

Application of Digital Technologies in Pedagogy: An Overview**Kriti Singh, Assistant Professor,****School of Media Studies, Jaipur National University, Jaipur, Raj.****Abstract:**

The objective of the review paper is to understand and elaborate the relationship between teaching and technology in general and digital technology in particular. The paper tries to explore the relationship between pedagogy and digital technologies, why digital technology is significant for pedagogy and what types of digital tools can be integrated in the existing teaching methodologies that can take the teacher-learner relationship to a new level. The paper commences with the human instincts of inquisitiveness and how gradually the instrument of teaching has evolved to quench the thirst of knowledge and how technology has played a crucial and mutual correlation with teaching and how the application of the digital technologies can take this relationship to the next level.

Key words:

Pedagogy, Digital Technology, Digital Game-Based Learning, Blended Learning, Social Media.

Body of Paper

“Education is evolving due to the impact of the Internet. We cannot teach our students in the same manner in which we were taught. Change is necessary to engage students not in the curriculum we are responsible for teaching, but in school. Period.” –

April Chamberlain

Inquisitiveness dimension of human being has been one of the key factors in his evolution. It is this element of curiosity, which gave birth to the idea ‘wheel’ and now it has graduated into the supersonic aircrafts, space rockets, bullet rains etc. One of the core need to understand the existing phenomena, to know the unknown has always triggered the interest of humans. In order to quench this never-ending thirst of knowledge and to retain the existing reservoir of knowledge for the coming generation, humans have designed the art of ‘teaching’. An art, which not only gives answer to the questions but also pass on the beacon of knowledge from one generation to another.

As Greek philosopher Aristotle once said, "The one exclusive sign of thorough knowledge is the power of teaching," which is one of the focal point of this paper. Teaching is an essential part of education. Its ‘special function’ is to impart knowledge, develop an understanding and impart skills.ⁱ From oral learning, to writing on leaves, to papers and today computer assisted teaching and the emergence of e-books, e-articles, online journals, virtual classrooms, online courses. Teaching has transformed itself and technology has played a very crucial and indispensable role in that transformation.

This brings us to the second aspect of this paper, which is technology. The word technology comes from two Greek words, transliterated *techne* and *logos*. *Techne* means art, skill, craft, or the way, manner, or means by which a thing is gained. *Logos* means word, the utterance by which inward thought is expressed, a saying, or an expression. So, literally, technology means words or discourse about the way things are gained.ⁱⁱ In simple terms, we can define technology as ‘the application of knowledge for practical ends.’ⁱⁱⁱ

However, to define technology is a mammoth task in itself as it keeps on changing and transforming itself with time. Even its relationship with other concepts and ideas keep on changing with these shifts thus making technology and its impact on other concept ‘dynamic’ in nature.

The classical Greek philosophers, Plato and Aristotle, reflected on the relationship between moral life and the use of tools and techniques to transform raw material into useful and artistic artifacts. They saw a connection between the training of artisans and the development of the whole person.^{iv} And if we perceive the above-mentioned idea from today’s context, we can see the relationship between ‘technology and teaching’ in ‘transforming the raw minds into useful minds’ and also crafting a paradigm shift in the way education is imparted. As we reflect upon this complex relationship between the teaching and technology, we can very well see how technology has played a crucial role in teaching.

If we just turn a few leaflets of recent history, we can see a 'technology', which emerged in late 20th century, which has transformed and redefined our lifestyles and teaching, is no exception to it. Although the genesis of this technology was for military purpose during the cold war era when the world order was bipolar in nature, nevertheless it has spread itself in every aspect of human life. The technology, which is being talked about here, is the 'Internet' which has transformed and effected all the façades of human life in general and teaching in particular.

In view of US scientist, Avram Noam Chomsky, "The internet could be a very positive step towards education, organisation and participation in a meaningful society." And the integration of Internet based technology or digital technology is not only making positive strides in the society, but is also playing a phenomenal role in transforming teaching from the old traditional ways of paper and pen to the Information and communications technology (ICT), massive open online course (MOOC), etc.

This brings us to the core of this paper, which is to bring in light various digital technologies, which are being applied in the domain of teaching. In view of Christopher Dede, Timothy E. Wirth Professor in Learning Technologies, Technology, Innovation, and Education Program, Harvard University, "When we talk about 21st century pedagogy, we have to consider many things—the objectives of education, the curriculum, how assessment strategies work, the kind of technology infrastructure involved, and how leadership and policy facilitate attaining education goals." And all this won't succeed as US politician Nancy Landon Kassebaum Baker points, "There can be infinite uses of the computer and of new age technology, but if teachers themselves are not able to bring it into the classroom and make it work, then it fails."

As the World Wide Web has spread in all corners of the world and its impact can be felt in all dimensions of life, the domain of teaching is no exception to it. Teaching has become far more challenging job than before. Writing on the recent trends in education, Mary Beth Hertz, Technology Teacher in Philadelphia writes, "Today's educator can no longer expect to know more than his or her students. Rather than trying to stay ahead of their students with the content they teach, they should be staying ahead of their students in guiding them through the process of navigating and accessing content. If teachers are still trying to deliver content to their students the way teachers have historically, then they will easily burn out and feel overwhelmed."^v

Digital technology in simple term is "the branch of scientific or engineering knowledge that deals with the creation and practical use of digital or computerized devices, methods, systems, etc."^{vi} Digital describes electronic technology that generates, stores, and processes data in terms of two states: positive and non-positive. Positive is expressed or represented by the number 1 and non-positive by the number 0. Thus, data transmitted or stored with digital technology are expressed as a string of 0's and 1's. Each of these state digits is referred to as a bit (and a string of bits that a computer can address individually as a group is a byte).^{vii}

Use of digital technology in pedagogy:

Technology can have a reciprocal relationship with teaching. The emergence of new technologies pushes educators to understanding and leveraging these technologies for classroom use; at the same time, the on-the-ground implementation of these technologies in the classroom can (and does) directly impact how these technologies continue to take shape.^{viii} In view of Drew Buddie, Senior Vice Chair at NAACE, the association for the UK's education technology community, "The use of mobile digital technologies in the classroom might be largely unfamiliar to parents, but the benefits can be huge....it's not about just shifting traditional lessons onto screens - it's about allowing pupils to make use of their devices to truly enhance their learning while giving teachers better ways to track individual achievement and personalise lessons."

In present scenario the integration of digital technologies is getting more and more evident. Every day, many students are spend countless hours immersed in popular technologies—such as Facebook or MySpace, World of Warcraft, or Sim City—which at first glance may seem like a waste of time, and brain cells. But these genres of technologies—Social Networking, Digital Gaming, and Simulations—deserve a second, deeper, look at what's actually going on.^{ix} Taking advantage of these interests, the pedagogy has been integrating following popular tools of digital technology, which is taking the in teacher-learner relationship to a new level. Although there are many, but this paper confines itself to three popular digital technologies:

- **Digital game-based learning:**

Digital game can be defined as any game on a console, handheld device, smartphone, or computer, including browser games. It includes different genres and types, including simulation, augmented reality, and alternate reality games.^x From analytical perspective, we can define digital game cultures as an aspect of the current media culture with increasing significance, whose primary resources of meaning are manifested in digital games that are mostly mediated or provided through technical communication media such as handheld or consoles.^{xi}

Game based learning (GBL) is a type of game play that has defined learning outcomes. It is designed to balance the subject matter with gameplay and the ability of the player to retain and apply said subject matter to the real world. It describes an approach to teaching, where students explore relevant aspects of games in a learning context designed by teachers. Teachers and students collaborate in order to add depth and perspective to the experience of playing the game.^{xii}

There are different types of games like: edutainment, serious games, and massive multiplayer online (MMO) games. Some examples are: Algebra Arcade (Maths), GPS Treasure Hunt (Science), Ghosts of a Chance (Social Studies), Titanium Chef (Health and Career Education/Social Responsibility) etc.^{xiii}

- **Blended learning:** With the arrival of digital and Internet technology, blended learning has gained prominence in the last two decades or so. However, as Internet technology is dynamic in nature, its effect can be experienced in defining the term 'blended learning'. As the name suggests, blended learning is the blend of online and the traditional methods of learning and development. It is considered as the most logical and natural evolution of the learning agenda. It suggests as elegant solution to the challenges of tailoring learning and development to the needs of the individual. It represents an opportunity to integrate the innovative and technological advances offered by online learning with the interaction and participation offered in the best of traditional learning.^{xiv} However, like many other Internet buzzwords around this time (e.g., new economy, e-learning), its precise connotations have changed and subsequently converged and stabilized. From 2006 to the present, blended learning has been understood as a combination of face-to-face and technology-mediated instructional forms and practices.^{xv}

Clayton Christensen Institute (California, USA) defines 'blended learning' as a formal education program in which a student learns:^{xvi}

- (1) at least in part through online learning, with some element of student control over time, place, path, and/or pace;
- (2) at least in part in a supervised brick-and-mortar location^{xvii} away from home;
- (3) and the modalities along each student's learning path within a course or subject are connected to provide an integrated learning experience.

Blended learning has emerged as a new and successful model for pedagogy. It provides students and learners a unique way to pursue their educational dreams. The majority of blended-learning programs resemble one of four models: Rotation, Flex, A La Carte, and Enriched Virtual. The Rotation model includes four sub-models: Station Rotation, Lab Rotation, Flipped Classroom, and Individual Rotation.^{xviii}

- **Social Media platforms:** Communication technology has been revolutionized by the digital technology and its effect can be seen by the arrival of social media platforms. In simple terms social media is the collective of online communications channels dedicated to community-based input, interaction, content sharing and collaboration. Websites and applications dedicated to forums, microblogging, social networking, social bookmarking, social curation, and wikis are among the different types of social media.^{xix}

Some of the popular social media applications are Facebook, Twitter, Instagram, LinkedIn, Tumblr, Flickr etc. The students find these social media applications very fascinating and can provide teachers as a thought-provoking instrument of pedagogy. Students use social media to seek out, collaborate, and obtain information from their classmates and academic peers. Even if students are not currently interacting with the library using social media, they are open to doing so. Social media sites also have uses for organising research and sharing it with others. Enabling and fostering that use is an ideal role for libraries. However, social media is not considered an appropriate information source for research.^{xx}

Given the interest of the students in social media, the teachers can take advantage of this medium and can engage students. There is also immense potential in these social media to be used as a tool for

academic growth of the students. Online communities mushrooming in these social media platforms can be optimized for academic purpose. High-speed Internet connection, economical smart phones, laptops and tablets, adaptive and free software have given a boost to the social media sector. Social media platforms can be used by teachers in sharing ideas, knowledge, engaging students in debates, providing motivation and inspiration to students, continuous thought-provoking viewpoints and thoughts, instant recognition of students achievement, encourage fruitful group online discussions, instant connection to accomplished name in related field, etc.

To conclude, there is no iota of doubt that digital technologies are here to stay, evolve, flourish and revolutionize the teaching process. Its impact is already being felt in many sections of pedagogy. These technologies are compressing the elements of space and time and blurring the boundaries. They are changing the way we teach and learn. Digital pedagogies move beyond using ICT for efficiency, motivation and effectiveness, to adding value to society and the economy by enabling the creation, distribution, sharing and application of knowledge to complex problems encountered in real world situations of work and life.^{xxi} New digital technologies are empowering students to become researcher, storytellers, historians, oral historians, and cultural theorist in their own right. Whether constructing their own life stories or interpreting the life stories of others, the digital format transforms student's capacity to synthesise, interpret, theories and create new cultural and historical knowledge. In this way, digital formats potentially democratise learning and produce critical subjects and authors.^{xxii} However, this democratisation will not reach its ultimate aim until it answers the challenges of the digital divide, computer illiteracy, lack of connectivity, illiteracy, etc. Nevertheless, the pedagogy has to adapt itself with the changing scenario triggered by digital technology and as per students' needs and aspiration and keep pace with the changing times. And in this digital skill equipped teacher will play an important role. Because, as Bill gates once said, "Technology is just a tool. In terms of getting the kids working together and motivating them, the teacher is the most important." And an efficient teacher who keeps himself/herself in pace with contemporary changes is always an agent of change.

References:

ⁱPathak, R. (2012). Teaching and Microteaching. In *Teaching Skills* (p.1). 2012, New Delhi: Pearson Education India.

ⁱⁱ Definitions of Technology. (n.d.). Retrieved January 16, 2016, from <http://web.engr.oregonstate.edu/~funkk/Technology/technology.html>

ⁱⁱⁱ Technology. (n.d.) *American Heritage® Dictionary of the English Language, Fifth Edition*. (2011). Retrieved January 17 2016 from <http://www.thefreedictionary.com/technology>

^{iv}Drengson, A. (1995). Definition and Example of technology practise. In *The Practice of Technology: Exploring Technology, Ecophilosophy, and Spiritual Disciplines for Vital Links* (p. 30). Albany: State University of new York Press.

^vHertz, M. (2013, March 13). How Teachers Use Technology: The Latest Research. Retrieved January 16, 2015, from <http://www.edutopia.org/blog/how-teachers-use-technology-mary-beth-hertz>

^{vi} Digital-technology. (n.d.). Dictionary.com Unabridged. Retrieved January 17, 2016 from Dictionary.com website <http://dictionary.reference.com/browse/digital-technology>

^{vii}Rouse, M. (2005). Digital. Retrieved January 18, 2016, from <http://whatis.techtarget.com/definition/digital>

^{viii}Klopfer, E., Osterweil, S., Groff, J., & Haas, J. (2009). Using the Technology of Today, in the Classroom Today. Retrieved January 17, 2016, from http://education.mit.edu/wp-content/uploads/2015/01/GamesSimsSocNets_EdArcade.pdf

^{ix}Klopfer, E., Osterweil, S., Groff, J., & Haas, J. (2009). Using the Technology of Today, in the Classroom Today. Retrieved January 17, 2016, from http://education.mit.edu/wp-content/uploads/2015/01/GamesSimsSocNets_EdArcade.pdf

^x Rapini, S. (n.d.). What is a Digital Game? Retrieved January 13, 2017, from <http://gamingforeducation.weebly.com/defining-a-game.html>

^{xi}Wimmer, J. (2012). Digital Game Cultures (s) as Prototypes(s) of Mediatization and Commercialisation of Society: The World Cyber. In *Computer Games and New Media Cultures: A Handbook of Digital Games Studies* (p. 33). London: Springer Science & Business Media.

^{xii} What is GBL (Game-Based Learning)? (2013, April 23). Retrieved January 18, 2016, from <http://edtechreview.in/dictionary/298-what-is-game-based-learning>

^{xiii}Examples of Digital Game-Based Learning. (2015). Retrieved January 12, 2016, from [https://techtrends-gamebasedlearning.wikispaces.com/Examples of Games](https://techtrends-gamebasedlearning.wikispaces.com/Examples+of+Games)

^{xiv}Thome, K. (2003). Blended Learning: How to Integrate Online & Traditional Learning. In *Introduction* (p. 2). London: Kogan Page.

^{xv}Friesen, N. (2012, August 1). Report: Defining Blended Learning. Retrieved January 17, 2016, from http://learningspaces.org/papers/Defining_Blended_Learning_NF.pdf

^{xvi} Definitions and Models of Blended learning. (2015). Retrieved January 17, 2016, from <http://www.christenseninstitute.org/blended-learning-definitions-and-models/>

^{xvii} Bricks and mortar refers to businesses that have physical (rather than virtual or online) presences . (Tech Target)

^{xviii} Definitions and Models of Blended learning. (2015). Retrieved January 17, 2016, from <http://www.christenseninstitute.org/blended-learning-definitions-and-models/>

^{xix} Rouse, M. (2015, May 1). Definition: Social Media. Retrieved January 19, 2016, from <http://whatis.techtarget.com/definition/social-media>

^{xx} McGough, B. L., & Salomon, D.. (2014). Engaging Students Through Social Media. In B. R. Bernhardt, L. H. Hinds, & K. P. Strauch (Eds.), *Too Much is Not Enough: Charleston Conference Proceedings, 2013* (pp. 283–286). Purdue University Press. Retrieved from <http://www.jstor.org/stable/j.ctt6wq772.51>

^{xxi} UNESCO. (2008). UNESCO's ICT Competency Standards for Teachers, Towards ICT skills for teachers. Retrieved January 28, 2016 from <http://cst.unesco-ci.org/sites/projects/cst/default.aspx>

^{xxii}Weis, T. M., Benmayor, R., O'Leary, C., & Eynon, B.. (2002). Digital Technologies and Pedagogies. *Social Justice*, 29(4 (90)), 153–167. Retrieved from <http://www.jstor.org/stable/29768155>