Original Article

Assessment of Information and Communications Technology Applications (ICT) in Management Education

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Abstract - *ICT has become an integral part of the education system today, affecting the academic interactions between tutors and learners. The COVID-19 period has proven the swiftness in adaptation to virtual ICT-based learning. The usage of the internet and the web, along with the development of new communication networks, have helped to bring people from all over the world closer and together. The rapid penetration of mobile telephone services and the lowest internet cost in the country has further revolutionized communication. Mobile devices, tabs, and computers have added to ICT usage in education. The rapid developments in information and communication technology and their application in the teaching-learning process have transformed the overall academic environment. The application of new information and communication technology tools in management education for teaching and learning is examined in this study. In the last few years, management education processes and systems have progressed rapidly to fulfil the need for high-quality education.*

Keywords - *Information and Communication Technology (ICT), ICT tools, Communication channels, Management education.*

1. Introduction

The education system has progressed from the traditional approach to an ICT environment based; technology is at the forefront of this learning revolution. These days, the teaching-learning process is not restricted to the walls of classrooms. The ways that students are taught, and their learning approach have significantly changed as an outcome of ICT. The present education system requires the quick sharing of information. Today's management faculty is equipped with ICT skills and responsible for the professional application of ICT skills in its immediate academic activities. ICT is defined as "a diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information" (Ajayi, 2008). Information and communication technologies are enabling teachers to transform their teaching practices from traditional practices to a technologically driven interactive practices. The pedagogical uses of technology require the development of a complex, situated form of knowledge, namely Technological-Pedagogical-Content-Knowledge (TPCK) (Mishra and Koehler, 2006).

Faculty teaching methods and ideas influence the use of information and communication technology that positively affects a student's cognitive process and reflects in their academic achievement. Information and communication technologies are helpful tools for course instructors, to create a student-centered learning environment and can be used to support advanced teaching practices. ICT can also be used to bring out adequate changes in teaching pedagogy and interaction between faculty and students. The faculty's usage of information communication technology depends on their general teaching styles. Methods of using ICT tools and applications are interrelated with the art of teaching, pedagogical requirement, the possibility of ICT use in the course, availability or development of content and classroom management. Teachers who have the knowledge and use different types of ICT teaching and learning software can present more effectively in contrast to traditional pedagogy transmission methods. The educator's capabilities and constraints influence the integration of ICT in management education and its adaptability in the classroom environment. The effective utilization of ICTs in the teaching process requires an understanding of technology and pedagogical relationship in delivering the curriculum (Mishra and Koehler, 2006). Using ICTs in pedagogy could promote 'deep' learning and allow educators to respond better to the different needs of different learners (Lau and Sim, 2008).

The following factors have an influence on the use of ICT in academic teaching and learning.

1. ICT infrastructure of the academic institution.
2. Educators' knowledge and capabilities to use and apply the ICT infrastructure for teaching and learning.

3. Commitment of Educator to professional learning and acquisition of new ICT skills.
4. Curriculum and its pedagogical approach to learning and delivering the content to the learners.
5. Learners' abilities and their adoption of ICTs in learning the course curriculum.

2. Objectives of the Study

The purpose of this study is to discuss the uses of ICT for Teaching, Learning and Assessment (TLA) and evaluation in the field of Management education by Tutors and Students and to review the importance and limitations of ICT applications in education:-

Thus, the researchers are focussing on
1. To identify the different ICT tools used in Management education by teachers and learners.
2. Opportunities for application of ICT in Management education.
3. Limitations and constraints for adaptation to ICT tools.

3. Methodology

The study is descriptive and qualitative in nature, and the researchers have examined and reviewed existing literature in the academic dimensions of teaching, learning and assessment (TLA) with the ICT applications. For this purpose, the researchers reviewed research articles, concept papers, conference papers, books, periodicals, and internet resources.

4. Limitations of the Study

This study excludes the ICT infrastructure from hardware and other supportive devices for facilitation in the classroom and devices used for teaching, learning and assessment. The study focuses more on the ICT components from software applications and programs perspective.

4.1. ICT Tools for Management Tutors and Students

Mishra & Koehler (2008) have stated that teaching with technology is a "wicked problem" for teachers since it has incomplete, contradictory, and changing requirements. Computers allow students to develop the same competencies identified as necessary skills for the modern workplace. Students using computers demonstrate greater problem-solving and critical-thinking skills compared to students in traditional classrooms (Haddad, 2003). ICT integrates technology in teaching and learning (IITL) as the use by teachers and/ or students of digital ICTs that support the constructivist teaching and learning process (Hughes, 2013).

ICT tools can greatly enhance the teaching and learning experience for management teachers. ICT helps teachers and learners to communicate and collaborate beyond boundaries, making learners autonomous and allowing teachers to bring the whole world into classroom activities, especially the concept of online programmes (Ugwu, Kingsley 2019).

These tools can aid in various aspects of their studies, such as research, organization, collaboration, and productivity. The ICT tools can be segregated into 4Ps, and their usage sequence can be represented as under

Preparation > Presentation > Practice > Performance

4.2. Review of Commonly used ICT Skills and Tools for Management Education
4.2.1. For Classroom Interactions, Documents Creation, Maintenance, Administration, and Communication

Presentation Tools
A presentation captures the students' attention toward the topic and content being discussed in the classroom. The most common presentation software, like Microsoft PowerPoint or Google Slides, can be used to create presentations for classroom lectures. These application tools offer various multimedia features such as images, videos, and animations to enhance the learning experience.

For students, the Microsoft Office suite offering Word, Excel, PowerPoint, and Outlook are essential tools for creating documents, presentations, spreadsheets, and managing emails, respectively. Moreover, in open-source, Google Suite containing Google Docs, Sheets, Slides, and Gmail are similar to Microsoft Office Suite but with the advantage of cloud-based collaboration and storage.

Content Creation
In a blended learning approach (Bonk and Graham, 2012), the ICT role is prominent, and content is very important for an educator. The teachers working in an online environment can use many E-learning Content Creation Tools such as Articulate Storyline, Adobe Captivate, or Camtasia to help instructors create interactive multimedia content, including videos, simulations, and interactive presentations, to enhance the learning experience.

5. Learning Management Systems (LMS)

For Tutors, LMS tools provide a centralized online platform for managing course materials, assignments, discussions, and assessments. Management teachers can upload lecture slides, share resources, create online quizzes, and facilitate online discussions through these platforms. For students, LMS offers an advantage of learning at their own schedule and pace.

The students can make the best use of platforms like Moodle, Canvas, and Blackboard LMS to manage course materials, assignments, quizzes, and discussions.

5.1. Experiential Learning through Simulations
Learning is more meaningful when you get to practice or experience by application of learned content. Management educators can use Business Simulation Software to enhance critical thinking and problem-solving skills. There are simulation tools like Simul8, SimVenture

and MarketPlace, and several other paid applications designed specifically for B-Schools and open-source tools. These provide experiential learning (Kolbe, 1984) through virtual environments for students to apply management concepts and make decisions in realistic scenarios.

5.1.1. Collaborating and Networking through Social Media Platforms

Today's classroom is boundaryless; Social Media Platforms, if utilized effectively, can offer unique learning experiences. Utilizing platforms like Twitter, LinkedIn, or Facebook can help management teachers connect with professionals and industry experts globally. These platforms can be used to share relevant articles and industry updates and engage in discussions outside the classroom.

5.1.2. For Managing Research and Projects
Project Management and Planning Tools

Managing tasks, collaborated activities using project management tools help in organizing and managing projects, sharing and assigning tasks, monitoring the progress, and collaborating with team members.

Conducting Surveys

Today the, ICT tools like Google Forms and Survey Monkey have made data collection, organization, and analysis easier.

Data management, analysis and Visualization

Tools like Microsoft Excel, Tableau, IBM SPSS, or R Studio assist in data analysis, visualization, and statistical modelling. They can be used by both Tutors and students to explore business data, conduct research, and present findings in a visually appealing manner. These tools can be useful for teaching data analysis and decision-making concepts.

Reference Management

Applications like Zotero, Jabref and Mendeley assist in organizing and citing references for research papers.

5.1.3. For Online Sessions, Meetings, and Collaborative Learning
Video Conferencing Tools

Real-time online live platforms like WebEx, Microsoft Teams, Zoom, or Google Meet enable management teachers to conduct online virtual classes, seminars, or guest lectures. These audio-visual platforms enable real-time audio and video communication, screen sharing, collaboration among students and instructors regardless of their physical locations and recording options for later review.

The same tools also facilitate the students for remote communication, video conferencing, and collaboration with classmates and team members.

Online Collaboration and Document Sharing Management education requires learning how to collaborate as a team. Students can learn and collaborate in projects, seminars, and group assignments using tools like Google Docs, Microsoft OneDrive, or Dropbox. These collaboration tools facilitate collaborative work on documents, spreadsheets, and presentations. Management teachers can share files with students, provide feedback, and encourage group projects using these platforms.

5.1.4. For Assessment and Evaluation
Online Assessment and Quizzing Tools

The assessment, evaluation and tracking of the progress can be made using the platforms such as Google Forms, Quizlet, or Kahoot. They allow management teachers to create online quizzes, surveys, or interactive learning games. These tools provide immediate feedback, track student progress, and encourage self-assessment. The institutes using LMS also has provision for assessment and evaluation on a continual basis through Assignments, Attendance recording, Students projects, objective assessments etc.

ICT and Student Data Management through LMS

The application of technology in the educational system for student data management has become increasingly convenient. Faculty can now view detailed analytics of a student's academic performance, such as the number of internal tests taken, submission delays, student progress in reading, chapters completed and content accessed, and so on. Faculty can assign case presentations and internal assignments to the entire class at once, and the results can be evaluated online. This level of automation in classroom activities has allowed faculty to allocate more time to their course modules and provide more in-depth guidance.

5.2. Importance of ICT Tools in Management Education

Information and Communication Technology (ICT) plays a significant role in management education by enhancing the teaching quality, and learning experience, improving student assessment, administrative processes, and preparing students for the demands of the modern business world. ICT has the means to aid in preparing learners by developing cognitive skills, critical thinking skills, information access, evaluation and synthesizing skills (Cawthera, 2000; Castro, 2003). The key important benefits of ICTs in management education are as under:

5.2.1. Enhanced Teaching Experience and Learning Experience

Effective application of the ICT tools such as multimedia presentations, online learning platforms, virtual simulations, and educational software provides dynamic and interactive teaching and learning environments for the management tutors and students. The tutors using these tools can engage students, cater to different learning styles, and facilitate active learning, leading to a more effective learning experience.

5.2.2. Access to Global Resources and Breaking Geographical Barriers

In a globalized environment, management students are supposed to learn enriched content from a global perspective. ICT enables students and educators to access a vast pool of global resources. Through the internet, faculty and students can access scholarly articles, research papers, case studies, and industry reports from around the world. This exposure to diverse perspectives and global best practices enhances their understanding of management concepts and their ability to apply them in real-world scenarios and case analysis.

5.2.3. Collaboration and Communication for Connected Learning

Today's employees do not work in silos; they have to work in teams, and students are expected to learn how to collaborate in an office and a virtual environment as a team. ICT facilitates collaboration among students and between students and faculty. Online platforms, discussion forums, and video conferencing tools enable students to engage in group projects, share ideas, and communicate with their peers and instructors, regardless of geographical barriers. This fosters teamwork, communication skills, and the ability to work effectively in virtual teams, which is essential in today's interconnected business world. The connected learning approach supports students in boosting group activities, quizzes, group discussions and assignments to showcase their academic talents, complete their assigned projects and find a solution to an issue.

5.2.4. Real-time Data Analysis

In management education, faculty and students are engaged in many research activities and projects of significance; here, data analysis plays a vital role. ICT tools provide access to real-time data, and with the use of statistical software and data visualization tools, students analyze and interpret business data effectively. This helps them develop data-driven decision-making, forecasting, and strategic planning skills, which are critical in managerial roles.

5.2.3. Experiential Learning beyond the Classroom

Learning skills have moved outside of the classroom due to mobile devices. ICT facilitates experiential learning through virtual simulations and business games. These tools allow students to apply management concepts and theories in simulated business environments, providing a hands-on experience without the risks associated with real-world business scenarios. By experimenting with different strategies and observing the outcomes, students develop problem-solving skills and gain practical insights into management practices.

5.2.4. Convenience, Flexibility and Accessibility

ICT provides a convenient learning environment with flexibility and accessibility in management education. Online learning platforms and digital resources can be accessed anytime and anywhere, enabling students to learn at their own pace and convenience. This particularly benefits working professionals pursuing management education while balancing their professional and personal commitments. Further, students can take up courses through MOOCs offered by various universities.

5.2.5. Automation of Administrative Processes

ICT streamlines administrative processes in educational institutions, such as student registration, course scheduling, grading, and record-keeping. This automation reduces administrative burdens, saves time and resources, and allows faculty and staff to focus more on teaching and student support.

5.2.6. Technological Competencies and Skills Development

Management graduates need to be technologically proficient to thrive in the digital age. ICT integration in management education equips students with essential technology skills, including proficiency in productivity tools, data analysis software, project management tools, and digital communication platforms. These skills enhance their employability and enable them to adapt to emerging technologies in their professional careers.

5.3. Limitations of ICT Tools in Management Education

The constraints in using ICT are individual capabilities, access to resources, ease and convenience of use, incentives to adapt to change, support and collegiality at the institute, policies, and commitment of an individual to professional learning in ICT learning (Mumtaz, 2000: Becta, 2003). However, educators require extensive knowledge of ICT to be able to select the relevant, suitable resources and to understand successfully integrate the technology into their pedagogies (Cox *et al.,* 2003). A high percentage of teachers do not understand how to integrate technology into their curriculum (Townsend, 2017). There are several factors affecting the integration of ICT in teaching, and they are access to technology, technical skills, the attitude of the tutors and institutional preparedness and readiness for the availability of the technologies (Mercado, 2008)

While information and communication technology (ICT) has greatly transformed the management education field, it has its limitations. Some of the key limitations of ICT in management education include:

5.3.1. Access and ICT infrastructure at the institution

The basic infrastructure needed for ICT in hardware infrastructure is adequate computers, systems in the classroom, projectors, internet connection at the institute and classrooms, smartboards, and projection screens. ICT heavily relies on reliable internet connectivity and appropriate infrastructure. In many parts of the world, particularly in rural or underdeveloped areas, access to high-speed internet and necessary hardware may be limited, hindering the effective implementation of ICT in management education.

5.3.2. Technical Issues and Maintenance

Many institutions fail to maintain the ICT facility; ICT systems are prone to technical issues, hardware failures, software bugs, and compatibility issues. These issues can disturb the learning process, and institutions must invest in maintenance; institutes also require technical expertise and resources for troubleshooting and maintenance.

5.3.3. Financial Implications

ICT deployment and regular maintenance need adequate financial resources. The integration of ICT in management education often comes with significant costs. Establishing and maintaining ICT infrastructure, acquiring software licenses, and training faculty and staff can be expensive, making it difficult for institutions with limited budgets to leverage ICT for educational purposes fully. Many software application licenses are expensive, and institutes are compelled to add this to program fees to be borne by the students.

5.3.4. Skills Gap and Digital Divide

The effective use of ICT in management education requires both students and faculty to possess adequate digital literacy skills. There are three issues here. First, not all students and educators may have the necessary ICT proficiency—secondly, their willingness to acquire and adapt to ICT skills. Thirdly apply ICT skills in teaching and learning and non-willingness to fully utilize the available ICT tools. This digital divide can create disparities in educational outcomes and opportunities.

5.3.5. Loss of Personal Interaction

Management education involves various interpersonal skills, such as communication, teamwork, and leadership. ICT tools, such as online lectures and discussion forums, may limit face-to-face interactions and diminish the development of these critical skills, better cultivated through in-person interactions. Further, this may limit the social interactions among the students, faculty and industry, restricting their networking opportunities.

5.3.6. Quality and Credibility of Online Resources

Information is valuable, but too much information overload leads to indecisiveness. The vast amount of information available on the internet can make it difficult for learners to assess the credibility and reliability of online resources. If there is no proper guidance, students may end up using inaccurate or outdated information, leading to misinterpretation or incomplete understanding of management concepts.

5.3.7. Limited Practical Experience and Application

Some aspects of management education, such as hands-on exercises, simulations, and real-world case studies, may be challenging to replicate effectively through ICT. Practical experiences and on-the-job learning, central to managerial skills development, may be limited in online or virtual environments.

5.3.8. Limited Customization and Personalization

ICT tools in management education often follow a standardized approach to content delivery. However, students follow different learning methods, styles, preferences, and pace of learning. Customizing and personalizing education experiences to cater to individual needs can be more challenging through ICT platforms.

While ICT has revolutionized management education by expanding access to resources and enabling remote learning, these limitations should be considered to ensure a balanced and effective educational experience. Institutions and educators should strive to address these limitations to optimize the benefits of ICT in management education.

6. Conclusion

The ICT offers greater leverage for management educators providing an opportunity for an inclusive and student-centric collaborative learning platform. The business management field is versatile and diverse, requiring continuous updation of information and skills. ICT offers solutions that break traditional teaching methods and provide creative and productive solutions for learners.

Today management education is not just conventional but has become boundaryless, and learners can learn from the best educators and institutions in the world. There is no doubt that ICT based teaching-learning approach will enhance the outcome of education. However, the challenge is infrastructure at the institutional level, commitment from the teachers and learners to adapt to an ICT environment, and pedagogical structure, of course, accommodating the ICT usage. Thus, ICT provides greater opportunity for teachers and students to balance and calibrate teaching and learning as per individual needs; therefore, it is necessary to enhance the integration of ICT concepts and application in Management education. Overall, ICT plays a transformative role in management education by enriching the learning experience, fostering collaboration, developing critical skills, and preparing students to succeed in a technologically driven business environment.

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