The Changing Role of Higher Education in the Era of AI-based GPTs

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ABSTRACT

Purpose: *Technology has become an increasingly important tool in solving social and economic problems. Advents in technology are changed many aspects in the education sector. Ubiquitous education technology offered an alternative way of providing education anytime, anywhere, and any amount of time thereby reducing both the cost and time spent on higher education. It also increases the quality of education and made it affordable to everyone. Currently, the use of AI-based GPYs changed the game further, and by providing ubiquitous global information, GPTs can change the higher education model further. In this paper, we have made an exploratory analysis on how AI-based GPTs are affecting the conventional model of education both offline & online.*

Findings: *There is a paradigm shift in the focus of the objective of higher education. Earlier the focus was on learning skills by information identification, information collection, understanding, and applying to solve problems. Now after the availability of AI-based GPTs, the focus is shifted to the use of research skills like Information analysis, comparison, evaluation, interpretation, and creation /generation to identify new problems along with their optimum solution.*

Originality/Value: *The paper compares the changing role of higher education from learning skill focus to research skill focus due to the advent and free availability of AI-based GPTs to HE stakeholders.*

Type of Paper: *Exploratory study.*

Keywords: AI-based GPTs, ChatGPT, Changing Role of Higher Education, Shift in the focus of HE, Learning skills, Research skills, Six thinking hats framework

1. INTRODUCTION :

The era of AI-based GPTs (Generative Pre-trained Transformers) has brought about significant changes in the field of higher education. These sophisticated language models have the ability to generate high-quality human-like text, opening up new possibilities for learning, research, and teaching. The role of higher education is changing rapidly in this era, as institutions seek to adapt to the advancements brought about by AI-based GPTs. This includes the development of new courses and programs that focus on data science, machine learning, and artificial intelligence, in order to prepare students for careers in fields that require expertise in these technologies. In recent years, we have seen a significant rise in the development and application of AI-based GPTs (Generative Pre-trained Transformers), which are sophisticated language models capable of generating high-quality human-like text. With the advent of this technology, the role of higher education institutions is changing rapidly, as they seek to adapt to the new era of AI-based GPTs. One of the primary ways that higher education is changing in the era of AI-based GPTs is through the inclusion of courses and programs that focus on data science, machine learning, and artificial intelligence. These courses are designed to prepare students for careers in fields that require expertise in these technologies, such as software development, data analysis, and engineering [1-2].

Additionally, AI-based GPTs are being utilized by higher education institutions for research purposes. Researchers can use these models to generate large amounts of text data for analysis, saving time and resources. AI-based GPTs can also help researchers identify patterns and relationships within the data

that might be difficult to detect using traditional research methods. Moreover, higher education institutions are utilizing AI-based GPTs for research purposes, which allows researchers to generate large amounts of text data for analysis more efficiently. In addition, AI-based GPTs can help researchers identify patterns and relationships within the data that might be difficult to detect using traditional research methods. AI-based GPTs are also being integrated into the classroom, providing students with a more personalized and engaging learning experience. Professors can use these models to generate content for lectures, assignments, and assessments, tailoring the content to the individual needs and interests of each student [3].

Furthermore, AI-based GPTs are being used to improve accessibility in higher education, making it easier for students with disabilities to engage with course materials and participate fully in their education. By providing the asked information from global sources, AI-based GPTs help to collect the required information for a higher education stakeholder. Hence, the role of higher education is changing rapidly in the era of AI-based GPTs, as institutions seek to embrace these new technologies to enhance the learning experience for students, advance research, and better prepare graduates for the workforce [4]. In this paper, we discussed & analyzed the changing role of higher education in the era of AI-based GPTs.

2. OBJECTIVES OF THE STUDY :

(1) To evaluate the effect of technology on Higher Education.
(2) To analyse the changing role of higher education in enhancing knowledge, skills, and experience.
(3) To know how GPTs provide customized information for students unlike teachers and Books.
(4) To compare the quality of GPT based information with search engine-based information for quality decisions.
(5) To study the effectiveness of GPT based information for skill development and confidence building.
(6) To analyse the effect of ChatGPT on higher education models using six thinking hats framework.
(7) To suggest the effectiveness and efficiency of AI-based GPTs as complementary to traditional higher educational models.

3. REVIEW OF LITERATURE :

The role of higher education is undergoing significant transformation with the emergence of AI-based models like GPTs. These models have the potential to impact various aspects of higher education, including teaching, research, and learning methodologies. Table 1 contains the summary of some key themes explored in the literature.

Table 1: Summary of review of literature on Changing Role of Higher Education in the Era of AI-based GPTs

S. No.	Area & Focus	Objective/ Outcome	References
1	Teaching and Learning Enhancements	The impact of ChatGPT on foreign language teaching and learning: opportunities in education and research	Hong, W. C. H. (2023). [5]
2	Teaching and Learning Enhancements	The role of AI in transforming pedagogy: A case study of GPTs in higher education	Chen, L., & Wang, H. (2023). [6]
3	Ethical Considerations and Challenges	How is ChatGPT Transforming Academia? Examining its Impact on Teaching, Research, Assessment, and Learning.	Malik, A., Khan, M. L., & Hussain, K. (2023). [7]
4	Ethical Considerations and Challenges	Artificial intelligence in higher education: the state of the field.	Crompton, H., & Burke, D. (2023). [8]
5	Impact on Research and Knowledge Production	On the educational impact of chatgpt: Is artificial intelligence ready to obtain a university degree.	Malinka, K., et al (2023). [9]

6	Impact on Research and Knowledge Production	ChatGPT and a new academic reality: Artificial Intelligence.	Lund, B. D., et al (2023). [10]
7	Future of Work and Skill Development	Learning occupational task-shares dynamics for the future of work.	Das, S., et al (2020). [11]
8	Future of Work and Skill Development	Artificial intelligence, jobs and the future of work: Racing with the machines.	Bruun, E. P., & Duka, A. (2018). [12]

The papers listed in Table 1 are starting points to explore the changing role of higher education in the era of AI-based GPTs. Remember to adapt the search terms according to your specific focus and preferences.

4. RESEARCH METHODOLOGY :

The exploratory study method [13-15] is used in this study. Exploratory research is a method of collecting and analyzing information to gain a preliminary understanding of a particular phenomenon or problem. The following are the general steps involved in conducting exploratory research:
(1) Define the research problem: The first step is to define the research problem or question that needs to be explored. This involves identifying the purpose of the research, the research objectives, and the scope of the study.
(2) Literature review: Conducting a literature review is an essential step in exploratory research. This involves reviewing existing literature, research studies, and other relevant sources to gain an initial understanding of the phenomenon being studied.
(3) Develop a research plan: Once the research problem has been defined and literature has been reviewed, a research plan should be developed. This plan outlines the methodology, data collection techniques, and data analysis methods that will be used.
(4) Collect data/information: Data can be collected through various techniques such as surveys, focus groups, interviews, observation, and secondary data analysis. The data collected should be relevant to the research problem and objectives.
(5) Analyze data/information: Once the data has been collected, it needs to be analyzed to identify patterns, themes, and trends. Data analysis techniques such as content analysis, thematic analysis, and grounded theory can be used.
(6) Draw conclusions and report findings: The final step involves drawing conclusions based on the analysis of data and reporting the findings. This report should be clear, concise, and provide insights and recommendations for further research.
Thus, exploratory research is a crucial method for collecting and analyzing information to gain a preliminary understanding of a particular phenomenon or problem. The procedure involves defining the research problem, conducting a literature review, developing a research plan, collecting data, analyzing data, and drawing conclusions and reporting findings.

5. THE EFFECT OF TECHNOLOGY ON HIGHER EDUCATION :

Technology has had a significant impact on higher education in recent years [16-17]. The following are some of the effects of technology on higher education:
(1) Increased access to education: Technology has made it easier for students to access education from anywhere in the world. Online courses, distance learning programs, and virtual classrooms have made higher education more accessible to people who might not have had the opportunity to attend traditional on-campus classes.
(2) Improved learning experiences: Technology has enhanced the learning experience for students through multimedia resources, interactive simulations, and virtual laboratories. This has made learning more engaging, interesting, and effective.
(3) Increased efficiency: Technology has also increased the efficiency of administrative tasks in higher education, such as registration, record keeping, and grading. This has allowed institutions to reduce costs and allocate resources more effectively.
(4) Personalized learning: Technology has made it possible to tailor learning experiences to individual students' needs and preferences. Adaptive learning technologies and artificial intelligence-powered

educational platforms can provide students with personalized learning experiences that adapt to their learning styles, strengths, and weaknesses.
(5) Collaboration and communication: Technology has made it easier for students and teachers to collaborate and communicate with each other. Online discussion forums, video conferencing, and instant messaging platforms facilitate communication and collaboration among students, teachers, and researchers across the globe.
(6) Evolving pedagogy: Technology has also changed the way teaching is done in higher education. New pedagogical approaches, such as flipped classrooms, project-based learning, and blended learning, have emerged due to technological advancements.
Thus, technology has had a profound impact on higher education, making education more accessible, efficient, engaging, and personalized. It has transformed the way teaching is done, and new pedagogical approaches have emerged due to technological advancements. Technology will continue to play an important role in higher education, and institutions must adapt and embrace new technologies to provide the best possible learning experiences for their students.

6. CHANGING ROLE OF HIGHER EDUCATION IN ENHANCING KNOWLEDGE, SKILLS, AND EXPERIENCE :

The role of higher education is changing as technology advances and the global job market becomes more competitive. Higher education institutions must now focus on providing students with the knowledge, skills, and experiences they need to succeed in the workforce [18]. The following are some ways in which higher education can enhance knowledge, skills, and experience:
(1) Incorporating practical experience: Higher education institutions can provide students with practical experience through internships, co-op programs, and service-learning opportunities. This practical experience can help students apply what they have learned in the classroom to real-world situations, and develop the skills and competencies that employers are looking for.
(2) Developing critical thinking skills: Critical thinking skills are essential for success in any field. Higher education institutions can help students develop critical thinking skills by incorporating problem-based learning, case studies, and group projects into their curriculum.
(3) Emphasizing soft skills: Soft skills, such as communication, teamwork, and leadership, are becoming increasingly important in the workforce. Higher education institutions can help students develop these skills through extracurricular activities, leadership opportunities, and courses specifically designed to teach these skills.
(4) Providing global experience: In today's globalized economy, employers are looking for employees who have experience working with diverse cultures and backgrounds. Higher education institutions can provide students with global experience through study abroad programs, international internships, and virtual exchange programs.
(5) Fostering entrepreneurship: Higher education institutions can encourage entrepreneurship by offering courses in entrepreneurship, providing mentorship and support for student-led startups, and creating incubators and accelerators for students and alumni.
(6) Incorporating emerging technologies: Emerging technologies, such as artificial intelligence, blockchain, and data analytics, are transforming many industries. Higher education institutions can incorporate these technologies into their curriculum, ensuring that students are prepared to work in the digital age.
Hence, higher education institutions must adapt to the changing needs of the workforce and provide students with the knowledge, skills, and experiences they need to succeed. Incorporating practical experience, developing critical thinking skills, emphasizing soft skills, providing global experience, fostering entrepreneurship, and incorporating emerging technologies are all ways in which higher education can enhance knowledge, skills, and experience.

7. HOW GPT PROVIDES CUSTOMIZED INFORMATION FOR STUDENTS UNLIKE TEACHERS AND BOOKS :

GPTs (Generative Pre-trained Transformers) are AI-based language models that can process vast amounts of information and generate responses based on that information. GPTs can provide customized information for students in a way that is difficult for teachers and books to replicate [19-20]. Here are some ways in which GPTs can provide customized information for students:

(1) Personalized responses: GPTs can generate personalized responses to students' queries, providing tailored information based on the student's individual needs and preferences.
(2) Natural language processing: GPTs can understand and process natural language, allowing students to ask questions in their own words and receive relevant answers.
(3) Instant feedback: GPTs can provide instant feedback to students, allowing them to identify gaps in their understanding and receive immediate clarification.
(4) Continuous learning: GPTs can learn and adapt to students' needs over time, providing increasingly accurate and relevant responses as they gain a deeper understanding of the student's learning style and preferences.
(5) Accessibility: GPTs can be accessed from anywhere with an internet connection, allowing students to access information and receive feedback at any time, from anywhere in the world.
(6) Flexibility: GPTs can provide information on a wide range of topics, allowing students to explore areas of interest outside of their formal coursework and pursue their own areas of curiosity and inquiry.
In conclusion, GPTs can provide customized information for students in ways that traditional teaching methods and books cannot. They offer personalized responses, natural language processing, instant feedback, continuous learning, accessibility, and flexibility. While GPTs cannot replace human teachers entirely, they can complement traditional teaching methods and provide students with a powerful tool for learning and exploration.

8. COMPARISON OF THE QUALITY OF GPT-BASED INFORMATION WITH SEARCH ENGINE-BASED INFORMATION FOR QUALITY DECISIONS :

GPTs (Generative Pre-trained Transformers) and search engines are both tools that can provide information to support decision-making. However, the quality of the information they provide can differ in several ways [21]. Table 2 lists some of the comparisons of the quality of GPT-based information with search engine-based information for quality decisions.

Table 2: Comparisons of the quality of GPT-based information with search engine-based information for quality decisions

S. No.	Key Indicator	AI-based GPTs	Search Engines
1	Depth and accuracy of information	GPTs can provide more in-depth and accurate information compared to search engines because they can understand and process natural language and generate responses based on a vast amount of information.	Search engines, on the other hand, can provide a wide range of information, but may not always provide the most accurate or reliable sources.
2	Relevance of information	GPTs can provide more relevant information than search engines because they can tailor responses to the specific needs and preferences of the user.	Search engines, on the other hand, can provide a broad range of information that may not always be relevant to the user's needs.
3	Understanding of context	GPTs can better understand the context of a question and generate responses that are more relevant to the specific situation.	Search engines, on the other hand, may not always understand the context of a question and provide generic or unrelated responses.
4	Authority and credibility of sources	GPTs can use their vast knowledge to identify authoritative and credible sources for information.	Search engines, on the other hand, may not always filter out unreliable sources, which can lead to inaccurate or misleading information.

5	Bias and objectivity	GPTs can be trained to be less biased and more objective in their responses.	Search engines may not always filter out biased sources or provide balanced perspectives.

Thus, while both GPTs and search engines can provide information to support decision making, GPTs may provide more in-depth, accurate, relevant, and contextualized information, while also being more objective and filtering out unreliable sources. However, it's important to note that GPTs are still developing and may not always be able to provide the best information for every situation. Additionally, the quality of information ultimately depends on how the tool is used and the judgment of the user in evaluating the information provided.

9. EFFECTIVENESS OF GPT-BASED INFORMATION FOR SKILL DEVELOPMENT AND CONFIDENCE BUILDING :

GPTs (Generative Pre-trained Transformers) can be effective for skill development and confidence building in several ways. Here are some of the ways in which GPT-based information can be effective for skill development and confidence building:
(1) Personalized feedback: GPTs can provide personalized feedback on specific skills, helping users identify areas for improvement and providing suggestions for how to improve.
(2) Interactive learning: GPTs can engage users in interactive learning experiences, allowing them to practice and apply skills in a low-pressure environment.
(3) Real-time support: GPTs can provide real-time support to users, allowing them to ask questions and receive immediate feedback on their performance.
(4) Access to a wide range of resources: GPTs can provide access to a wide range of resources on a given topic, allowing users to explore different approaches to skill development and find the approach that works best for them.
(5) Confidence building: GPTs can provide users with a sense of accomplishment as they master new skills, which can help build confidence and motivation to continue learning.
(6) Continuous learning: GPTs can adapt to users' needs over time, providing increasingly relevant and challenging information as users gain more skills and experience.
In conclusion, GPT-based information can be effective for skill development and confidence building by providing personalized feedback, interactive learning, real-time support, access to a wide range of resources, confidence building, and continuous learning. While GPTs cannot replace human teachers entirely, they can complement traditional teaching methods and provide users with a powerful tool for learning and skill development.

10. ANALYSE OF THE EFFECT OF CHATGPT ON HIGHER EDUCATION MODELS USING SIX THINKING HATS FRAMEWORK :

10.1 Six thinking hats framework:

The Six Thinking Hats framework is a method of analysis and decision making developed by Edward de Bono [22]. It involves using six different colored "hats" to represent different modes of thinking. Here is a brief overview of each of the six hats [23-25]:
(1) White Hat: This hat represents objective, factual thinking. It involves looking at data and information to make informed decisions.
(2) Red Hat: This hat represents emotional thinking. It involves considering feelings, intuitions, and instincts when making decisions.
(3) Black Hat: This hat represents critical thinking. It involves looking at the potential negative consequences of a decision and identifying potential problems and pitfalls.
(4) Yellow Hat: This hat represents optimistic thinking. It involves looking at the potential positive consequences of a decision and identifying opportunities and benefits.
(5) Green Hat: This hat represents creative thinking. It involves generating new ideas and solutions to problems.
(6) Blue Hat: This hat represents process thinking. It involves managing the thinking process and setting goals and objectives for the group.

The Six Thinking Hats framework is often used in group decision-making and problem-solving. By considering different modes of thinking, individuals can approach problems from a variety of angles and consider multiple perspectives. This can lead to more informed and effective decision-making [26-28].

10.2 Application of Six Thinking Hats Analysis on GPT-based Higher Education Information Collection:

The Six Thinking Hats framework [29-32] can be a useful tool for analyzing GPT-based higher education information collection. Table 3 lists the breakdown of how each hat can be applied.

Table 3: The breakdown of how each hat can be applied to analyzing GPT-based higher education

S. No.	Hat	Analysis on GPT-based higher education
1	White Hat	This hat can be used to analyze the factual information provided by GPTs. It involves looking at data and information to assess the accuracy and reliability of the information provided.
2	Red Hat	This hat can be used to consider the emotional impact of GPT-based information on learners. It involves thinking about the potential feelings and reactions of learners to the information provided.
3	Black Hat	This hat can be used to consider the potential negative consequences of relying solely on GPT-based information. It involves thinking critically about potential biases or limitations in the information provided.
4	Yellow Hat	This hat can be used to consider the potential benefits of using GPT-based information. It involves thinking optimistically about how the information can enhance the learning experience.
5	Green Hat	This hat can be used to generate new ideas and solutions for improving GPT-based information collection. It involves thinking creatively about how the information can be presented and organized to enhance learning outcomes.
6	Blue Hat	This hat can be used to manage the thinking process and set goals for the use of GPT-based information. It involves thinking about how GPTs can be integrated into the larger framework of higher education and how they can be used to achieve specific learning objectives.

Thus, the Six Thinking Hats framework can be a valuable tool for analyzing GPT-based higher education information collection. By considering different modes of thinking, educators and learners can approach GPT-based information from a variety of angles and consider multiple perspectives, leading to more informed and effective use of these tools.

11. ABCD ANALYSIS ON THE CONCEPT OF USING GPT-BASED HIGHER EDUCATION INFORMATION COLLECTION CONCEPT :

Advantages, Benefits, Constraints, and Disadvantages (ABCD) analysis framework in proposed in the year 2016 to analyze systems, concepts, ideas, strategies, products/services, materials, etc. [33-38]. ABCD analysis framework can be used both qualitatively and quantitatively depending upon requirements [38]. Qualitative ABCD analysis framework consists of (1) ABCD listing from information gathering from primary and secondary sources [39-44], (2) ABCD listing from Stakeholders' point of view [45-48], (3) Factor and Elemental analysis using ABCD framework [49-54]. The quantitative ABCD analysis framework consists of (1) Ranking the ABCD constructs based on primary data [55-62], and (2) Statistical analysis of ABCD constructs. In this section, we have used ABCD listing of using GPT-based Higher Education Information Collection Concept.

11.1 Advantages:

There are several advantages of using GPT-based higher education information collection. Here are some of the most significant advantages:

(1) Personalization: GPTs can provide personalized learning experiences tailored to individual learners' needs, interests, and skill levels. This can help learners feel more engaged and motivated and can lead to better learning outcomes.

(2) Access to a wide range of resources: GPTs can provide learners with access to a vast amount of information on a given topic, allowing them to explore different approaches and perspectives.

(3) Flexibility: GPT-based learning can be done anytime, anywhere, and at the learners' own pace, making it more accessible and convenient for learners with busy schedules or limited access to traditional educational resources.

(4) Real-time feedback and support: GPTs can provide immediate feedback and support to learners, helping them identify areas for improvement and providing suggestions for how to improve.

(5) Cost-effective: GPT-based learning can be more cost-effective than traditional educational methods, as it eliminates the need for physical classrooms, textbooks, and other expensive resources.

(6) Continuous learning: GPTs can adapt to learners' needs over time, providing increasingly relevant and challenging information as learners gain more skills and experience.

(7) Scalability: GPT-based learning can be scaled to reach a large number of learners simultaneously, making it more efficient and cost-effective for educational institutions.

In conclusion, GPT-based higher education information collection offers several significant advantages, including personalization, access to a wide range of resources, flexibility, real-time feedback and support, cost-effectiveness, continuous learning, and scalability. By leveraging these advantages, educators and learners can enhance the learning experience and improve learning outcomes.

11.2 Benefits:

There are several benefits of using GPT-based higher education information collection. Here are some of the most significant benefits:

(1) Enhanced Learning Experience: GPTs can provide personalized and engaging learning experiences that cater to learners' individual needs, interests, and skill levels. This can enhance the learning experience, improve motivation and engagement, and lead to better learning outcomes.

(2) Access to a wealth of Information: GPTs can provide access to a vast amount of information on a given topic, including the latest research and real-world case studies, which can enrich the learning experience and provide learners with a more comprehensive understanding of the subject matter.

(3) Improved Efficiency: GPT-based learning can be done at any time and at the learner's own pace, allowing them to learn more efficiently and effectively. This can be particularly useful for learners who have busy schedules or limited access to traditional educational resources.

(4) Real-Time Feedback and Support: GPTs can provide immediate feedback and support to learners, helping them identify areas for improvement and providing suggestions for how to improve. This can enhance the learning experience and lead to better learning outcomes.

(5) Cost-Effective: GPT-based learning can be more cost-effective than traditional educational methods, as it eliminates the need for physical classrooms, textbooks, and other expensive resources.

(6) Continuous Learning: GPTs can adapt to learners' needs over time, providing increasingly relevant and challenging information as learners gain more skills and experience. This can help learners continue to develop their knowledge and skills over time, leading to ongoing personal and professional growth.

(7) Scalability: GPT-based learning can be scaled to reach a large number of learners simultaneously, making it more efficient and cost-effective for educational institutions.

In conclusion, GPT-based higher education information collection offers several significant benefits, including enhanced learning experiences, access to a wealth of information, improved efficiency, real-time feedback and support, cost-effectiveness, continuous learning, and scalability. By leveraging these benefits, educators and learners can improve the learning experience, enhance learning outcomes, and facilitate ongoing personal and professional growth.

11.3 Constraints:

While there are several advantages of using GPT-based higher education information collection, there are also some constraints that must be considered. Here are some of the most significant constraints:

(1) Limited understanding of context: GPTs lack contextual understanding and may not always be able to accurately interpret the nuances of a given topic or situation. This can lead to incorrect or incomplete information being provided to learners.
(2) Reliance on existing data: GPTs rely on existing data to generate responses, which means that the quality of the information provided is limited by the quality of the data available. This can lead to inaccuracies or biases in the information provided.
(3) Lack of personal interaction: GPT-based learning lacks the personal interaction that traditional educational methods provide, which can be particularly important for learners who require more individualized support or who benefit from direct feedback from teachers or peers.
(4) Limited feedback and assessment options: While GPTs can provide immediate feedback and support, they may not be able to provide detailed assessments or evaluations of learners' progress or performance.
(5) Dependence on technology: GPT-based learning relies heavily on technology, which can be a barrier for learners who do not have access to reliable internet connections or who are not comfortable using technology.
(6) Privacy and security concerns: GPTs require access to large amounts of data, which can raise concerns around privacy and security. Educational institutions and learners must take steps to ensure that personal information is kept secure and that data privacy is maintained.
In conclusion, while GPT-based higher education information collection offers several significant benefits, including enhanced learning experiences, improved efficiency, and continuous learning, there are also several constraints that must be considered. These include limited understanding of context, reliance on existing data, lack of personal interaction, limited feedback and assessment options, dependence on technology, and privacy and security concerns. It is important for educational institutions and learners to carefully consider these constraints when implementing GPT-based learning solutions to ensure that they are used effectively and ethically.

11.4 Disadvantages:

There are several disadvantages of using GPT-based higher education information collection. Here are some of the most significant disadvantages:
(1) Lack of personalization: While GPTs can provide personalized learning experiences, they may not always be able to account for individual differences and learning styles. This can lead to a one-size-fits-all approach to learning that may not be as effective for some learners.
(2) Dependence on technology: GPT-based learning relies heavily on technology, which can be a disadvantage for learners who do not have access to reliable internet connections or who are not comfortable using technology.
(3) Potential biases and inaccuracies: GPTs can be trained on biased or inaccurate data, which can lead to biased or inaccurate responses being provided to learners.
(4) Limited interaction with peers and instructors: GPT-based learning can lack the personal interaction that traditional educational methods provide, which can be particularly important for learners who benefit from direct feedback from teachers or peers.
(5) Limited practical experience: GPT-based learning can be limited in its ability to provide learners with practical experience in a given field, which may be necessary for certain types of learning, such as those related to physical skills or hands-on experience.
(6) Cost and implementation challenges: Implementing GPT-based learning solutions can be expensive and time-consuming, particularly for educational institutions that do not have the necessary infrastructure or resources in place.
Thus, while GPT-based higher education information collection offers several significant benefits, including enhanced learning experiences, access to a wealth of information, and improved efficiency, there are also several disadvantages that must be considered. These include a lack of personalization, potential biases and inaccuracies, limited interaction with peers and instructors, limited practical experience, and cost and implementation challenges. It is important for educational institutions and learners to carefully consider these disadvantages when implementing GPT-based learning solutions to ensure that they are used effectively and ethically.

12. SUGGESTIONS TO IMPROVE THE EFFECTIVENESS AND EFFICIENCY OF AI-BASED GPTS AS COMPLEMENTARY TO TRADITIONAL HIGHER EDUCATIONAL MODELS :

Here are some suggestions to improve the effectiveness and efficiency of AI-based GPTs as complementary to traditional higher educational models:
(1) Combine GPTs with traditional educational methods: GPT-based learning should be used as a complementary tool to traditional educational methods. By combining GPT-based learning with traditional teaching methods, learners can benefit from the strengths of both approaches.
(2) Ensure quality data: The quality of the data used to train GPTs is crucial to their effectiveness. Therefore, educational institutions must ensure that the data used to train GPTs is of high quality and free from biases.
(3) Personalize learning experiences: Educational institutions can use GPT-based learning to personalize learning experiences based on learners' individual needs and preferences. This can help to improve learner engagement and retention.
(4) Provide opportunities for interaction: While GPT-based learning lacks personal interaction, educational institutions can provide opportunities for learners to interact with instructors and peers to promote collaboration and feedback.
(5) Assess and evaluate performance: Educational institutions should ensure that learners receive regular assessments and evaluations to track their progress and identify areas for improvement.
Provide access to technology: Educational institutions must ensure that learners have access to reliable technology and internet connections to enable them to benefit from GPT-based learning.
(6) Foster ethical and responsible use: It is essential to foster ethical and responsible use of GPT-based learning to ensure that learners are not exposed to biased or inaccurate information.
In conclusion, GPT-based learning has the potential to enhance the effectiveness and efficiency of traditional higher educational models. However, it is essential to ensure that GPT-based learning is used in conjunction with traditional educational methods and that quality data is used to train GPTs. Additionally, educational institutions must provide opportunities for interaction, assess and evaluate learners' performance, provide access to technology, and foster ethical and responsible use of GPT-based learning.

13. CONCLUSION :

After the availability of AI-based GPTs, the focus of higher education is shifted from the use of learning skills to the use of research skills like Information analysis, comparison, evaluation, interpretation, and creation /generation to identify new problems along with their optimum solution. The changing role of higher education in enhancing knowledge, skills, and experience is analyzed. How GPTs provide customized information for students unlike teachers and Books is discussed and the quality of GPT-based information with search engine-based information for quality decisions is compared. The effectiveness of GPT-based information for skill development and confidence building is studied. The effect of ChatGPT on higher education models using the six thinking hats framework and ABCD listing frameworks. Based on the findings, some suggestions are given for the effectiveness and efficiency of AI-based GPTs as complementary to traditional higher educational models. It is advised to use new technological tools in higher education and due to the advent and free availability of AI-based GPTs to HE stakeholders the higher education is expected to shift from learner skill centric to research skill centric.

REFERENCES :

[1] Gimpel, H., Hall, K., Decker, S., Eymann, T., Lämmermann, L., Mädche, A., ... & Vandrik, S. (2023). Unlocking the power of generative AI models and systems such as GPT-4 and ChatGPT for higher education. A Guide for Students and Lecturers. Whitepaper of Hohenheim Discussion Papers in Business, Economics, and Social Sciences with ISSN 2364-2084. 01-56. Google Scholar↗

[2] Neumann, M., Rauschenberger, M., & Schön, E. M. (2023). “We Need to Talk About ChatGPT”: The Future of AI and Higher Education. White Paper. 01-04. Google Scholar↗

[3] Rudolph, J., Tan, S., & Tan, S. (2023). ChatGPT: Bullshit spewer or the end of traditional assessments in higher education?. *Journal of Applied Learning and Teaching*, *6*(1). 01-22. Google Scholar↗

[4] Tajik, E., & Tajik, F. (2023). A comprehensive Examination of the potential application of Chat GPT in Higher Education Institutions. TechRxiv. Preprint, 01-10. Google Scholar↗

[5] Hong, W. C. H. (2023). The impact of ChatGPT on foreign language teaching and learning: opportunities in education and research. *Journal of Educational Technology and Innovation*, *5*(1), 37-45. Google Scholar↗

[6] Chen, L., & Wang, H. (2023). The role of AI in transforming pedagogy: A case study of GPTs in higher education. Educational Sciences, *40*(3), 201-218. Google Scholar↗

[7] Malik, A., Khan, M. L., & Hussain, K. (2023). How is ChatGPT Transforming Academia? Examining its Impact on Teaching, Research, Assessment, and Learning. *Examining its Impact on Teaching, Research, Assessment, and Learning (April 9, 2023)*. 01-34. Google Scholar↗

[8] Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: the state of the field. *International Journal of Educational Technology in Higher Education*, *20*(1), 1-22. Google Sholar↗

[9] Malinka, K., Perešíni, M., Firc, A., Hujňák, O., & Januš, F. (2023). On the educational impact of chatgpt: Is artificial intelligence ready to obtain a university degree?. *arXiv preprint arXiv:2303.11146*. Google Scholar↗

[10] Lund, B. D., Wang, T., Mannuru, N. R., Nie, B., Shimray, S., & Wang, Z. (2023). ChatGPT and a new academic reality: Artificial Intelligence-written research papers and the ethics of the large language models in scholarly publishing. *Journal of the Association for Information Science & Technology*, *74*(5), 570-581. Google Scholar↗

[11] Das, S., Steffen, S., Clarke, W., Reddy, P., Brynjolfsson, E., & Fleming, M. (2020, February). Learning occupational task-shares dynamics for the future of work. In *Proceedings of the AAAI/ACM Conference on AI, Ethics, and Society* (pp. 36-42). Google Scholar↗

[12] Bruun, E. P., & Duka, A. (2018). Artificial intelligence, jobs and the future of work: Racing with the machines. *Basic Income Studies*, *13*(2), 01-15. Google Scholar↗

[13] Makri, C., & Neely, A. (2021). Grounded theory: A guide for exploratory studies in management research. *International Journal of Qualitative Methods*, *20*(1), 1-14. Google Scholar↗

[14] Aithal, P. S., & Aithal, S. (2019). New Directions in Scholarly Research–Some Fearless Innovations & Predictions for 21st Century Research. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, *4*(1), 1-19. Google Scholar↗

[15] Mbaka, N., & Isiramen, O. M. (2021). The Changing Role of An Exploratory Research in Modern Organisation. *GPH-International Journal of Business Management*, *4*(12), 27-36. Google Scholar↗

[16] Dunn, T. J., & Kennedy, M. (2019). Technology Enhanced Learning in higher education; motivations, engagement and academic achievement. *Computers & Education*, *137*(1), 104-113. Google Scholar↗

[17] Aithal, P. S., & Aithal, S. (2020). Conceptual analysis on higher education strategies for various tech-generations. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, *5*(1), 335-351. Google Scholar↗

[18] De Wit, H., & Altbach, P. G. (2021). Internationalization in higher education: global trends and recommendations for its future. *Policy Reviews in Higher Education*, *5*(1), 28-46. Google Scholar↗

[19] Firat, M. (2023). How chat GPT can transform autodidactic experiences and open education. *Department of Distance Education, Open Education Faculty, Anadolu Unive*. 01-05. Google Scholar↗

[20] Baidoo-Anu, D. Education in the Era of Generative Artificial Intelligence (AI): Understanding the Potential Benefits of ChatGPT in Promoting Teaching and Learning. *Available at SSRN 4337484*, 01-22. Google Scholar↗

[21] Zeng, Y., Rajasekharan, A., Padalkar, P., Basu, K., Arias, J., & Gupta, G. (2023). Automated Interactive Domain-Specific Conversational Agents that Understand Human Dialogs. *arXiv preprint arXiv:2303.08941*. Google Scholar↗

[22] De Bono, E. (2017). *Six Thinking Hats: The multi-million bestselling guide to running better meetings and making faster decisions*. Penguin UK. Google Scholar↗

[23] Aithal, P. S., & Kumar, P. M. (2017). Ideal analysis for decision-making in critical situations through six thinking hats method. *International Journal of Applied Engineering and Management Letters (IJAEML)*, *1*(2), 1-9. Google Scholar↗

[24] Aithal, P. S., & Kumar, P. M. (2016). Using six thinking hats as a tool for lateral thinking in organizational problem solving. *International Journal of Engineering Research and Modern Education (IJERME)*, *1*(2), 225-234. Google Scholar↗

[25] Rangi, P. K., & Aithal, P. S. (2020). Academic Institutions Risk Decisions using Six Thinking Hats based Analysis. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, *4*(2), 270-279. Google Scholar↗

[26] Dhanapal, S., & Ling, K. T. W. (2013). A study to investigate how six thinking hats enhance the learning of environmental studies. *IOSR Journal of Research & Method in Education*, *1*(6), 20-29. Google Scholar↗

[27] Kivunja, C. (2015). Using De Bono's six thinking hats model to teach critical thinking and problem-solving skills essential for success in the 21st century economy. *Creative Education*, *6*(03), 380-392. Google Scholar↗

[28] Aithal, P. S., Kumar, P. M., & Shailashree, V. (2016). Factors & elemental analysis of six thinking hats technique using abcd framework. *International Journal of Advanced Trends in Engineering and Technology (IJATET)*, *1*(1), 85-95. Google Scholar↗

[29] Aithal, P. S., & Kumar, P. M. (2017). Integrating Theory-A and six thinking hats technique for improved organizational performance. *International Journal of Applied Engineering and Management Letters (IJAEML)*, *1*(2), 66-77. Google Scholar↗

[30] Aithal, P. S., & Kumar, P. M. (2017). Lateral thinking in managerial decision making through six thinking hats technique. *International Journal of Scientific Research and Modern Education (IJSRME)*, *2*(1), 53-58. Google Scholar↗

[31] Aithal, P. S. (2017). A critical study on Various Frameworks used to analyse International Business and its Environment. *International Journal of Applied Engineering and Management Letters (IJAEML)*, *1*(2), 78-97. Google Scholar↗

[32] Gupta, R., & Bodhankar, A. (2023). Impact of Six Thinking Hats Techniques on the Legitimate Decision-making Skills of Managers. *Russian Law Journal*, *11*(5s). Google Scholar↗

[33] Aithal, P. S. (2016). Study on ABCD analysis technique for business models, business strategies, operating concepts & business systems. *International Journal in Management and Social Science*, *4*(1), 95-115. Google Scholar↗

[34] Aithal, P. S., Shailashree, V., & Kumar, P. M. (2015). A new ABCD technique to analyze business models & concepts. *International Journal of Management, IT and Engineering*, *5*(4), 409-423. Google Scholar↗

[35] Aithal, P. S. (2017). ABCD Analysis as Research Methodology in Company Case Studies. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, *2*(2), 40-54. Google Scholar↗

[36] Aithal, P. S., Shailashree, V., & Kumar, P. M. (2015). Application of ABCD Analysis Model for Black Ocean Strategy. *International journal of applied research*, *1*(10), 331-337. Google Scholar↗

[37] Aithal, A., & Aithal, P. S. (2017). ABCD analysis of task shifting–an optimum alternative solution to professional healthcare personnel shortage. *International Journal of Health Sciences and Pharmacy (IJHSP)*, *1*(2), 36-51. Google Scholar↗

[38] Aithal, S., & Aithal, P. S. (2016). ABCD analysis of Dye-doped Polymers for Photonic Applications. *IRA-International Journal of Applied Sciences*, *4*(3), 358-378. Google Scholar↗

[39] Raj, K., & Aithal, P. S. (2018). Generating Wealth at the Base of the Pyramid–a Study Using ABCD Analysis Technique. *International Journal of Computational Research and Development (IJCRD)*, *3*(1), 68-76. Google Scholar↗

[40] Aithal, P. S., Shailashree, V., & Kumar, P. M. (2016). The study of new national institutional ranking system using ABCD framework. *International Journal of Current Research and Modern Education (IJCRME)*, *1*(1), 389-402. Google Scholar↗

[41] Shenoy, V., & Aithal, P. S. (2016). ABCD Analysis of On-line Campus Placement Model. *IRA-International Journal of Management & Social Sciences*, *5*(2), 227-244. Google Scholar↗

[42] Kumari, P., & Aithal, P. S. (2020). Growth & Fate Analysis of Mangalore International Airport–A Case Study. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, *4*(2), 71-85. Google Scholar↗

[43] Aithal, P. S., & Pai T, V. (2016). Concept of Ideal Software and its Realization Scenarios. *International Journal of Scientific Research and Modern Education (IJSRME)*, *1*(1), 826-837. Google Scholar↗

[44] Bhuvana, R., & Aithal, P. S. (2020). Blockchain based service: A case study on IBM blockchain services & hyperledger fabric. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, *4*(1), 94-102. Google Scholar↗

[45] Aithal, P. S., Shailashree, V., & Kumar, P. M. (2016). Application of ABCD Analysis Framework on Private University System in India. *International journal of management sciences and business research*, *5*(4), 159-170. Google Scholar↗

[46] Aithal, P. S., Shailashree, V., & Kumar, P. M. (2016). ABCD analysis of Stage Model in Higher Education. *International Journal of Management, IT and Engineering*, *6*(1), 11-24. Google Scholar↗

[47] Aithal, P. S. (2021). Analysis of systems & technology using ABCD framework. *Chapter*, *8*(1), 345-385. Google Scholar↗

[48] Aithal, P. S., Shailashree, V., & Kumar, P. M. (2016). Analysis of NAAC Accreditation System using ABCD framework. *International Journal of Management, IT and Engineering*, *6*(1), 30-44. Google Scholar↗

[49] Aithal, P. S., Kumar, P. M., & Shailashree, V. (2016). Factors & elemental analysis of six thinking hats technique using abcd framework. *International Journal of Advanced Trends in Engineering and Technology (IJATET)*, *1*(1), 85-95. Google Scholar↗

[50] Aithal, P. S., & Aithal, S. (2018). Factor & Elemental Analysis of Nanotechnology as Green Technology using ABCD Framework. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, *3*(2), 57-72. Google Scholar↗

[51] Aithal, P. S., & Aithal, S. (2017). Factor Analysis based on ABCD Framework on Recently Announced New Research Indices. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, *1*(1), 82-94. Google Scholar↗

[52] Aithal, P. S., & Kumar, P. M. (2016). CCE Approach through ABCD Analysis of 'Theory A'on Organizational Performance. *International Journal of Current Research and Modern Education (IJCRME)*, *1*(2), 169-185. Google Scholar↗

[53] Aithal, P. S., Shailashree, V., & Kumar, P. M. (2016). Application of ABCD Analysis Framework on Private University System in India. *International journal of management sciences and business research*, *5*(4), 159-170. Google Scholar↗

[54] Aithal, P. S., Shailashree, V., & Kumar, P. M. (2016). Analysis of NAAC Accreditation System using ABCD framework. *International Journal of Management, IT and Engineering*, *6*(1), 30-44. Google Scholar↗

[55] Shenoy, V., & Aithal, P. S. (2017). Quantitative ABCD Analysis of IEDRA Model of Placement Determination. *International Journal of Case Studies in Business, IT and Education (IJCSBE), 1*(2), 103-113. Google Scholar↗

[56] Mendon, S., & Aithal, P. S. (2022). Quantitative ABCD Analysis of Organic Food Product and its Impact on Purchase Intention. *International Journal of Management, Technology, and Social Sciences (IJMTS), 7*(1), 254-278. Google Scholar↗

[57] Kumari, P., & Aithal, P. S. (2022). Stress Coping Mechanisms: A Quantitative ABCD Analysis. *International Journal of Case Studies in Business, IT, and Education (IJCSBE), 6*(2), 268-291. Google Scholar↗

[58] Prabhu, N., & Aithal, P. S. (2023). Quantitative ABCD Analysis of Green Banking Practices and its Impact on Using Green Banking Products. *International Journal of Applied Engineering and Management Letters (IJAEML), 7*(1), 28-66. Google Scholar↗

[59] Raj, K., & Aithal, P. S. (2022). Assessing the Attractiveness & Feasibility of doing Business in the BoP Market–A Mixed Method Approach using ABCD Analysis Technique. *International Journal of Case Studies in Business, IT, and Education (IJCSBE), 6*(2), 117-145. Google Scholar↗

[60] Frederick, D. P., & Salins, M. (2022). Quantitative ABCD Analysis of Online Shopping. *International Journal of Applied Engineering and Management Letters (IJAEML), 6*(1), 313-329. Google Scholar↗

[61] Nayak, P., & Kayarkatte, N. (2022). Education for Corporate Sustainability Disclosures by Higher Educational Institutions–A Quantitative ABCD Analysis. *International Journal of Management, Technology, and Social Sciences (IJMTS), 7*(1), 465-483. Google Scholar↗

[62] Nandini Prabhu, G., (2023). Quantitative ABCD Analysis of Integrating Corporate Social Responsibilities with Green Banking Practices by Banks from Customers' Attraction and Retention Perspectives in Selected Indian Banks. *International Journal of Case Studies in Business, IT, and Education (IJCSBE), 7*(2), 1-37. Google Scholar↗

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