Artificial Intelligence and Career Development of College Teachers: Challenge and Countermeasures

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Abstract. In this AI-dominated age, emergence of virtual teachers, advances in smart education and changes in the job market bring about new challenges to career development of college teachers. How to cope with the development of artificial intelligence, reshape the roles and improve their educational expertise has become an important issue that teachers should pay attention to. On the basis of previous studies and in-depth interviews with college staff and engineers, this study illustrates the strategies for career development and improvement of expertise of college teachers from the perspectives of building the human-computer collaboration philosophy, reshaping the role of teachers, improving expertise of smart education and increasing college support, in hopes of helping teachers to adapt to the AI-dominated age.

1. Introduction
Breakthrough in big data technologies have advanced development of AI products that have been adopted in diverse areas including urban transport, health care, smart homes, education and employment. The impact of artificial intelligence is increasing. In the field of higher education, artificial intelligence technologies have been playing an increasingly salient role in teaching activities. These changes have brought about impacts to reforms of higher education and the teachers’ career development. Discussions over “AI+higher education” have gained momentum in the academia, especially reflection over the changes in the teacher’s roles and career development: will robots replace teachers? If not, how the teachers’ roles will change? Will collaboration of teachers and AI complete the work of future teachers [1]? With the launch of policies including “AI Innovation Action Plan of Higher Education”, it is necessary to study the career development and expertise development of college teachers in the age of artificial intelligence.

2. Challenges for career development of college teachers in the age of AI
2.1. Emergence of virtual teachers
With the fast development of Internet, the ways and efficiency of information and knowledge transmission has witnessed considerable changes. The rise and wide adoption of MOOCs and micro-courses have made knowledge transmission more diversified and efficient. Traditional classes are no longer the only channel for students to obtain knowledge; instead, they can take online courses, which is more efficient and diversified. New technologies reverted the way of knowledge sharing. For instance, VR and AR provide richer experience for students to learn. These reduced overdependence on teachers and lead the teaching profession to a crisis. Moreover, with the emergence of virtual
teachers, the traditional teachers face harsh challenges in terms of their roles and career development. In 2014, AI passed the Turing test and was then applied to higher education by providing around-the-clock online help. At the start of 2016, Prof. Ashok Goel and his team from Georgia Institute of Technology provided an online course. To answer the thousands of questions on the forum and reduce the team’s workload, Prof. Ashok Goel used a robot assistant, Jill Watson. After being debugged, Jill reached an accuracy of 97% in providing answers and later even became able to communicate with students directly without human aid [2]. Obviously, AI plays an important role in supporting teaching activities. Studies have probed into the role of AI teachers in future education and assumed that AI teachers can undertake roles for 12 tasks: design test questions, check exam papers, diagnose and give feedback on learning disorders, evaluate the students’ problem-solving skills, assess their psychological resilience and improvement, monitor and improve their physical health, evaluate their all-round skills, provide tailored training, make education decisions [3]. Most work of college teachers can be done by AI devices.

2.2 Promotion of smart education
With the advancement of informatization of education, colleges are shifting their focus from digital education to smart education. Smart education is thus gaining more and more attention. Many colleges are making more investment to smart classrooms. Without smart classrooms, smart education will go nowhere. In 2012, Sichuan University started the “Project of building smart education environment”, and has invested more than 200 million yuan to advance “classroom reform” and build multi-window interactive classrooms, multi-screen research classrooms, network interactive classrooms, mobile interactive classrooms, flexible research and teaching offices, remote interactive classrooms and specific research offices. It has built more than 400 classrooms of these seven types, taking up over 80% of the total number of classrooms [4]. East China Normal University and Central China Normal University have made tangible achievements in construction of smart classrooms. Practice shows that smart classrooms help advance teaching reforms and improve the teaching quality. A study on H University shows that over 93% teachers think positive of smart classrooms. However, most teachers still have a superficial understanding of smart classrooms, and 43.3% teachers indicate that they are not able to use smart classrooms to shift from “teaching-dominated” education to “learning-oriented” education [5]. This means that to realize smart education, it is necessary to improve the teachers’ understanding of smart education.

2.3 Changes in the job market
AI is an inevitable trend and will bring about impact to some professions. AI and robots will replace human in simple and repetitive tasks. In 2013, Michael A. Osborne and Carl Benedikt Frey from Oxford University co-published a paper “The Future of Employment: How Susceptible Are Jobs to Computerisation?” They studied the rates of susceptibility of 365 professions to computerization: 99.0% for telemarketers, 98.5% for typists, 97.6% for accountants, and 97.0% for insurance marketers. Meanwhile, development of AI have given birth to some new professions, such as AI engineers, IoT engineers, IoT installation technicians, big data engineers, cloud computing engineers, etc. Moreover, AI introduces innovation to diverse professions, making technical operations more advanced and intelligent. It is obvious that in the AI age, the job market has witnessed considerable changes, and these changes will bring about new requirement for talent training in colleges, thus new requirements for the expertise of teachers.

3. Analysis of ways for career development of college teachers
In face of challenges, what college teachers can do? To give short shrift to or reject AI, obviously, will not solve the problem. In fact, research and practice shows that AI cannot fully replace teachers. Education in the future will be education with collaboration between the teachers and AI. Thus, college teachers are the subjects of educational reforms and smart education, and should give the unique advantage of AI in data mining full play, and re-position themselves in terms of educational
philosophy and reshaping of roles. To analyze career development of teachers, we conducted surveys and literature review, and made in-depth interviews with five college staff members devoted to AI research and enterprise engineers (as shown in Table 1).

Table 1. Interview subjects and topics.

| Interview subject | Interview topics | Duration (min) |
|-------------------|------------------|---------------|
| 1 A Professor     | AI and college talent training reforms, transformation of teachers’ expertise | 60 |
| 2 B Professor     | Role reshaping of teachers, teacher-student relations, smart teaching | 60 |
| 3 C Associate professor, deputy director of teaching office | Role reshaping of teachers, teacher-student relations, smart teaching | 60 |
| 4 D Senior engineer | In-depth integration between universities and enterprises | 45 |
| 5 E Engineer      | Framework of AI teachers | 45 |

3.1. Establishing Human-computer collaboration philosophy
As stated in “China AI Development Report 2018”, the purpose and significance of developing AI is not to replace humans, but to help make human activities more intelligent. AI technologies can save human from mechanical, repetitive and dangerous activities, and allow us to invest more time to thinking and innovation. In the field of higher education, teaching robots and virtual TAs will not replace teachers but collaborate with teachers to make teaching activities more efficient. The experts we have interviewed all think that “AI+teachers” will be a common existence in future higher education. Thus, college teachers should embrace the inevitable trend of AI, keep an open mind, change their entrenched thinking and establish the human-computer collaboration philosophy. In this way, colleges can direct teachers to think how to realize collaboration between teachers and AI, how to use AI to conduct educational reforms, how to improve the teachers’ expertise. This is what the teachers and colleges should do in the age of AI. So far, some studies are exploring the ways of AI-teacher collaboration under the philosophy of human-computer interaction. For instance, Prof. Shengquan Yu, in light of the level of intelligence in human-computer collaboration, categorizes the AI-teacher relation into four phases – AI agent, AI assistant, AI teacher and AI partner [6].

3.2. Reshaping of roles
In the interviews, the most discussed topics are the role reshaping of college teachers and improvement of teaching expertise. In teacher-AI collaboration, college teachers should re-identify their position and their roles. Then, what are the focuses of the shift of roles of college teachers? There have been in-depth studies in this regard. Some studies indicated that teachers should assume the roles of “analyst of student development data, value and belief guide, customized learning director, friend for students in learning from the society, car-giver for students’ mental and emotional development” [7]. Some other studies argued that teachers should remodel their roles – from “all-round talent” to “domain-specific talent”, from “teacher” to “assistant”, from “coach” to “advisor” [1]. Thus, as the focus of study changes, the discussions on the shift of roles of teachers differ, but what remains the same is that in the process of human-computer collaboration, the focus should not only be on “impartment of knowledge” but “cultivation of morals” of talents. Therefore, in reshaping the role of teachers, colleges should pay more attention to the mutual influence of the character, personality and wisdom of teachers, and to the students’ psychological well-being, values, social abilities and creativity.
3.3. Improving the ability of smart education

To build an environment of smart education in colleges, smart education-oriented teachers are needed. As a result, teachers should dispense with the “spoon-feeding” teaching method, and learn how to interact with AI to develop more intelligent teaching methods and improve their expertise of smart education. First of all, college teachers should learn more about AI technologies and how to use these technologies. Only by improving their skills of using AI technologies can they realize effective collaboration with AI. Secondly, college teachers should, by using AI technologies, improve their data literacy. Education decision-making and precision education should be driven by big data analysis. Teachers are expected to be able to mine the obtained data, acquire information on the learning status and growth status of students, and on that basis, teach the students and improve teaching reforms. Thirdly, college teachers should establish their own personality and teaching charisma. Teaching practice shows that even though the environment of smart education remains the same, different teaching methods will lead to different effects and popularity. Personalized education and charismatic teachers will invigorate the classroom; otherwise, teaching will become boring and humdrum routines. Therefore, teachers should, in light of their own conditions, make the best of AI technologies and make bold innovations to carry out teaching reforms, explore special smart teaching methods and improve their teaching effect.

3.4. Increase facility support from colleges

Indeed, role reshaping and expertise improvement of teachers not only rely on the teachers’ own efforts but more on the support from colleges. On one hand, colleges should embrace challenges of AI and increase investment into smart campus construction to provide material conditions for “AI+ higher education”; on the other hand, colleges should rely on smart education to lead and shore up teaching reforms. Colleges should establish incentives and provide specific training funds to encourage teachers to carry out classroom reforms, accelerate changes in the teachers’ knowledge network, teaching philosophy and teaching ways, thus giving help for the teachers’ career development.

References
[1] Zhang, Y.L., Shang, J.J. (2019) Reengineering the Role of Teachers in the Era of Artificial Intelligence. Tsinghua Journal of Education, 40:39-45.
[2] Jiemodui. (2016)"My teacher is a robot"; Georgia Tech uses AI as a teaching assistant. https://www.jiemodui.com/N/47445.html.
[3] Yu, S.Q. (2018) the Future Roles of AI Teacher. Open Education Research, 24:16-28.
[4] Sina. (2018) 2018 International Smart Education Exhibition: Exploring the Smart Classroom Solution of Sichuan University. http://k.sina.com.cn/article_5121738109_13147857d00100dwuc.html.
[5] Mao, Q.M., Jiang, L.B., Hou, J.Q. (2018) Investigate on the Effectiveness of the Application of Smart Classrooms by University Teachers-A Case Analysis of University H. Modern Educational Technology, 28:49-55.
[6] Yu, S.Q., Wang, Q. (2019) Analysis of Collaborative Path Development of "AI+Teachers". e-Education Research, 4:14-22.
[7] Fan, G.R. (2018) Teacher’s Roles in Intelligence Era. Research in Educational Development, 10:69-74.