Hypertext, Interactivity and AI:Paradigm Shifts in the Mode of E-Learning

Dr. Durgesh Tripathi, Assistant Professor, University School of Mass Communication, G.G.S. Indraprastha University ,New Delhi.
Mr. Namit Vikram Singh, Assistant Professor, Vivekananda Institute of Professional Studies, New Delhi

Abstract

Changing technologies have evolved the mode of interaction of people through a compression of time and space. In this very process of change, the nature of engagement of the people has become more and more personalized, interactive and instantaneous. From the Egyptian times of the use of Papyrus to the modern digital technologies, media tools have provided a far greater scope in the access of information and creation of knowledge. In the case of digital media, the process of learning has become highly dynamic with the rising levels of interactivity and the utilization of hypertext which has led to a process of digital convergence. Now with the integration of AI, e-learning is expected to achieve a different mantel in terms of engagement. The paper primarily focuses on highlighting the transformational trends that have taken place in respect to e-learning platforms from the use of hypertext to increasing the mode of interactivity and finally the integration of AI for a more personalized form of learning. The paper further illuminates upon the future scope of e-learning platforms and how the integration of AI can be seen as a transformational shift in the mode of engagement in various e-learning platforms.

Keywords: Text, Hyper-Text, Digital Convergence, E-Learning, Artificial Intelligence, Interactivity, Instantaneity.

Introduction

The process of learning be it in India or across the globe was initially confined to few hands from which a process of trickle down has commenced for other sections of the society. Knowledge building and sharing especially in terms of education was seen as a luxury as it could only be accessed by a particular class having an enormous socio-economic capital within the society. In the case of Europe, the nobles and the ruling elites were fortunate to have access to education and knowledge. Similarly in the case of India, the Indian princes and the aristocrats were the ones who were first to acquire education and knowledge about their history, politics, economics and the overall process of governing the state. This provided them an upper hand in terms of actively participating in the formation of rational arguments and decoding of related information to control and regulate their empire. Even in the case of Egypt, the use of Papyrus as a tool for information dissemination was largely controlled by those who had access to vast knowledge. It was a communicating tool used to share information concerning the ruling classes to the military tactics and other forms of classified information. However, this trend began to alter with time as the technology did not remain

static, rather it transformed dynamically and along with it many other social and cultural factors too evolved within society.

The advent of Guttenberg Press (1440-50) was a major technological transformation in terms of massification of information. The printing of the Holy Bible in 1452 and its replication helped in breaking the barriers of superficiality about Christianity as a religion. Earlier due to the access to Holy Bible being restricted to few hands, the population was largely dependent upon the holy priests for the interpretation which to a greater extent depended upon the social and cultural mind-set of these information disseminators. For the first time it was observed that a homogenous form of the information was being received by the heterogeneous population which could develop its own rational understanding in a transparent manner.

Similarly in many other societies, technology played a pivotal role in terms of empowering the citizens about the idea of rationality by making the access to information and education inclusive from exclusive. Mass media, in that context, was seen as a positive development especially in terms of educating the masses about different forms of information. The most contemporary and the prominent form of mass media has been new media.

India as a country has been blessed with a rich cultural diversity where rationality has been multifarious. However, the shaping of rationality within the society has undergone different stages of struggle especially in terms of access to education. Even in the contemporary India, we are still facing the problem of accessibility to education because of which the literacy rate in India is still comparably low (75% as of 2011) as per the global standards. However, the remarkable aspect worth noticing in India is the youth literacy rate which is close to 87% (2011). This is, to an extent, possible because of youth's access to new media through which they can educate themselves through different data-banks and other sources. It is important to highlight the fact that mere technological advancement was not sufficient enough for overall development. Accessibility too has a crucial role to play. In the case of India despite the issues of digital-divide and digital inequality, the percentage of access to new media technologies by the youth clearly indicates that they are in much better position to acquire and process different kinds of information concerning their social surrounding.

The most noticeable feature of new media is the integration of hypertext which is now being complemented with artificial intelligence. Hypertext is a form of visual-representation of language which is completely dynamic and fluid. It possesses the capability to integrate both visual and audio with the text thereby, making the access to information possible for different strata of the public. With the integration of AI, the process of communication is not only becoming highly personalized but also inter-personal through which exact specific informational requirements of the public can be met easily. There is a more human-centric approach in the virtual space regarding information development and its interactivity.

The use of new media as a platform for e-learning has been a very innovative step in the field of education as it has provided the possibility to reach out to various cultural communities

which have their own distinct wants regarding education and in that context the information can be moulded as per the required cultural characteristic be it language, understanding and even engagement. This space for knowledge generation is being complemented with different forms of closely related visual and audio data which provides the audience a far more simplified understanding of complex processes of the society. Along with that, the integration of AI further amplifies the scope for feedback which is more human-like and creates the desire to revisit the platform due to its personalized and far more dynamic interaction.

Interactive Learning and Hypertext

When it comes to learning in the 21st century India, the telecommunication boom post globalization has brought about a tremendous change in the forms of learning and teaching pedagogy. The coming of new communication technologies such as the internet and smartphones, have greatly enhanced the mode of accessibility of information for the people. Apart from that, the shift from Web 1.0 to Web 2.0 and its later evolved platforms have made a considerable change in the means of interactivity and instantaneity of information.

Hypertext in this context, utilized within webpages, have a considerable role to play. Hypertext can be understood as a form of text which utilizes hyperlinks within the text and other static graphics to make the interaction with the user fluid and dynamic. It helps in creating a chain of information which is linked with each other so as to provide a broader perspective to the user. There is a non-linear form of interaction where the users can control the extent to which they would like to be exposed to the information. The moment of saturation or information overload for the user can result in him/her stopping the further consumption of such information chains. The advantage of such a process is that information unlike in the text-books is no longer static. It can be easily bridged with other potential sources thereby, making the overall understanding of the topic far more holistic in comparison with the conventional forms of learning. There is a shift from the teacher-centric mode of learning to a more personalized form of student-centric form of learning.

We are now in a stage of information development where not only information creators have a pivotal role to play but the information designers too have a significant role in terms of designing the learning platform in a manner which makes the overall process of understanding highly simplified and engaging. At the same time, the designers of information also have a critical role to play in terms of connecting the right kind of information nodes which can help in developing a constructive network of information for the users. For instance, platforms such as “moocs.org”, “IIMBx MOOCs”, etc., are some of the examples where not only the development of content but also the design has a significant role to play to ensure long term student engagement on such platforms.

Although the nature of information display in such spaces appear hierarchical but in reality they are completely multi-path and web like where the hierarchical structure is dynamic and fluid in terms of operation. For instance, a page on the internet may showcase a set of information which from a hierarchical point of view will be placed first, but the content is

integrated and sub-integrated with each other like a complex web of networks connected with multiple nodes of information sources. All this is governed by the hypertext through the use of hyperlinks.

Apart from that, another important aspect through which hypertext helps in the overall mode of interactive learning is that each piece of information is completely independent from its source. That is unlike in a book where the piece of information is bound within the physical space, the information within the digital space is entirely free from its source. It can be extracted and shaped to form a newer piece of information with multiple other sources which can help in verifying multi-dimensional processes of the society. Another important aspect of hypertext as indicated by Patterson (2000) is that, "Hypertext gives permission to the readers to insert themselves into the meaning construction process and write a text in a way that is often different from the way the author foresaw". Hypertext enables greater recall ability due to the visuals associated with the text. The idea of memory and imagination becomes far more specific to the context. This in comparison with the text in books fades after a point of time as it is entirely dependent upon imagination which is constantly evolving due to changing interpretation and social settings. For instance, if we examine the online version of Britannica encyclopaedia and open a section of information concerned about the history of Paris. Then the information provided to us will be both in the form of textual and visual history where the exact images included within the text can help in recalling the brief glimpses of the history. Apart from that, the visual information also complements in the ways of providing a more personalized experience about the subject under study as the visual information allows the user to virtually visit the key places which otherwise through text would provide a different interpretation.

In addition to that, the flow of information via hypertext is a form of narrative where the author or creator of information is playing the role of a choreographer, deciding upon which piece of information to be presented and that too in what sequence (Patterson, 2000). The reader here is also being empowered to share feedback which is instantaneous. The information on the basis of feedback can be instantly verified, cross-checked and further modified to suit the cultural needs of different audiences. As a result, it leads to a far greater engagement on the virtual space in comparison with the physical which can be very consuming due to the inter-personal interaction with a larger number of target audiences.

For instance, taking the case of different e-learning platforms such as "eduuncle.com", "studynation360.com", "zigya.com", "swayam.com" and "shiksha.com, etc., there is a degree of multi-linearity and multi-vocality associated with the platform along with interactivity through hypertext. As a result, the nature of engagement is entirely different and constantly in the process of advancement which makes the platform engaging for the users in the case of e-learning.

In the case of India, different open educational resources (OER) are entirely dependent upon hypertext as it is providing such platforms a means to gamify the learning experience for a dynamic engagement and promoting a mode of adaptive learning where IT tools are getting

shaped to become interactive teaching devices. The current trends are now gradually moving towards the incorporation of artificial intelligence for further enhancement of e-learning on new media platforms.

Interactive Learning and Artificial Intelligence

E-learning post the development in information and communication technologies is argued to be one of the best learning methods due to its capabilities for allowing greater retention of information for the user (Anderson, 2018). E-learning has helped in breaking the geographical boundaries for knowledge transfer and accessibility for people of different ethnicities at any given point of time.

Artificial intelligence within the domain of e-learning can be seen as an independent entity which is being governed entirely by the flow of information and focuses on creation of a human like interaction where the machine is behaving and operating exactly as a human. Machine learning, in this context, is an application that provides the ability to learn and improve from the experience automatically without the need for explicit programming.

Artificial intelligence allows the machines to learn from its own data and take appropriate action without the need for human control or any kind of coding algorithm. Machine learning here is seen as the subset of artificial intelligence. It gradually shapes into AI. The advantage of artificial intelligence integrated with different e-learning platforms is that it enables a far better bridging of data networks due to AI being far more responsive and easy to adapt with the changing threads of data. AI is also providing the scope for far better optimization of the learning programme and its structures on the basis of the meta-data. Even the delivery of the e-learning programme can be better optimized for the users through AI. However, the most pivotal aspects of AI integration in e-learning are:

a) The degree of personalization which can help in fulfilling the educational needs of students of various social and cultural backgrounds.

b) The nature of engagement of the programme can be easily altered on the basis of progress of the student to the difficulties and challenges in understanding of the programme.

c) AI can help in deciding if the programme requires further bridging of the data networks which can help in enhancing the scope of knowledge retention and its practical implications.

d) Lastly, AI can help in playing the role of a human assist who can actively clear any related queries of the students regarding the e-learning programme.

Another important aspect of AI which is argued to benefit the e-learning platforms is the aspect of emotion. In terms of emotion of the respective users, most of the e-learning platforms are not better adjusted to understand the emotional process that the student or the user is going through during the course of the e-learning programme. Despite the fact hypertext is being extensively used, but the degree of response towards the student's attempt or the failure is approached in a more static and rigid manner. This form of approach may not be suitable in every situation. As a result, a human intervention in such process may be

required. However, it may become quite overloading to engage with each and every student at an individual level in the digital spaces. As a result, AI can help in terms of interpreting the feedback of the user in order to understand his/her emotional status and respond back accordingly and at times provide some degree of console and counselling to the user during his/her emotional experience in the course of the programme.

In terms of the pedagogical engagement, it is important to understand that there are different modes of engagement on the basis of which the AI selects its nature of action. For instance, under the expert model, the AI will compare the user's acquired knowledge with the expert knowledge to understand the areas where the user is lagging behind or is unable to comprehend (Sadakthulla, 2014). The learner model allows the AI to evaluate the user's performance to determine the level of knowledge, perceptual abilities and the learning skills. Under the interface model, the AI can provide a wide range of options through which the user can decide how he/she would like to engage with the e-learning programme. Lastly, the instructional model will help the AI in providing any form of assistance to the user in the form of instructions if need be (Sadakthulla, 2014).

However, the most important aspect of AI in terms of e-learning platforms is the scope for greater interoperability on different platforms and medium. AI can help in easily calibrating the digital space for effective functioning of the e-learning programme on various tools such as smartphones, tablets, notepads etc. AI can also be seen to play a far greater role in the process of gamification of learning and augmented realities where the both the nature of engagement is becoming highly dynamic and there is a blurring of boundary between the physical and virtual reality. The mode of learning can be gamified and the degree of challenge can be easily assessed by the AI on the basis of the performance level of the users.

However, despite the possibilities the principle challenge that remains is the fact that AI is still in its infancy stage. It has not transcended from "Narrow AI" to "General AI" which is far more responsive to data. Another key challenge that comes about is the issue of overload. The calibration of the AI has to be done in a manner that it is easily able to identify the stage of overload for the user. Since the data is being largely shared in the form of hypertext, the information does not have a concrete end. It can be extended like a web of network with countless number of nodes. What is pivotal is the need for human like intervention to assess the situation of overload. Lastly, AI also has to be sensitive towards the idea of inter-disciplinary approach. In inter-disciplinary form of learning and engagement the different degrees of information should converge and help in developing an understanding about its correlation. A situation of information overlap may create issues in terms of formulation of knowledge for the user. Static definitions explaining each and every concept have to be interlinked in order to have a multi-disciplinary understanding about the social phenomena and AI needs to assess the different ways through which such forms of connection can be built without compromising on the understanding and engagement of the students.

Conclusion

The process of learning within the society has evolved with the evolution of technology. Information is gradually moving away from the domain of exclusivity to inclusivity. Apart from that, there is a degree of convergence in the nature of information as each form is overlapping the other at some stage. Knowledge generation and its sharing has become a lot more fluid with the incorporation of new media. The gradual shift towards the utilization of AI can be seen as another important step in the field of learning through digital technologies. However, the platforms are still not dynamic in absolute. The mode of engagement is static to some degree which makes the scope for interactivity a challenging process especially when the nature of information is highly complex. There are elements of human-centric approach which are missing that can ensure the levels of engagement for the student on such platforms remain consistent and sound in the long-run. As a result, despite the easy availability of information, there emerges a challenge as how to keep the audience glued to the particular piece of information for a given time.

Reference

- Anderson, K.(2018). How will ai and machine learning revolutionize e-learning?. Retrieved from
- https://www.zeolearn.com/magazine/how-will-ai-and-machine-learning-revolutionize-e-learning.
- Davey,N., Jefferies,A., Sun,Y. andWakelam,E.(2015). The potential for using artificial intelligence techniques to improve e-learning systems.
- Retrieved from https://uhra.herts.ac.uk/bitstream/handle/2299/16546/907215.pdf?sequence=2
- Farkas, D.K. (2004). Hypertext and hypermedia. Retrieved from http://faculty.washington.edu/farkas/HCDE510-Fall2012/Farkas-HypertextHypermedia-WGraphics.pdf
- Harouni, H.A., Hachem,E. and Ziti, C.(2017). Artificial intelligence in e-learning. Retrieved from https://www.researchgate.net/publication/309718409_Artificial_intelligence_in_e-learning
- Lal, M., Rana, H. and Rajiv. (2014). E-learning: Issues and challenges. Retrieved from https://www.researchgate.net/publication/272863519_E-learning_Issues_and_Challenges
- National strategy for artificial intelligence (2018). Retrieved from http://niti.gov.in/writereaddata/files/document_publication/NationalStrategy-for-AI-Discussion-Paper.pdf
- Patterson,N.(2000). Hypertext and the changing roles of readers. Retrieved from http://homepages.gac.edu/~mkoomen/edu241/hypertext.pdf
- Potode, A. and Manjare, P. (2015). E-learning using artificial intelligence. Retrieved from http://www.researchpublish.com/download.php?file=E-Learning%20Using%20Artificial%20Intelligence-1034.pdf&act=book

- Sadakthulla, P.K. (2014). Artificial intelligence in e-learning using pedagogical software agents. Retrieved from https://pdfs.semanticscholar.org/84ce/7c77f7064ce32d3ed43d876d761d468f39df.pdf.
- Vivekananda, M. and Ruvn, S.(2017). Emerging trends of e-learning in India. Retrieved from https://www.researchgate.net/publication/325010202_EMERGING_TRENDS_OF_E-LEARNING_IN_INDIA

Web References

- http://download.nos.org/srsec335new/ch5.pdf
- http://www.slideshare.net/guest1f06ee/devika-ias
- http://hbswk.hbs.edu/archive/2738.html (Gilbert, C. 2002. "Newspapers Lose Web War: Interview with Prof. Clark Gilbert.")
- http://library.thinkquest.org (The newspaper: the process behind the presentation and the newspaper history)
- http://www.iamai.in (Internet and Mobile Association of India)
- http://rni.nic.in (Registrar of Newspapers for India)
- http://www.internetlivestats.com