For that it should be articulated within the framework of the national policy.[16] Studies are going on, for the need of creating digital educational models in medical sector.[8,23]

Conclusion

Learning has now become a real-life work field as technology resolve the problems in practical manner. There are numerous opportunities for research in India to guide evidence-based selection and implementation of ways to enhance using technology.[27]

Recommendation

The promotion of education equity requires efforts from various stakeholders and interventions specifically targeting disadvantaged students. The study findings recommend to work on some pressing policy, pedagogical and research implications, which are discussed in the final section. National education policy should focus on technology diffusion for equitable technological

activities and basic infrastructural developmental issues, as it is not possible only through personal interest.

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