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A Review of the Last Two Decades of Research on Deep Learning From the Perspective of Education in China

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Abstract. In recent years, deep learning has gradually become a hot topic in the field of education. This paper summarizes the research on deep learning in education in the past two decades. The relevant academic journals and dissertations published at home and abroad are statistically analyzed. The annual distribution of literature, literature sources, and research hotspots are interpreted in turn, with a view to summarizing the current status of research on deep learning in China, identifying problems and making a conclusion.

Keywords. Deep Learning; Research Review; Teaching Pedagogy

1. Introduction

With the rapid development of society and the popularity of smart devices and 5G networks, English learning is beginning to break through the traditional limitations of paper textbooks and books and move to mobile. English vocabulary, as the foundation of English learning, has always had a pivotal role in English teaching. However, vocabulary teaching, which is the foundation of second language acquisition, is often neglected in the teaching process, and students' acquisition of vocabulary is often limited to its fragmented and superficial meanings, while ignoring its essential internal connections and the deeper meaning and use of vocabulary. Therefore, deep learning strategies based on cognitive semantics should be introduced in English vocabulary teaching, so that students' passive and shallow learning can be transformed into deep learning that is more in line with the laws of language acquisition.

2. The origin of the concept of deep learning in the field of education

The concept of deep learning in education was first introduced by the Swedish educational psychologist Ference Marton in his series of papers ON QUALITATIVE DIFFERENCES IN LEARNING with Roger_Säljö (1976). In an empirical investigation of Swedish university students' reading ability, the authors found that the subjects used two distinct information processing processes, one focusing only on the meaning of the text itself, known as "surface-level processing", and the other focusing on The other type of acquisition, which focuses on the intention of the text and the author's directionality, is called deep-level processing. In Marton's view, shallow learning involves the use of minimal involvement in the completion of a task, and the learner usually focuses on acquisition at the level of memory

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and application, but this process does not include reflection on knowledge, and the aim of learning is usually to achieve a grade in an exam. Deep learning, however, involves a willingness to understand and deeply interpret intentions. In deep learning, students focus more on understanding the relationships between the many dimensions of the text, developing hypotheses and their own understanding of the concepts and issues within the text. More attention is given to gaining intrinsic interest in learning and understanding. (Smith, 2007).

3. Analysis of literature related to deep learning

3.1. Distribution of deep learning research topics

In a search of the concept of "deep learning" on the Internet, there were 33,365 papers on the concept between 2000 and 2022, and most of these papers were on the concept of "deep learning" in the field of computer and artificial intelligence. In the field of education, however, the concept has also flourished and has become one of the most popular concepts in the field of educational theory and higher education. In this search, there were 4,829 papers related to deep learning in education. The research focuses on the exploration of deep learning strategies and empirical studies of learning models in various levels of education, including higher education. This study selects 1,778 of these papers from the Chinese Social Sciences Citation Index (CSSCI) and the core journal of Peking University for summary analysis.

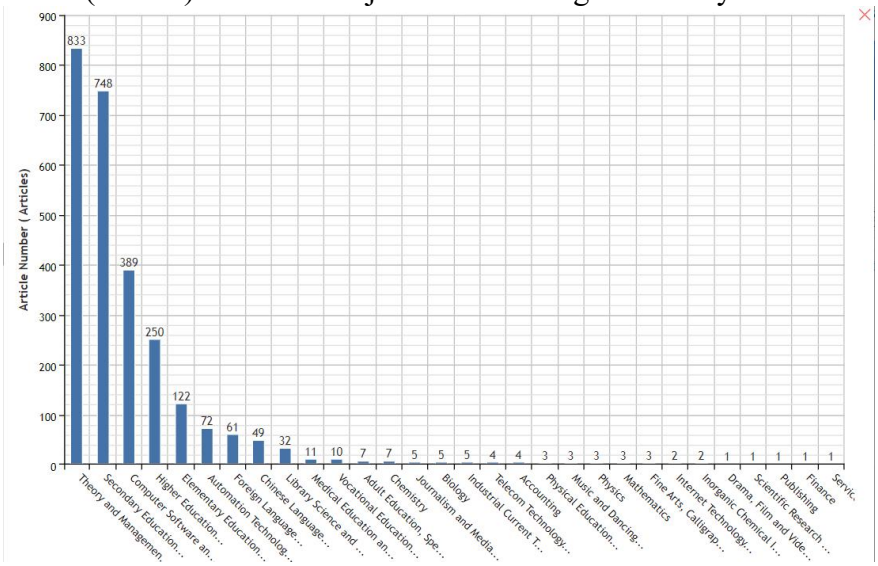

Figure 1. Deep learning research topic sub-distribution, 2000-2022

As can be seen from Figure 1 Distribution of deep learning research topics by topic 2000-2022, deep learning in education has to contribute in a considerable amount in different dimensions of pedagogy. Firstly, it is represented at all levels of education: e.g. primary education, higher education, higher education, etc. Deep learning research in this part of the field mainly combines teaching practice and explores the design of learning models and the construction of disciplines in a deep learning perspective. Secondly, there is the innovation of teaching models. This part of the research mainly combines deep learning with innovative forms of teaching concepts such as core literacy development, flipped classroom, blended teaching and smart classroom. Last but not least, very revealing is the research that combines deep learning with multimedia teaching tools such as big data, artificial intelligence and information technology. This part of the research integrates the concept of e-learning with the concept of deep learning in the digital age, which is enlightening.

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3.2. *Yearly trends in deep learning publication in general*

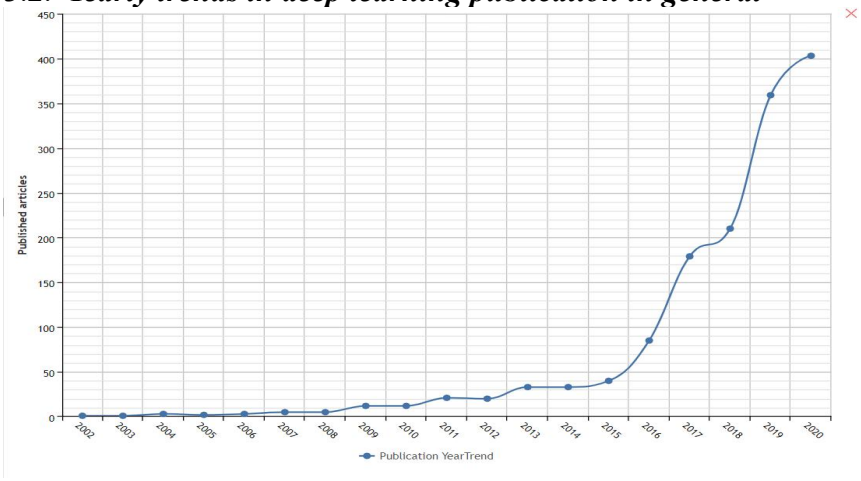

Figure 2. Yearly trends in general publication of deep learning in education

Figure 2 shows the yearly trend of academic papers related to deep learning in education, with the vertical axis showing the annual number of articles published in CSSCI and Chinese core journals such as Peking University Core, and the horizontal axis showing the year. From the above trend graph, it can be seen that research on deep learning in education has initially started in 2012 and has gradually and steadily developed from 2012 to 2018, and the number of relevant academic papers has made a certain leap since 2018, and the number of relevant core papers has surged from 2020 onwards, which reflects from one side that the attention of this research trend has been increasing and has a tendency to gradually become mainstream.

3.3. Trends in the distribution of articles in higher education institutions

In recent years, there has been a gradual increase in the importance attached to the concept of deep learning in some university institutions. This is also evident from the fact that teacher-training institutions have invested great efforts and placed greater emphasis on exploring innovative teaching methods and combining deep learning with teaching practice. The above distribution trend also shows that some universities, such as East China Normal University, Central China Normal University, Beijing Normal University, Southwest University and Shaanxi Normal University, have made high contributions in this field, with more than 50 papers on deep learning in education being included in core journals of Peking University and CSSCI journals in the past two decades.

3.4. Distribution of published journal sources

Based on the papers related to research on deep learning in education, the journals with the largest number of publications are *Research on Electrochemical Education*, *Chinese Electrochemical Education*, *Modern Educational Technology*, *Journal of Distance Education*, *Chinese Journal of Education*, *Chinese Distance Education*, *Modern Distance Education Research* and *Open Education Research*, etc. In general, the journals of educational theory and educational research are more recognized and In general, educational theory and educational research journals are more recognized and accepted in this field. Among them, the journals that focus on the research of e-education, distance education and educational technology pay more attention to the research of deep education, the reason for which this study believes has an extremely important connection with the essence and origin of deep learning, the concept of deep learning was first put forward by the computer field, and has a deep research foundation in artificial intelligence, algorithm research, convolutional neural

network and other related fields. More research scholars have attempted to introduce the concept of deep learning in the computer field into the field of education, providing new research methods and ideas to the field of education. This interdisciplinary combination is also more in line with the research characteristics of educational technology and distance education journals, and is therefore more easily accepted by such journals. This trend also reflects that domestic research related to deep learning is increasingly showing an interdisciplinary, multi-disciplinary, and technically focused combination.

4. Conclusion

Among the studies related to deep learning in education, a considerable part has given a definition of the concept and connotation of deep learning. In China, Professor Li Jiahou (2005) was the first to introduce the concept of deep learning in education. In his analysis of the characteristics of deep learning, he combined Bloom's taxonomy of educational goals and divided the teaching goal levels into six levels, with shallow learning corresponding to the first two levels, and deep learning corresponding to the last four corresponding to more in-depth levels. Zhang Hao (2012) compared the characteristics of deep learning and shallow learning, summarising the differences between the two levels of learning in terms of memory style, knowledge system, focus, engagement, reflective state, transferability, thinking level and motivation, and concluded that deep learning focuses on critical understanding and emphasises information integration, and can promote knowledge construction, transferability and problem-solving oriented, and further advocates lifelong learning. Guo Hua (2016) defines the conditions for deep learning to occur or not, namely through association and structure, the interconversion of experience and knowledge; the activities and experiences in the student's learning mechanism; the ability to deeply process the learning object; transfer and application and ultimately the evaluation process to determine whether deep learning can consciously occur and have an impact.

References

[1] Czerkawski, B. C. (2014). Designing deeper learning experiences for online instruction. Journal of Interactive Online Learning, 13(2).
[2] Guo,H. (2016). Deep learning and its implications. Curriculum, Teaching Material and Method, 36(11), 25-32.
[3] Hirschel, R., & Fritz, E. (2013). Learning vocabulary: CALL program versus vocabulary notebook. System, 41(3), 639-653.
[4] Klimova, B. (2021). Evaluating impact of mobile applications on EFL university learners' vocabulary learning–A review study. Procedia Computer Science, 184, 859-864.
[5] Mahdi, H. S. (2018). Effectiveness of mobile devices on vocabulary learning: A meta-analysis. Journal of Educational Computing Research, 56(1), 134-154.
[6] Traxler, J. (2005, June). Defining mobile learning. In IADIS International Conference Mobile Learning (Vol. 261, p. 266).
[7] Wang, Y. H., & Shih, S. K. H. (2015). Mobile-assisted language learning: Effects on EFL vocabulary learning. International Journal of Mobile Communications, 13(4), 358-375.
[8] Zhang, H., & Wu, X.J.,(2012). The connotation and cognitive theoretical basis of deep learning. China Educational Technology, 309,7-21.