Challenges and Responses of Higher Education to ChatGPT

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ABSTRACT

Currently, the combination of the Internet and artificial intelligence technologies has been effectively applied in the field of higher education, making the integration between the Internet, artificial intelligence, and higher education more closely intertwined. With the emergence of ChatGPT, a new application of Internet + artificial intelligence, by the end of 2022, the hierarchy structure, professional setup, talent cultivation model, academic system, teaching methods, and faculty capabilities in higher education will face new challenges. To address the various challenges posed by ChatGPT to higher education, universities should actively change their mindset, be prepared, and take measures such as optimizing the higher education hierarchy structure, adjusting the professional setup, establishing new talent cultivation models, improving academic creation and evaluation systems, innovating teaching methods, enhancing faculty professional capabilities, and establishing diverse regulatory mechanisms.

Keywords: Higher education, Internet, ChatGPT, Artificial intelligence.

1. INTRODUCTION

Since the reform and opening-up policy, China's higher education has rapidly developed for over forty years, laying a solid foundation for its development. With the advent of the "Fourth Industrial Revolution," production technology has undergone revolutionary changes, especially in the rapid development of artificial intelligence and the Internet, which has deeply transformed higher education. In fact, as early as the 1960s, computer and internet technologies were already being applied in education, leading to the emergence of the romantic theory of technology's role in educational revolution [1]. Some scholars have proposed that the higher education system should adjust its development direction according to the development of the Internet and artificial intelligence technologies, considering their significant advantages and impact on the entire economic and social structure.

As the Internet and artificial intelligence technologies continue to develop and apply in higher education, remarkable achievements have been made in China's higher education. Firstly, the "211 Project" Phase III Higher Education Literature Guarantee System integrates academic resources from over 800 libraries nationwide, forming a service network that can provide access to a collection of 140 million volumes (articles) [2]. Moreover, many universities have widely adopted Massive Open Online Courses (MOOCs) and actively developed online education, allowing students to access a diverse range of excellent educational resources anytime, anywhere. Secondly, online education, based on the Internet platform, has rapidly developed, breaking away from traditional organized teaching methods and forming a 4A learning model (Anytime, Anywhere, Anyone, Anything) [3]. Through real-time communication with students, quick feedback collection, and timely analysis of teaching issues, university instructors can adopt more flexible and efficient teaching methods. As digital natives of the Internet age, university students often have access to more information resources than their teachers [4], and the new generation of university students is generally proficient in using the Internet to obtain and learn various knowledge. Furthermore, since the advent of the Internet era, Chinese universities have continuously updated their Internet infrastructure, breaking the boundaries of

traditional university management, integrating high-quality resources within and outside the university with an open educational philosophy. University administrators have also improved higher education management by fostering intercollegiate cooperation and outsourcing non-core functions to specialized agencies [5], providing more accurate services to students and faculty.

Entering the 21st century, the rapid development of Internet and artificial intelligence technologies has given rise to numerous "Internet +" and "artificial intelligence +" applications. Higher education in China has integrated the Internet and artificial intelligence technologies into its domain, revolutionizing traditional teaching methods and educational models, leading to significant improvements in the quality and cost-effectiveness of higher education.

2. CHATGPT CHALLENGE TO HIGHER EDUCATION

On November 30, 2022, Open AI released the popular chatbot ChatGPT, which truly realized the fully autonomous "ARTIFICIAL intelligence content generation" (AIGC), with text generation, code generation, video generation, text question and answers, image generation, paper writing, film and television creation, scientific experiment design and other functions[6]. It can not only have a normal dialogue with humans, but also write relatively complex documents according to user requirements. Some students have used it to write papers [7]. ChatGPT is definitely a major breakthrough in the field of Internet + artificial intelligence in recent years. The Internet belongs to the production relationship, while artificial intelligence belongs to the productivity, and is the "core productivity of the productivity" [8]. As an advanced form of Internet + artificial intelligence, ChatGPT not only transforms existing production relations but also enhances productivity. From the public test links, the AI model has the prototype of the human mind, the simple, more specific, more conventional judgment effect of the human brain will depreciate [9]. ChatGPT is a milestone in the field of artificial intelligence and a future trend in Internet development. History has repeatedly proven that once a technology is convenient for humans, it rapidly finds widespread applications in human activities. Although ChatGPT has just been developed, and people are still exploring its full potential, it has already shown its challenging

aspects to current higher education. As ChatGPT is applied and developed in higher education, the hierarchy structure, professional setup, talent cultivation model, academic system, teaching methods, and faculty requirements will all face new challenges, and higher education will be influenced by multiple stakeholders in various ways:

2.1 Challenges in Higher Education Hierarchy Structure

Higher education in China comprises three levels: junior college, undergraduate, and graduate (master's and doctoral) [10]. The hierarchy structure of higher education not only needs to match the level of technological development but also should be responsive to the needs of society for various talents. With the development and application of ChatGPT, technical professionals with characteristics such as data accumulation and simple rules may be rapidly replaced, making the cultivation of such professionals at risk of being discontinued. Conversely, individuals with rational judgment, logical thinking ability, innovation, and a strong moral character are less likely to be replaced by ChatGPT, making the training of these abilities even more critical. ChatGPT will improve productivity, change the existing mode of production, and then produce employment substitution effect and employment creation effect [11] — will replace labor-intensive industries and professional and technical jobs, and create some jobs that emphasize innovation ability and value judgment. Because specialized education mainly trains technical personnel with superb professional skills, and ChatGPT will replace a large number of technical talents, the scale of specialized education will be gradually reduced. On the other hand, with the emergence of ChatGPT and use, productivity will be able to further liberation, social demand for talent level will be further promoted, this must extend the education of educatees, in order to improve social human capital level, and master education stage is to develop development strategic vision and innovative thinking of advanced minimum standards, so one of the direction of higher education structure adjustment is to continue to improve the scale and quality of graduate education talents.

2.2 The Structure of Higher Education Majors Faces Adjustment

Said the resolution of the sixth plenary session of the communist party of China 19th to "promote

the development of higher education connotation, promote the construction of education power, do a good job in people's satisfactory education" [12], China's higher education should be guided by the needs of the state and society, combined with the actual situation of the Internet age, reasonable disciplines and professional setting and determine the appropriate scale, for national development and social progress to provide sufficient talent reserves. With the end of 2022 "strongest" in the history of the emergence of artificial intelligence ChatGPT, the existing professional structure of colleges and universities will encounter new challenges: due to the ChatGPT has huge data storage, data retrieval, data analysis ability, high operation accuracy, high security, copy editor fast and always on the job, some has the characteristics of knowledge accumulation and simple rules of technical personnel is likely to be ChatGPT quickly replacement in the future, cultivate these talents professional face the threat of being cancelled. On the other hand, talents with rational judgment, logical thinking ability, innovation ability and sound personality are not easy to be replaced by ChatGPT, and the major that cultivate these abilities will be more important. Basic disciplines form the foundation for the development of all disciplines [13] and provide scientific basis for problem-solving. Learning basic disciplines is the fundamental training for cultivating innovative ability and requires an increase in its importance. Humanities disciplines play a vital role in shaping students' values and forming a sound personality, requiring a resource shift toward humanities specialties to increase their weight in higher education.

2.3 Challenges in Higher Education Talent Cultivation Model Lagging Behind Student Development Needs

From ChatGPT's limited performance so far, it has shown moderate performance, though it has not yet excelled in answering doctoral-level questions, it performs reasonably well with master's-level questions [14]. With the application of ChatGPT in higher education, students can analyze their learning behaviors, diagnose their learning conditions, and customize learning plans using ChatGPT at any time. Student autonomy will become more important in higher education, and the existing talent cultivation model may no longer be suitable for future students. As an advanced form of Internet + artificial intelligence, ChatGPT will not only facilitate human life but will also change the way humans think and approach problem-solving. University students, as the new generation of young people, still have highly malleable thinking, making them more susceptible to the influence of ChatGPT. When the thinking patterns of the target of cultivation — university students — change, their learning needs will change as well. The significance of what we once valued as "specific skills" may diminish, while the importance of value judgment and critical thinking, which were previously not emphasized enough, will increase. However, the existing cultivation model has not changed accordingly, leading to a lag in higher education talent cultivation model compared to student development needs.

2.4 Impact on Higher Education Academic System

ChatGPT's ability to automatically edit text and write papers will make the paper-writing skills that many university students gradually acquire after years of academic practice less important. University students only need to input their requirements and relevant information into ChatGPT to obtain an academic paper. Some university students have already begun using ChatGPT, and with further development, a large number of university students may become dependent on and increasingly reliant on ChatGPT. As they stop engaging in academic writing for an extended period, their ability to apply academic language and analytical skills will gradually deteriorate. Ultimately, this will lead to a weakening of university students' academic autonomy and creativity, causing them to become "lazy" creators who rely on ChatGPT's intelligent construction. This, in turn, may lead to a lack of successors in higher education and changes in the existing academic evaluation system [15]. Additionally, when publishing blogs, articles, and other content online that uses ChatGPT-generated text, it becomes challenging to attribute the sources correctly, as the lack of interpretability of neural networks makes it difficult to determine whether ChatGPT infringes upon copyright. According to China's Copyright Law, authors can only be natural persons, legal entities, or non-legal entities, and it is evident that AIGC is not recognized as a legal entity and does not have copyright ownership [16]. Therefore, academic papers written by ChatGPT will raise issues of academic intellectual property attribution, significantly impacting the existing academic system.

2.5 Threats to Teacher's Teaching Models Diverging from Students

In the Internet era, ChatGPT will quickly spread throughout various corners of higher education through the Internet, challenging the current teaching models in universities. On one hand, ChatGPT can facilitate students' autonomous learning, altering their thinking styles and behavioral habits. When students undergoing education change, the existing teaching models will face new challenges. On the other hand, ChatGPT can also assist teachers in automatic text editing, completing assignments, and grading tests [17], effectively serving as an assistant to save teachers' time spent on lesson preparation, etc. However, as Papert put it, one of the biggest problems education faces is that teachers are using an outdated, non-digital language to try to teach people who speak an almost entirely digital language [18]. At present, university teachers have not actively utilized ChatGPT for data collection, analysis, and text writing in teaching, nor have they improved teaching models based on real demands. The proficiency of students in using ChatGPT and teachers' unfamiliarity with ChatGPT may create a generation gap between teachers and students, where teachers teach based on their own ideas, students learn using their own methods, resulting in the current teaching models diverging from students.

2.6 New Professional Requirements for University Teachers

In the Internet era, ChatGPT not only has access to a vast amount of information through the Internet at any time but also possesses the ability to quickly analyze data and make comprehensive judgments, things that humans cannot currently achieve. University teachers will face higher professional requirements to ensure their value. Research shows that ChatGPT displays some simple intelligent behaviors, answering consecutive questions, admitting mistakes, questioning incorrect premises, and refusing inappropriate requests. If the identities of the speakers were hidden, it could be a dialogue between two living researchers with a certain level of expertise [19]. ChatGPT has passed the "Turing Test" [20], showing some "human-like" characteristics. Some courses currently taught by university teachers may gradually be replaced, leading to new professional requirements for university teachers. Additionally, ChatGPT will significantly reduce teachers' teaching workload, freeing them from the tedious and inefficient repetitive research work and allowing them to focus more on guiding students in innovative research. This will change the role of teachers in higher education and further increase the professional requirements for them.

3. HIGHER EDUCATION'S RESPONSE TO CHATGPT

As Albert Einstein once remarked, "Science is a potent instrument, and whether it bestows happiness or calamity upon humanity entirely hinges on how humans wield it, rather than on the inherent nature of the tool itself." [21] ChatGPT, as a state-of-the-art tool in the realm of internet applications, remains value-neutral per se. It is incumbent upon humanity to adopt proactive measures, leveraging ChatGPT to advance human development rather than imperil it. Accordingly, higher education institutions should conduct an in-depth exploration of the challenges posed by ChatGPT to higher education and the underlying rationale behind these challenges, in order to devise targeted countermeasures:

3.1 Optimizing the Hierarchy of Higher Education

The core mission of higher education lies in producing high-caliber talents that align with societal needs. With the advent of ChatGPT, the demand for talents in society is set to undergo transformation. As such, higher education institutions ought to optimize their hierarchical structure. Based on the social relations and social practice on which human life depends, the integrity, emotion and innovative artificial intelligence of human thinking cannot be replaced [22]. Therefore, first of all, we should vigorously develop graduate education and cultivate the advanced talents needed by the society. Colleges and universities should not only increase the investment in professional graduate education and the cultivation of the practical innovation ability of academic graduate students, but also continue to expand the enrollment scale of doctoral students. Emphasis should be placed on graduate education, where the cultivation of socially desirable high-level talents can be prioritized. Moreover, control of the scale of undergraduate education should be exercised, fostering the cultivation of well-rounded, highly competent individuals. The transformation of vocational education should focus on nurturing talents possessing the specific skills demanded by

the populace. In this regard, vocational institutions should shift their emphasis from exclusive specialization to skill development and collaborative technological research, catering to the needs of specific segments of society and providing "lifelong learning" [23] opportunities.

3.2 Adjusting Higher Education Majors

According to the characteristics of ChatGPT and the monitoring and forecasting system of talent demand, [24] universities should compare the existing professional Settings, make preparations for professional adjustment, and make the adjustment plan in advance. Higher education institutions should reevaluate their majors based on the distinctive features of ChatGPT and the projected talent demands. Disciplines that are readily replaceable by ChatGPT in terms of technological applications should undergo reduced resource allocation, while preparation for their phasing out should be undertaken. Conversely, greater emphasis should be placed on fundamental and humanities disciplines, wherein ChatGPT's limitations render it incapable of addressing complex reasoning and human emotions. The anticipated rise in demand for talents in these fields necessitates the establishment and resourcing of majors that embody high innovation, humanistic care, and robust dialectical thinking, thereby effectively serving societal needs. Universities should increase the resource investment in these majors, and at the same time, combine the advantages of the university to build personalized majors [25], form their own characteristics and highlight the value of the major.

3.3 Establishing Talent Cultivation Models Aligned with Student Needs

At its core, the primary concern of students lies in employability. ChatGPT Will replace the original student training mode of talents, and adhere to the "moral education first, ability, comprehensive development" quality education [26] cultivate talent is not easy to be replaced, so colleges and universities should strengthen quality education, promote students all-round development, meet the needs of society, cultivate high-quality talents for the society. As western Liverpool university President Youmin Xi said, "the future university should be a place for lifelong learning, support people creative life place" [27], universities need to help students to change the original passive learning concept, find learning goals , on-demand

custom personal learning plan, play to the student's subjective initiative, encourage students to autonomous learning and lifelong learning, and cultivate personality; Higher education is no longer a mode of knowledge indoctrination for students, but should pay attention to cultivating students 'ability of innovation, criticism and practice. Colleges and universities should cultivate students' innovative spirit, critical consciousness and practical ability through quality-oriented education, and cultivate innovative talents with critical thinking to engage in production and construction activities. At the same time, we should pay attention to the integration of majors, establish an interdisciplinary talent training model of "Internet + artificial intelligence + majors", and take the initiative to introduce ChatGPT and other new technologies into the talent training system to cultivate talents to meet the needs of society.

3.4 Enhancing the Higher Education Academic System

Primarily, the responsible usage of ChatGPT for academic creation warrants attention. International conferences such as the International Conference on Machine Learning (ICML) and select journals have already prohibited the use of large pre-trained models like ChatGPT as a means to assist in writing papers, mitigating potential overreliance and undue impact on the existing academic creation system. Consequently, higher education institutions should develop pragmatic regulations concerning the intellectual property rights pertaining to ChatGPT-generated works [28], reducing its impact on academic creativity while rectifying potential lacunae in the academic system. Furthermore, improvements to the academic evaluation system should be prioritized [29]. Incentives must be devised to encourage student engagement in independent academic writing and research, elevating the importance accorded to problem-solving and academic innovation in the evaluation framework. This would enhance students' academic pragmatism and creativity, motivating them to engage in meaningful academic pursuits. Moreover, shaping the academic atmosphere and forging a consensus that ChatGPT should neither be utilized for student examinations nor paper writing is imperative to curb its misuse.

3.5 Establishing Interactive and Diverse Teaching Models

Educators should conduct thorough analyses of their courses to innovate teaching models accordingly. Departing from traditional unidirectional control, teachers should facilitate two-way interaction with students, increasing student participation and enthusiasm for learning. Teachers still improve students' participation and enthusiasm, help students correctly use ChatGPT and other tools to learn, and establish a dual-subject enlightenment and guided classroom teaching mode [30]. They should also change the simple teaching mode of knowledge indoctrination as soon as possible, form a flexible teaching mode that focuses on innovation and thinking guidance, and become the students' inspiration, so that the teaching time is no longer confined to the institutionalized classroom time, teaching place is no longer limited to the classroom. Teachers should also emphasize moral education and emotional communication [31], fostering students' individual development and meeting their increasingly multifaceted learning needs. Using active integration of ChatGPT and other AI tools into the teaching system, teathers leverage their capabilities for intelligent grading and provision of learning materials and serve to diminish repetitive workloads for educators. Consequently, educators can dedicate more time to analyze students' demands and characteristics, adapt teaching content and methodologies accordingly, and enhance teaching effectiveness through a more versatile and efficient teaching model.

3.6 Enhancing teachers' Professional Competencies

In the era of intelligent education, the roles of teachers have undergone a process of fine-grained specialization. Teachers shall shoulder responsibilities that machines are incapable of replacing, necessitating the enhancement of their professional competencies [32]. First and foremost, educators should elevate their course innovation capabilities. For courses involving high innovation or critical thinking, educators should consistently innovate their teaching content. On the other hand, educators teaching courses that emphasize knowledge accumulation or simplistic technical applications should promptly revise their courses to elevate innovation. Moreover, educators should hone their abilities for student care and emotional communication. As Johann Pestalozzi asserted,

"Education is a mutual exchange of body and soul between people." [33] Therefore, educators should actively engage in interactions and emotional exchanges with students during the teaching process, underscoring moral education and nurturing students' noble character, proper worldviews, and value systems. Additionally, educators should actively participate in practical activities, enhancing the efficacy of their courses, updating their knowledge base continually, grasping the latest developments within their specialized fields, and elevating the timeliness of their courses. Thereby, they can provide students with effective knowledge and actionable methodologies. In conclusion, educators should strive to enhance their competencies, showcase their value, and successfully preserve themselves in the future competition with artificial intelligence, such as ChatGPT.

4. CONCLUSION

Currently, the integration of the internet and artificial intelligence technologies into higher education has brought about significant improvements and achievements. ChatGPT, as the latest advancement in these fields, presents challenges to various aspects of higher education, including its hierarchy, majors, talent cultivation models, academic system, teaching methods, and teacher capabilities. Higher education institutions must embrace a humanistic approach, encouraging collaboration among students, teachers, universities, and society to establish a diverse and cohesive regulatory framework. By implementing measures such as optimizing the hierarchy of higher education, adjusting major offerings, creating new talent cultivation models, enhancing academic creation and evaluation systems, innovating teaching methods, and bolstering teacher competencies, higher education can effectively address the challenges posed by ChatGPT. This proactive approach will foster the healthy development of higher education and promote positive advancements in the field.

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