Trends in Social Sciences and Humanities Research
Print ISSN: 2959-992X
Online ISSN: 2959-9938
DOI: https://doi.org/10.61784/tsshr3195

THE INFLUENCE OF AI-ENABLED SMART COURSES ON THE TEACHING PEDAGOGY IN HIGHER EDUCATION

LiShan Lv
School of Foreign Study, South China Agricultural University, Guangzhou 510642, Guangdong, China.
Corresponding Email: lv_sally@scau.edu.cn

Abstract: With the rapid advancement of artificial intelligence (AI) and educational technology, smart courses have emerged as a transformative force in reshaping English language teaching (ELT) pedagogy in higher education globally. This paper explores the impact of smart courses on ELT pedagogy by first reviewing the development of smart courses and distinguishing them from traditional online learning platforms such as MOOCs and Coursera. It then analyzes the revolutionary changes brought by AI empowerment, focusing on three dimensions: reform in AI-enabled education, the specific impacts on teaching pedagogy (encompassing teachers, students, and management and evaluation), and the overall influence on higher education. Finally, the study also raises some concerns about future research of smart courses.
Keywords: AI-enabled smart course; English language teaching; Higher education; Pedagogy; AI empowerment

1 INTRODUCTION

In the digital era, the integration of educational technology and language teaching has become a core trend in higher education reform. English, as the most widely used international language, plays a pivotal role in global academic exchange, career development, and cultural communication. Traditional English teaching in higher education, however, often faces challenges such as standardized curricula that fail to cater to individual learning needs, limited interaction between teachers and students, and inefficient assessment methods[1] . The emergence of online learning platforms like MOOCs (Massive Open Online Courses) and Coursera in the early 2010s initially addressed some of these issues by expanding access to educational resources, but they still lacked adaptability and personalized guidance [2].

In recent years, smart courses, empowered by AI technologies such as natural language processing (NLP), machine learning (ML), and big data analytics, have transcended the limitations of traditional online education. Unlike MOOCs which primarily focus on content delivery, smart courses emphasize dynamic interaction, adaptive learning paths, and data-informed decision-making. This paper aims to investigate how smart courses are transforming ELT pedagogy in higher education both at home (China) and abroad. By examining the development of smart courses, comparing them with traditional online platforms, and analyzing the AI-driven changes in teaching practices, this study seeks to provide insights into the future direction of ELT and its contribution to higher education quality and national language soft power.

2 LITERATURE REVIEW

2.1 The Development of AI-enabled Smart Courses

The concept of “smart courses” originated from the intersection of smart education and adaptive learning. According to UNESCO [3], smart education refers to “the application of emerging technologies to transform teaching and learning environments, making education more personalized, efficient, and inclusive.” Smart courses, as a core component of smart education, integrate AI, big data, and interactive technologies to create learning environments that can adjust to individual learners’ abilities, interests, and progress. Abroad, institutions like Stanford University and MIT have pioneered smart course platforms, such as Stanford’s AI-powered language learning system that uses NLP to provide real-time feedback on students’ writing and speaking .In China, the development of smart courses has been accelerated by national policies such as the “Education Informatization 2.0 Action Plan”[4], which emphasizes the integration of AI into educational practices.

The global promotion in AI-enabled education has grown exponentially in recent years, with a particular focus on smart courses for language learning. In China, major universities such as Peking University and Tsinghua University have established AI-education laboratories to develop smart English courses, which integrate virtual reality (VR) for immersive language learning and big data analytics for student performance tracking. Tsinghua University’s “Smart English” platform has been adopted by over 100 domestic universities, serving more than 500,000 students. Some other provinces also promote the construction of platforms for smart education at faster speed, focusing more on large-scale platform construction and policy-driven promotion.

2.2 Differences Between AI-enabled Smart Courses and Traditional Online Platforms

Traditional Online Platforms such as MOOCs and Coursera have made significant contributions to expanding educational access, they differ fundamentally from AI-enabled smart courses in several key aspects. First, in terms of personalization, MOOCs typically offer a one-size-fits-all curriculum, whereas smart courses use ML algorithms to analyze students' learning data (e.g., quiz scores, time spent on tasks, error patterns) and generate customized learning paths. For example, a smart English course can identify a student's weakness in grammar and recommend targeted exercises, while a MOOC would present the same grammar module to all students [5]. Second, interaction in MOOCs is often limited to discussion forums and pre-recorded videos, while AI-enabled smart courses enable real-time interaction through AI chatbots, virtual tutors, and interactive simulations. Third, assessment in MOOCs relies heavily on automated multiple-choice tests, whereas smart courses use NLP and ML for formative assessment, such as evaluating essay content, detecting plagiarism, and providing detailed feedback on pronunciation [6].

The potential of digital technologies in language teaching has been explored in early studies [7] but did not fully integrate AI. More recent studies have examined the effectiveness of AI-powered tools in smart courses. AI is streamlining operations and improving efficiency. Universities are leveraging AI to automate tasks like admissions processing, grading assignments, it did improve the effectiveness. Researches also studied the modes of function of information presentation and assess their impacts on college students' cognitive, skill-based, and affective learning outcomes[8-10].However, these previous studies have focused on individual technological tools rather than the holistic impact of smart courses on teaching pedagogy.

3 REQUIREMENTS IN AI-ENABLED SMART COURSES

AI-Enabled Smart Courses should cater to the following qualities: 1. adaptive learning with tailored content based on individual strengths and weaknesses, thus better satisfying students' need; 2. immersive learning environment with real-world scenarios to simulate work or academic contexts and bridge the gap between theory and practice; 3. real-time feedback system with instant corrections on learning. With "digital intelligence-driven and multi-dimensional integration" as its core strategy, the course systematically integrates knowledge graph, competence graph, question graph and literacy graph (ideological and political quality) together with all teaching contents to form a whole system, reconstructs the learning and teaching ecology, effectively enhancing students' language application ability and cross-cultural literacy.

Various resources such as textbooks and other learning materials present the logical connections of knowledge nodes through knowledge graphs, helping students build a systematic language knowledge network. Knowledge graph usually helps to visualize hierarchical relationships between dimensions, nodes, and resources. The graph continuously is updated based on teaching feedback and curriculum reforms.

Smart courses also highlight the competence dimensions of students: Based on teaching objectives and language proficiency frameworks (e.g., CEFR), it presents the competence into four core dimensions: language proficiency (listening, speaking, reading, writing, translation), cultural literacy (cross-cultural communication, global cultural awareness), academic skills (academic writing, critical reading, research presentation), and learning autonomy (self-assessment, resource utilization).Through the competence map, teachers get to identify students' strengths and weaknesses by analyzing their performance against node indicators .

Together with these two graphs, the question graph that centers on "learner questions" is also a required part of the whole course design. It systematically organizes, classifies, and associates questions generated in teaching (e.g., students' doubts, key inquiry topics, and assessment questions) with knowledge nodes, learning resources, and competence goals.

As a new requirement in the design of the smart course, systematic construction of literacy (ideological and political literacy or quality) corresponds to a clear value view, such as dedication, patriotism, innovation, and progress. It also supports the visualization of critical thinking cultivation in the course.

For each dimension, map knowledge and skill nodes refine sub-competencies and link to specific knowledge nodes (e.g., "academic writing" includes sub-nodes like essay structure, citation norms, and academic vocabulary) and skill indicators (e.g., "speaking" covers fluency, pronunciation, and topic relevance).

The 4-dimension system enhance the teaching alignment, it helps to guide teachers to design lessons aligned with core dimensions, ensuring resources and activities directly contribute to competence improvement.

4 THE IMPACT OF SMART COURSES ON TEACING PEDAGOGY

According to the China Smart Education Development Report, 2025 was defined as the "first year of smart education"[11]), since then smart courses have brought profound changes to ELT pedagogy, affecting teachers, students, teaching methods, and management & evaluation.

4.1 For Teachers

Student-centered pedagogies prioritize learners' autonomy, individual needs, and active participation. Smart courses have transformed teachers' roles from "knowledge transmitters" to "learning designers and mentors". AI, big data, and interactive technologies amplify this focus by enabling personalization, adaptive learning, and collaborative engagement. AI tools handle routine tasks such as grading homework, providing basic feedback, and tracking student progress, allowing teachers to focus on designing personalized teaching strategies and facilitating interactive activities.

Smart courses serve to reduce teachers' workload. More intelligent agents or tools like VR that can simulate real-world scenarios (e.g., international conferences, job interviews) allowing students to practice English in immersive environment.

However, many macro-systems lack sufficient training and support for teachers, leading to resistance or ineffective implementation because teachers may be inadequately trained to use AI-powered smart course tools, and struggle to balance technology with traditional teaching methods. This may lead to "tech-for-tech's-sake" implementations—smart courses are adopted in macro-designs but not integrated meaningfully into lessons, wasting resources and failing to improve learning outcomes. In the context of AI era, access to information is easy, another problem may come out--teachers need to figure out innovative ideas that can attract the interest of students to learning while struggling to learn new technologies like AI and generative tools at a faster pace than students do, which will be more challenging for language teachers. ELT teachers should aim high in designing smart courses that can enhance students' ability to participate in global academic and cultural exchanges, fostering cross-cultural understanding and strengthening global language soft power networks.

4.2 For Students

With adaptive learning paths, students can learn at their own pace and focus on areas where they need improvement. The interactive features of smart courses, such as AI chatbots and VR simulations, also increase student engagement. Smart courses also offer integrated graph resources such as knowledge graph, competence graph, question graph as well as literacy graphs (or quality that help to shape the critical thinking) for students to follow and search the content they want to learn at a faster pace. For example, a smart course on "Airport English" includes a self-directed learning hub. Students can select subtopics based on personal needs (e.g., a student preparing for an international trip might prioritize "check-in dialogue practice,". Students can use a built-in self-assessment tool after practicing "boarding pass vocabulary," and they can take a 10-question quiz and receive an instant report (e.g., "You mastered 7/10 words－review 'gate number' and 'departure time''). And they can join peer forums to ask questions (e.g., "Does anyone have tips for pronouncing 'baggage claim' clearly?") and share resources (e.g., linking to a YouTube video on "airport announcement listening practice"). This empowers students to take ownership of their learning journey. Students can have independent learning at their own pace, but have a clear picture of how they learn and what position they are in compared with their peers with the data produced in the learning platform.

Smart courses include tools for students to evaluate their own progress-encouraging them to reflect on strengths and weaknesses. This aligns with student-centered pedagogy by giving students ownership of their learning, for example a smart course on "airport English" includes a self-assessment tool for the "navigation" module. Students complete a practice quiz on signage vocabulary and directional dialogue. They can evaluate their learning outcome by using a checklist to rate their own skills (e.g., "I can understand 'baggage claim' signs: 1=Not at all, 5=Very well"). This helps students identify gaps independently and take steps to improve.

However, since knowledge are easily accessed to, they may face the decrease of efforts and willingness of getting involved in the required study time, thus the guiding of learning for teachers and the sense of fulfillment may become the more important focus in education.

4.3 For Management and Evaluation

Smart courses enable data-driven management and formative evaluation. Big data analytics can track students' learning behaviors in real time, providing teachers and administrators with insights into student progress and course effectiveness. Students-centered smart courses organize resources (e.g., micro-lectures, practice exercises, peer forums) in a modular, searchable way. AI analyzes student behavior (e.g., which resources are accessed most, how long students spend on them) to update resource libraries—adding high-demand materials and removing outdated ones. For example, smart courses use real-time data to track each student's progress toward learning goals (e.g., mastering "airport check-in dialogue," improving writing fluency). Teachers can access dashboards to identify students who need extra support or acceleration—enabling proactive intervention.

Traditional evaluation often focuses on summative assessments (e.g., midterm/final exams) that measure "what students know" at a single point. Student-centered smart courses shift to formative, multi-dimensional evaluation—using AI to assess skills (e.g., speaking fluency, collaboration), provide real-time feedback, and involve students in self-assessment. This makes evaluation fairer, detailed, and focused on improvement on not just factual knowledge (e.g., vocabulary, grammar rules) but also practical skills (e.g., communication, critical thinking) and soft skills (e.g., collaboration, self-direction)—key to student-centered learning. AI tools analyze multiple data points (e.g., dialogue recordings, group project contributions) to generate holistic evaluations.

AI-powered assessment tools can evaluate not only knowledge acquisition but also skills such as critical thinking and communication. Feedback of students learning can further help the redesign of the teaching process and the adjustment of the teaching content flexibly. Smart courses break geographic and resource barriers by centralizing high-quality educational content (e.g., lectures by top professors, interactive simulations, digital libraries) on cloud-based platforms, making them accessible to schools nationwide or even globally. The democratization of resources aligns with macro-design goals of reducing regional education disparities, ensuring more equitable access to quality learning opportunities.

Though with the massive volumes of student data (e.g., learning habits, performance metrics, personal information etc.) generated by smart courses, educators can use them in the promotion of better education to realize the macro schema of education. But it may also raise critical ethical concerns in macro-educational design, such as data privacy breaches, algorithmic bias, and the potential misuse of sensitive information. Without robust regulatory frameworks, macro-designs may prioritize data utility over student privacy.

5 CONCLUSION

This paper has explored what smart courses center on and how smart courses are transforming ELT pedagogy in higher education in the new era. Smart courses highlight the importance of the design of the course's four graphs (knowledge graph, competence graph, question graph and literacy graph) that work for the development of students in the new era. It advocates shifting from traditional knowledge-based education to a more comprehensive model that integrates personal development with societal needs. We believe that it will enhance the quality and accessibility of higher education and reshape teaching pedagogy by redefining the roles of teachers and students, promoting learner-centered teaching methods, and enabling data-driven management and evaluation.

Despite the progress, we would like to remind that challenges remain, such as ensuring the equity of access to smart courses, addressing data privacy concerns, and integrating AI tools with human teaching effectively. When an AI tutors a student on the language by adapting explanations based on real-time performance, it redefines the "source" of knowledge—not just a teacher or textbook, but an algorithm that synthesizes vast datasets. This raises questions: Does knowledge generated by AI carry the same "validity" as human-curated knowledge? Can learners truly "know" a concept if their understanding is shaped by an algorithm's priorities (e.g., prioritizing testable facts over conceptual depth)? What is the influence of teachers in the shaping of students' thoughts since we believe in the saying of "The essence of education lies in the fact that one tree shakes another tree, one cloud pushes another cloud, and one soul awakens another soul."

Future research should focus on these challenges and explore the long-term impact of smart courses on ELT pedagogy. Overall, smart courses represent a promising direction for the future of English teaching in higher education, offering new opportunities to improve learning outcomes and promote the development of education.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

FUNDING

The research received funding by South China Agricultural University Teaching Projects "Ideological and Political Education Demonstration Course - Practical Situational Oral English"(kcsz2023024) and by South China Agricultural University Teaching Projects "Smart Courses- Practical Situational Oral English".

REFERENCES

[1] Richards J C, Rodgers T S. Approaches and methods in language teaching (3rd ed.). Cambridge University Press, 2014.
[2] Dillenbourg P, Järvelä S, Fischer F. The evolution of research on computer-supported collaborative learning. In: Balacheff N, Ludvigsen S, de Jong T, et al. (eds). Technology-enhanced learning, Springer, 2009: 3-19. DOI: 10.1007/978-1-4020-9827-7_1.
[3] UNESCO. Global education monitoring report: Technology and education. Paris: UNESCO Publishing, 2023.
[4] European Commission. Digital education action plan (2021-2027). Brussels: European Commission, 2021.
[5] Baker R S. Challenges for the future of educational data mining: The Baker learning analytics prizes. Journal of Educational Data Mining, 2019, 11(1): 1-17.
[6] Bates A W. Teaching in a digital age: Guidelines for designing teaching and learning (3rd ed.). Open University Press, 2019.
[7] Warschauer M, Matuchniak T. New technology and digital worlds: Analyzing evidence of equity in access, use, and outcomes. Review of Research in Education, 2010, 34(1): 179-225.
[8] Akyuz Y. Effects of intelligent tutoring systems (ITS) on personalized learning (PL). Creative Education, 2020, 11(6): 953. DOI: 10.4236/ce.2020.116069.
[9] Bhutoria A. Personalized education and artificial intelligence in the United States, China, and India: A systematic review using a human-in-the-loop model. Computers and Education: Artificial Intelligence, 2022, 3: 100068. DOI: 10.1016/j.caeai.2022.100068.
[10] Cui W, Xue Z, Thai K P. Performance comparison of an AI-based adaptive learning system in China. In: 2018 Chinese Automation Congress (CAC), Xi'an: IEEE, 2018: 3170–3175. DOI: 10.1109/CAC.2018.8623327.
[11] Ministry of Education of China. Education informatization 2.0 action plan. Beijing: Ministry of Education of China, 2018.