Enriching the Quality of Education Through Implementation of Generative Artificial Intelligence

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Abstract

The significant impact of generative artificial intelligence in the education sector has been observed due to improved and enhanced educational processes. The phenomenon of global learning has occurred, the personalization of learning and the creation of intelligent content and effective educational management influence the quality of education. The fundamental role has been played by the implementation of technological advancements that alter the teaching-learning processes, learning is not only a product but a continuous process that is beyond knowledge acquisition and emerging generative artificial intelligence technologies influence the education field that fosters learning improvements. Generative artificial intelligence has the potential to transform existing higher education practices by improving the learning of students and enriching the experience of academicians. The utilization of machine and deep learning and the usage of ChatGPT developed by OpenAI is a remarkable tool that delivers individualized recommendations to participants and increases the collaboration and communication that improve the learning of students. This research effort has explained the phenomenon of education quality that can be improved through the utilization of generative AI tools. The study also incorporated the opportunities, challenges, barriers, and priorities to integrate the generative AI tools with educational activities. This research suggested conducting the study on empirical evidence of the role of generative AI tools and educational quality. The research questions have been raised that may be answered in future research as the current study is limited in several ways. The study provides the basis for decision-making related to the adoption and implementation of generative AI tools for educational purposes to increase performance-related outcomes.

Keywords: Artificial Intelligence, Machine Learning, Deep Learning, Educational Quality

Introduction

The education sector plays a pivotal role in economic and social development that also contributes to the generation of human capital. The higher education sector has an impact on all aspects of life that are determined through education policies, decisions, and information related to pedagogical approaches that contribute to human capital development to fulfill the needs in professional life and society. The education sector has faced several challenges and come across several issues due to a rapidly changing and demanding environment. Numerous educational practices have emerged so far that have altered traditional practices. The futuristic approach of the young generation has taken the education sector to a new stage of involvement of technologies and utilization of artificial intelligence for sustainable education that continuously contributes to social and human capital development growth (Porto, 2021).

Today the rapidly changing environment and the advancement of the technological era the underlying models and training are playing an essential role in the development of the teaching and learning process of educational technologies and have shown sustainable innovative growth in the sector of higher education (Okoye et al., 2021). Many higher education institutions are trying to implement digital technologies in their teaching and learning practices including educational programs to enhance the performance of the organization. Similarly, the previous research claimed that digital technologies are one of the essential tools that teachers and higher education institutions apply to improve learning and teaching practices and develop and transform both faculties and the student's productivity, learning experiences, and engagement (Barton & Dexter, 2020). In the higher education domain, digital technologies have a positive impact on a large scale by consistently providing access to learning platforms and offering equal learning opportunities for all by enhancing the long-term learning benefits (Sanchez & Alemán, 2011). With the advancement of the technological era and the age of the generation of the twenty-first century, the wave of digital technologies involved at a large scale in all aspects of life and plays an integral role in all sectors (Boninger et al., 2019; Boninger et al., 2020; Cuban, 2021).

The adoption and implementation of the technologies and practices of the pedagogical changes and transformation rate are very slow. The higher education institutions must consider the technological importance and the challenges that are facing due to the emerging of the new digital technologies in learning and teaching (Tatnall, 2020;Smith et al., 2021). Smith et al., (2021) Extend over the different process and tools that facilitate the learning activities these tools include virtual reality, augmented reality, flipped class rooms, learning management system, class rooms and as well as learning platform such as serious learning games, mobile learning that enhance the performance and productivity of the higher education institutions.

Education is one of the most important components to playing an integral role in the development of the country. During the pandemic situation of COVID-19 virus the schools, colleges, universities and all institutions are shifted to the online learning platforms, e-learning platforms to deliver the education in this difficult situation of the economic times. E learning is defined as a learning that is transfer via the use of digital media, it is called virtual or online learning in other contexts. Sharing information, deliver lectures, reading learning materials, webinars and paper presentations, via internet through emails it is only possible due to online learning platforms. Information technology plays a significant role in higher education sector, through the information communication technology education provided through e learning tools in the form of PowerPoint, PDF, Word documents. Students access the learning material on online platform and teachers conduct their lectures in the pandemic situation by using online applications such as WeChat, Zoom, Voov, Google meet, Cloud meeting and many others due to the technological advancement it is very easy to improve the learning activities easy to operate (Bajaj & Sharma, 2018).

Artificial Intelligence has gained the attention of the many researchers due to its significant role in the education sectors. By using the artificial intelligence completely replace the human activities and various tasks performs by machine learning, various IT firms Facebook, Amazon, Google and Microsoft incorporated machine learning activities (Alava et al., 2017). AI has the ability to perform various tasks generally align with the intelligent beings, aligned technologies are divided into different branches such as machine learning, big data, computer vision and natural language processing (Sing et al., 2022; Chiu et al., 2021). Consistent growth and implementation of the AI transforming the way to interact and communicate with the people, the way of living, learning and working environment (Pedro et al., 2019; Chiu et al., 2021). AI in the higher education sector introduce the different applications of AI technologies like chat boats, robots, intelligent tutoring and the automated assessment tools of digitalization to promote the education activities. AI in education has the ability to develop the learning, teaching assessment and educational administration by offering the students to adapt the learning, fostering the teaching skills to understand the students learning process and provide anywhere anytime facility to learn through the machine learning and immediate feedback (Sing et al., 2022; Chiu, 2021). In United State the resources and fund are provide to incorporate the AI applications to the institutions and the organizations to enhance the productivity (Boninger et al., 2020; Williamson & Eynon, 2020). Jacobs Foundation has awarded 2million of the university of Oulu to establish a global research center of AI for youngers will prepare to the learners for age of the artificial intelligence and it promote the learning activities and performance of the students (Kuhl et al., 2019). Continuous development and formation of the AI technologies and implementation of the related

policies, AI in education has gain the attention to the research area by setting out future of learning and its positive impact on all sectors of learning, teaching and administration (González-Calatayud et al., 2021).

Literature Review

The ability to perform various human intellectual and cogitative tasks on a computer refers artificial intelligence by John McCarthy in 1955. These tasks are involved reasoning, learning, problem solving and communicating (Koper & Tattersall, 2004). The artificial creation of a human mind that can easily understand the natural language, recognize the situation, plan and learn refers to the intelligence in a general term. Computer system theory and development have the ability to incorporate the human intelligence skills such as, choice, the translation of the language, the recognition of the voice and visual perception. Information Technology organization are trying to take such initiative that implement the equipment's related functions that react like a human being. John McCarthy described AI is a scientific and technological knowledge for the creation of the intelligent computer related programmers (González-Calatayud et al., 2021). The most widely used of AI techniques are machine learning and deep learning. Industries, persons, and government are use AI related entities to predict the data on this base. Machine learning techniques are developed for the complexity and unpredictable information in the food sector (Aleem & Gore, 2020). The artificial intelligence assists the organizations in adoption of machine learning that support various activities of the firms, the organizations strive to adopt the latest technological equipment to support the business operations and engage the external stakeholders for accomplishment of the goals. Machine learning technique enabled the computer to create the models for test the in order to help the automated decision making based on the data (Hicham et al., 2020). The educational data enabled the students to the effective learning and it provides the information that promote the educational performance of the students4. Recently machine learning application are used in educational purpose to solved the complex situations, the machine learning tools follow the instructions through computer-based processes research modeling and divided into two different tools supervised learning and unattended learning (Rao et al., 2018). The latest technological advancements such as big data, the artificial neural networks, machine learning and cloud computing provided the basis for development of innovative skills, cognitive abilities and intelligence of the humans (Jordan & Mitchell, 2015). The higher education institutions are suggested to adopt the effective platforms for learning that emerged from the digital technologies such as Blockchain and AI. If the organizations implement the effective use of AI in their environment it could be more manageable to maintain the balance of working life and social life, the new generation should be well aware of such technological advanced applications that

possess the capabilities to resolve complex problems and issues while enrich the transversal skills (Bucea-Manea-Țoniş et al., 2022).

Teachers have the many responsibilities to grading the students, assessment of the students, evaluation and answering the various quarries, developing the course outlines, non-academic tasks such as involvement in administrative activities that requires extra-ordinary time, effort and attention of academic employees (Xie et al., 2019). AI tools are helping the teachers to accomplish their tasks and activities that are required more time and attention such as personal touch, paying the attention to the deserving students, supervising the projects and participating in the academic and discussion with the students (Larrabee Sønderlund et al., 2019). Learning and education activities contains many administrative tasks such as enrollment of the students in various courses or sessions, maintain the record of the students' admissions and applications process, evaluate the potential candidate for the position and admission, the educational outlets hire employees through online job application portals, the AI based solutions assist the educational institutes to manage the tasks effectively and efficiently that meet the goals of suitable hiring (Karam et al., 2017). AI based applications is used to analyze the job of applications in ma appropriate manners, further it plays important role in human resource development, it enable the organizations and educational institutes to manage the record and acquire the suitable potential candidates for organizations to appear for an interview (Gobert et al., 2012).

Previously the researcher has examined the impact of AI applications in academic and administrative domain. The findings of the study revealed that the AI applications not only reduces the tasks of the teachers but it also helps to teachers in various tasks such as virtual reality, learning analytics, grading and assessment. The results of the study shows that AI applications have the positive and significant contribution to promote the students' performance and learning and minimize the workload of teachers to assess the grade and effectiveness of the students and so many other administrative tasks (Ahmad et al., 2022). Another research effort has been made to investigate the significant impact of AI in higher education institutions in the domain of Romania and Serbia. The finding of the study stated that higher education sector come across various issues and challenges in adoption, implementation and utilization of latest available technological advancements, the inclination towards technology adoption has changed the dynamics of the business operations, however the firms faced numerous issues while implementation of the such advanced systems while integrating with existing educational practices.

The prior literature has explained that utilization of AI based systems enable the higher education institutes to improve the educational method and practices. The creative and innovative practices and adoption of such informatic systems requires

transversal skills, and abilities to take advantage of utilization of technological advancements. The newly emerging practices and educational methods focuses on the ethical concerns, values and problem-solving issues in routine life and activities at workplace. The study also focused on the enrichment of the learning capabilities and capacity of the students through educational material and changes that align the futuristic approach. The digital skill set is required to be ensured among the employees in order to adopt the AI based solutions, machine learning, Internet of Things (IoT), cloud computing, big data, block chain, data analysis and 5G communication for effective operations on long-term perspective (Bucea-Manea-Țoniș et al., 2022).

The prior study determined the AI impact in the higher education sector by predicting the performance of the students. The results of the study stated that machine learning applications significantly enhance the performance of the students. It has been depicted in the literature that support vector machine positively enhances the performance of participants of the academic (Pallathadka et al., 2022). Another research effort has been conducted to investigate the effect of utilization of AI and big-data for the implementation of online learning system that has direct influence on the productivity capacity and promotion of better educational platforms including colleges and universities in the Saudi Arabian domain. The study also reported that AI and big-data enable the education sector to accomplish the tasks effectively and efficiently as it has been observed during covid period. The research studies have also focused and stressed upon the adoption of technological advancements for higher education sector that predict the performance of participants in global context with the assistance of AI. The study highlights the few issues regarding the adoption of the advance technologies faced higher education sectors, the issues such as administration and student's support. The findings suggested to the teachers and staff the effective use of the resources in educational institutions to enhance the productivity and learning tasks and it also enabled the students to get more time with their concerning teachers (Khan et al., 2022). Artificial Intelligence has the ability to revolutionize the academic research and with this potential to analyze and interpret large amount of data creation of the simulations and scenarios, communication and findings in an effective way and concise manner, AI has the ability to consistently increase efficiency and effectiveness of research.

On 30 November 2022, the artificial intelligence based chatbot introduced the name of the application ChatGPT (Chat Generative Pre-Trained Transformer) was launched by OpenAI and rapidly growing the attention of the media and all sectors due its wide range benefits, this application has the potential to answers the questions, technical and professional knowledge (Rudolph et al., 2023). Natural language processing has gained the attention in academic research particular it has the one aspect of AI. The natural language processing has the potential to understand the computer-based language and interpret like human language, it has different applications in

academic research one of the most important applications of AI are ChatGPT. ChatGPT has the ability to generate the conversation like human in a text format and engage the conversation in a wide range of the topics. It also generate conversations by its own making it a powerful tool of natural language processing (M Alshater, 2022). Previously a research effort has been done to investigated the factors that influence the adoption of the ChatGPT in higher education institutions in the domain of Thailand. The study also determined the impact of ChatGPT on various outcomes that increase the perceived usefulness based on the theory of planned behavior, and the perceived ease of use, that means the technologies that has the potential to bring the benefits to the users, that increase the ease of usage of these technologies in routine business life, the facilitating conditions also has the tendency to increase and impact the performance, further the privacy and security also enable the firms to increase the performance related outcomes. It has been reported that adoption and implementation of AI based tools and generative capability of AI has the significant influence of ChatGPT on the educational context that influences their perception towards the incorporation of the advance technological applications, the supportive environment, providing facilities and resources for adoption of the latest tools, knowledge about the technology also influence the positive and significant impact on the perception to adopt the ChatGPT. The results of the study show insignificant relationship towards perceived ease of use, perceived usefulness, privacy and security. The study suggested that the perception of the students and ease of usage towards the adoption of the ChatGPT is usefulness but their concerns about the privacy and security is not usefulness (Shaengchart et al., 2023). A systematic literature has been done to explored the role of ChatGPT in higher education institutions, the findings of the study stated that the adoption of ChatGPT has the positive influence on education sectors, the study highlights the significance the teachers being trained for the adoption of the technological and effective utilization of the application in education properly. The results of the study revealed ChatGPT has enhance the education institutions performance, the successful incorporation of this application tools the teachers require to be familiar in this technological application for the efficient results and progress (Montenegro-Rueda et al., 2023).

Research questions

RQ1 Does technological advancements has the tendency to influence the academic activities?

RQ2 Does machine learning and deep learning can alter the educational practices?

RQ3 Does the adoption and implementation of artificial intelligence (AI) for academic practices encourage the employees to harvest the greater benefits?

RQ4 Does utilization of AI based solution influence the students' learning and impact the performance?

RQ5 What is the impact of generative AI tool (Chat-GPT) impact the educational activities and enhances the performance of academicians?

Thematic view

Prior literature has developed the themes related to the integration of generative AI tools with education sector to enhance the quality. The figure 1 demonstrates the opportunities, barriers, challenges and priorities in integrating the generative AI tools.
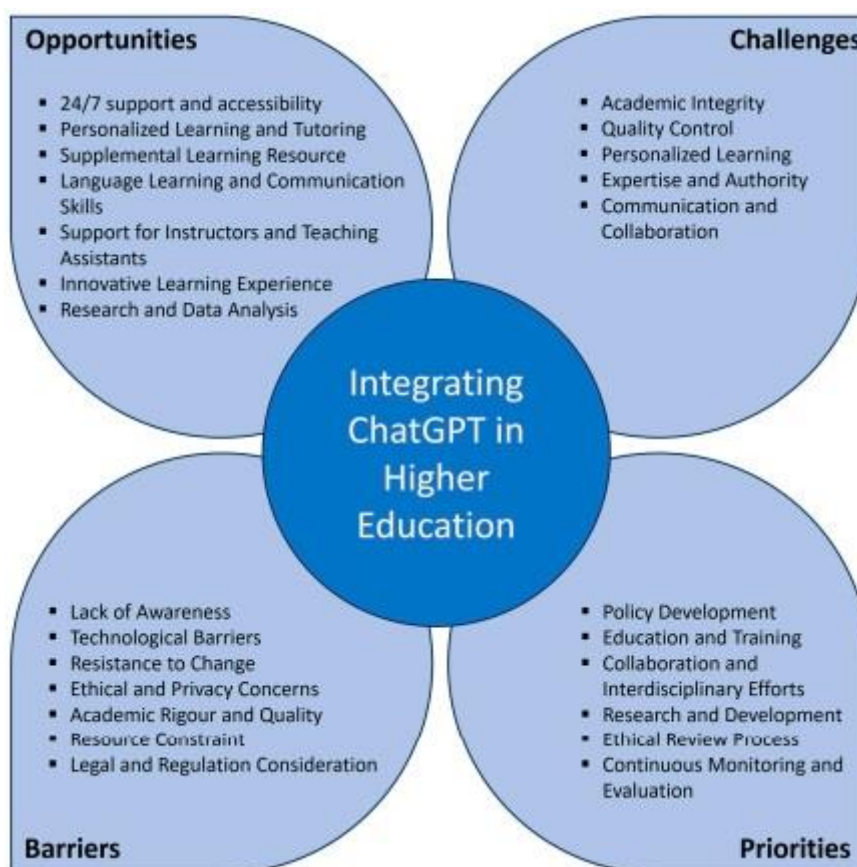

Figure-1 Integration of generative AI in higher education

Source: (Michel-Villarreal et al., 2023)

Conclusion

The teaching and learning practices have been altered due to the implementation of artificial intelligence, the innovative and generative AI tools such as ChatGPT revolutionize higher education activities. The ChatGPT found to be an effective tool that enable the individuals to learn and develop recommendations, facilitation, effective communication and fostering the teamwork. The numerous opportunities, challenges, barriers and priorities have been identified in this research effort that provide the direction to overcome such difficulties in order to enhance the performance of existing educational practices. The research study has argued that there is dire need to work on the attitude of participants that use the ChatGPT specifically attitude and behavior of students to embrace the technology for educational purposes. The various critical factors have been identified including facilitating conditions, the conservation and utilization of resources and knowledge, and development of such environment that successfully integrate the generative AI tools in educational landscape.

This study is limited in terms of description of the phenomenon of quality of education through adoption and implementation of generative AI tools. This research effort explained the role of machine learning, deep learning, and ChatGPT to enhance the quality of educational activities. The study is based on the previous research studies and evidences of implementation of such generative AI tools, but the study lacks in empirical investigation of these tools and quality of education. This may be due to insufficient research on the empirical evidences of implementation of ChatGPT in higher education institutes, the educational technology has the tendency to develop the field and enhance the effectiveness of educational quality outcomes. The future research may focus on the outcomes of implementation of generative AI tools that influence the quality of education by effective upgradation and alternation of existing educational practices.

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