

Review and Prospect of Research on Metalanguage in Educational Field-Based on Visualization Analysis of Keywords With Citespace

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Abstract. The forms and meanings of language are significant in the educational field. According to Systematic Functional Linguistics, language has the functions of ideational, textual, and interpersonal. Metalanguage can not only be used to explain the forms of language but also plays an important role in connecting the forms and meanings of language. This paper visually analyzes the research related to metalanguage in the educational field using Citespace, a kind of citation visualization analysis software, and finds out that the number of publications on metalanguage in educational field grew rapidly from 2011 to 2020 and declined gradually, which is presumably caused by the outbreak of the COVID-19 pandemic. Additionally, the clusters of keywords are presented visually and mainly include *language awareness*, *assessment*, *pedagogy*, *English language learners*, and *disciplinary literacy* and so on, which represent research focuses in this field. The keywords with the strongest citation burst have *Systematic Functional Linguistics*, *language and pedagogy*, which could be the research hotspots in future studies on metalanguage in educational field. This paper hopes to provide future studies about metalanguage and education with a new research perspective.

Keywords: metalanguage, Citespace, Systematic Functional Linguistics, education.

1. Introduction

The distinction between object language and metalanguage is proposed to solve the problem of liar paradox [1]. Sometimes when people talk about language, language is both the object and the tool. Metadiscourse was first coined by Zelling Harri in 1959, which was adopted in discourse studies from 1959 to the mid-1980s, then metadiscourse and metalanguage got attention gradually [2].

Metalanguage has known as language about language. According to Halliday's systemic functional linguistics, language has the functions of ideational, textual, and interpersonal. Metalanguage can not only be regarded as explicit knowledge but also plays a role in connecting language and meaning. The research on metalanguage in educational field has been varied. However, the review of the international research on metalanguage in educational field is still blank. In this paper, the author analyzes the research in the Web of Science Core Collection (WOSCC) by using Citespace to analyze the number of publications, prolific authors, clusters of keywords, and research hotspots related to metalanguage. The author hopes a general picture of research on metalanguage can be vividly presented so as to provide the studies about metalanguage and education with a new research perspective.

2. Research Design

2.1. Data Collection

These research data are collected from the WOSCC of the Institute for Science Information. The Web of Science Core Collection (WOSCC) is a database representing the highest level of studies in social science internationally and is representative of the cutting edge of existing research. In WOSCC, the topic is selected as *metalanguage* and the subject category is limited to *education educational research*. The time range of the search is set from 1987 to 2023 (the first article was published in 1987). The type of publications to be analyzed is selected as *paper*. The data was searched on June

17, 2023, and 151 valid papers were generated after manual elimination of apparently irrelevant articles.

2.2. Research Instrument

The research instrument of this paper mainly uses Citespace, which is a kind of citation visualization analysis software. The relationship among the massive literature can be presented vividly in the form of knowledge graphs. Citespace can be used to sort out the trajectory of past research, highlight the hotspots of current research, and point out the direction of future research so that studies related to metalanguage can have a general picture systematically.

3. Data Analysis and Discussion

The number of publications each year, the prolific authors, the keywords with the highest centrality, the clustering of keywords on metalanguage, the development of clusters, the research hotspots and trends of research on metalanguage in educational field are visually analyzed in this part.

3.1. The Analysis of the Number of Publications Each Year

The number of articles published each year on metalanguage in educational field is computed by Citespace. Figure 1 shows the number of publications on metalanguage annually. The research on metalanguage research related to education is in its initial phase from 1987 to 2011, with less than 5 publications per year. Metalanguage attracts researchers' attention in educational field gradually. Since 2011 the research on metalanguage in educational field has entered a rapid growth period with an average of over 5 publications per year, and the number of publications has already reached more than 20 until 2020. However, the number of the research on metalanguage in educational field has shown a decreasing trend since 2020, which indicates researchers' attention to metalanguage has been on the wane. The outbreak of the COVID-19 pandemic makes communication among people get less, and promotes the popularity of digital technology, which might lead to research interests convert to areas such as digital learning and wisdom education.

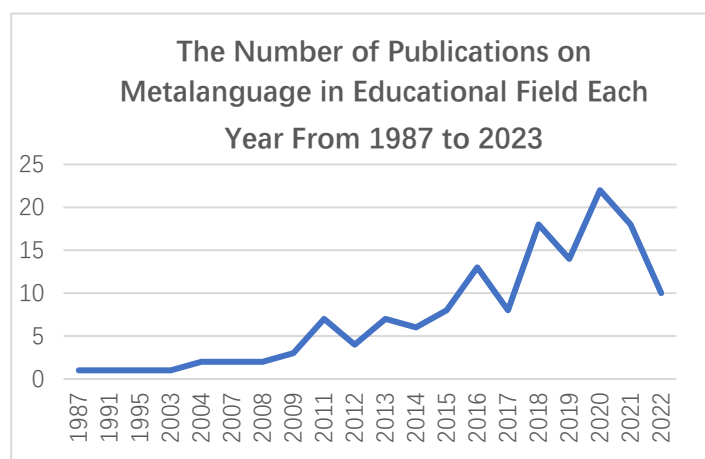


Fig. 1 The Number of Publications on Metalanguage in Educational Field Each Year From 1987 to 2023

3.2. The Analysis of the Prolific Authors

The author uses Citespace to identify the prolific authors, which is shown in Table 1. The authors with the most publications on metalanguage in educational field are Mary J Schleppegrell, Mary Macken-horarik, and Jason Moore.

Table 1. The Prolific Authors on Metalanguage in Educational Field From 1987 to 2023

The Author	The Number of Publications
Mary J Schleppegrell	5
Mary Macken-horarik	4
Jason Moore	4
Emily Phillips Galloway	3
Meg Gebhard	3
Koksing Tang	3
Fei Victor Lim	3
Jon Callow	3

Mary J. Schleppegrell is significantly influential in the area of metalanguage. She puts forward that Systematic Functional Linguistics (SFL) metalanguage can provide a meaningful framework for engaging learners in explicit talk about language and meaning, especially for learners' development of academic language. She also claims that metalanguage can be in service of curricular goals [3]. In 2020, Schleppegrell proposes that teachers need to have meaningful metalanguage to achieve their disciplinary learning goals and develop their subject areas, which proposes a new challenge for teacher education [4]. Macken-Horarik explores the potential of systemic functional semiotics to interpret multimodal literature [5]. Macken-Horarik and Morgan propose that metalanguage is adequate to the development of voicing in a post-structuralist literature course [6]. According to Moore, J., SFL metalanguage can help students' explicit interpretation of linguistic patterns and study of textual characters [7].

3.3. The Analysis of the Key Words with the Highest Centrality

This research computes the keywords that appear the most frequently by using citespace, among which with the highest centrality are *metalanguage*, *language*, *knowledge*, *literacy*, *grammar*, *English*, *academic language*, *acquisition*, *systemic functional linguistic* and *awareness*, which is shown in Table 2.

Table 2. The Keywords With the Highest Centrality on Metalanguage in Educational Field From 1987 to 2023

Centrality	Keywords
0.61	metalanguage
0.23	language
0.21	knowledge
0.18	literacy
0.18	grammar
0.16	English
0.14	academic language
0.14	acquisition
0.1	systemic functional linguistics
0.08	awareness

The keywords with higher centrality show more attention is paid in these areas by researchers. **1) Knowledge** The studies of metalanguage related to *knowledge* in educational field have involved various topics, such as metalinguistic knowledge, disciplinary linguistic knowledge, multimodal knowledge, strategic knowledge, and implicit knowledge and so on. Matruglio investigates how to support seasoned teachers with metalanguage to articulate their latent textual knowledge in order to improve the literacy outcomes of a group of underprivileged children [8]. **2) Literacy** The research topics related to literacy are varied, such as the relationship between metalanguage and hybrid literacies, increased cultural diversity, literate epistemologies, teacher training, disciplinary literacy,

and genre-based pedagogy. **3) Grammar** The functions of grammar are explored in various aspects of classroom pedagogy, students' literacy ability and learning strategies, such as promoting students' metalinguistic understanding [9], responding to hybrid literacies [10] and improving students' strategic knowledge and linguistic knowledge [11]. Carrie Symons, Annemarie Sullivan Palincsar, and Mary J. Schleppegrell propose that students could use systemic functional metalanguage to better connect the forms and meanings in information science texts [11]. **4) Academic Language** Research related to academic language examine how to promote learners' academic language through metalanguage. Galloway Emily Phillips examines the use of student-generated metalanguage as a main teaching resource to increase students' knowledge of academic language and promote their agency as academic language users [12]. Mary J. Schleppegrell also stresses that SFL metalanguage could provide a meaningful framework for learners' development of academic language [3]. **5) Systemic Functional Linguistics** SFL provides metalanguage with a solid theoretical framework, based on which numerous research topics come to birth, such as literacy education, academic learning, and multiliteracy. Michael Halliday describes language as offering a functional grammar to connect language forms with meanings in the context of uses [13]. The metalanguage of SFL is frequently used to raise students' consciousness about form-meaning relationships. **6) Awareness** Studies have explored the functions of metalanguage to develop students' language awareness. For example, O'Hallaron explores elementary students' development of critical language awareness in the context of reading informative texts using functional metalanguage [14].

3.4. The Clustering of Keywords of Research on Metalanguage

Figure 2 shows the clusters of keywords from research on metalanguage in the educational field. According to this chart, there are 11 clustering labels, 288 network and the number of connections is 1217. The density is 0.0294. Modularity $Q=0.6079$ (> 0.3) means the clustering effect is obvious, and Weighted Mean Silhouette $S=0.8487$ (> 0.7) means that the clustering results have high reliability. The clusters of keywords show the research hotspots on metalanguage in the educational field, which mainly focus on the aspects of *pedagogy*, *disciplinary literacy*, *heritage language*, *language awareness*, *English language learners*, *knowledge*, *image-schema*, *assessment*, and *early career teachers*.

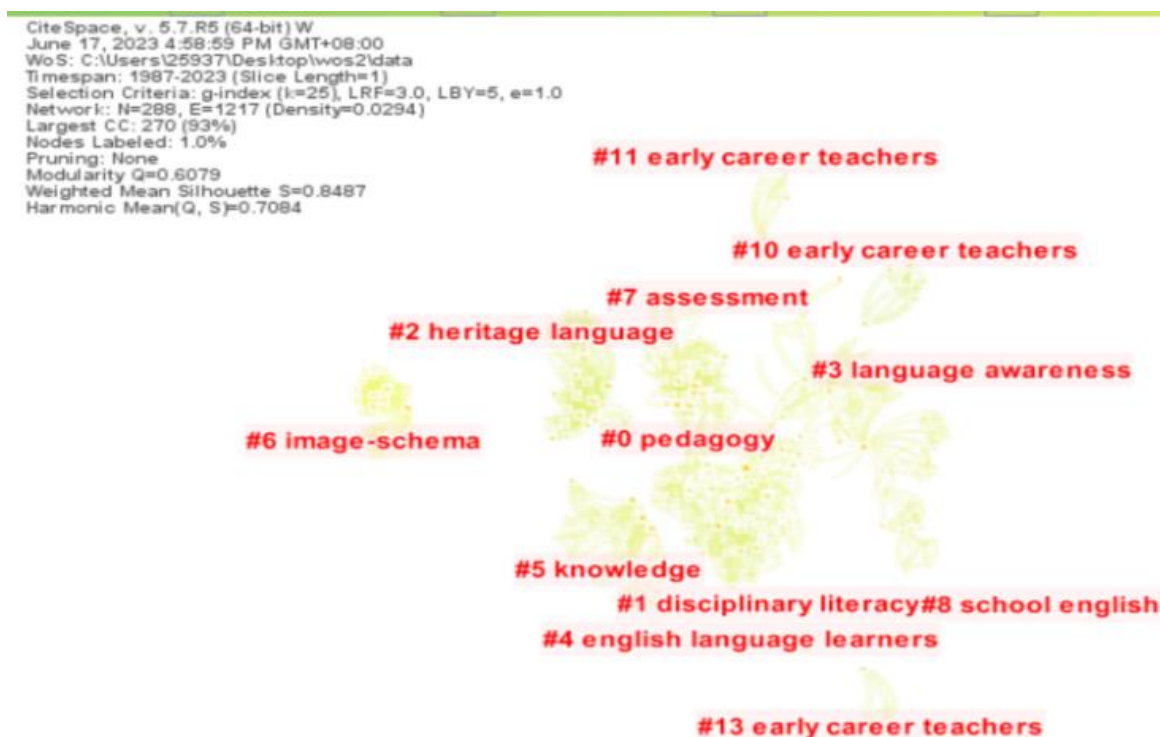


Fig. 2 The Clusters of Keywords of Research on Metalanguage in Educational Field From 1987 to 2023

3.5. The Analysis of the Development of Clusters on Metalanguage

Citespace's clustering function is used to find out the field of a researcher's highest interests. The timeline view of clusters of keywords shows the sequential development of the keywords in each cluster, which is shown in Figure 3.

1. The cluster of *pedagogy* The keyword *literacy* began to appear in 2007, and the research relates to various fields, such as digital news learning, English language education, and academic language learning. Kathy A. Mills in 2009 proposes the continued revision of multiliteracies to respond to a broadening range of hybrid literacies and increased cultural diversity [10]. In two secondary English classrooms in Singapore, Fei Victor Lim reported on a study to create a pedagogic metalanguage as a tool to help teachers' thinking and discussion about digital news texts [15]. As to the research about *English language education*, Sally Ann Jones proposes in 2021 that teacher knowledge and beliefs about texts, the metalanguage of the subject, and theories of linguistic and conceptual development require extending [16].

2. The cluster of *disciplinary literacy* The research on *revision* and *writing* appeared in 2013. Anthony Wilson and Debra Ann Myhill investigate poetry writing and find that their literate epistemologies do not value linguistic metalanguage [17]. Language teachers need to understand how English "means what it does" in order to bring learners' attention to how English functions, according to Mary J. Schleppegrell. She makes the case that metalanguage can assist English language learners' reading comprehension. [4]. Gail Forey finds that SFL supports teachers' and students' understanding of discipline literacy and that the explicit teaching of language for curriculum learning has a positive impact on teaching and learning [18]. The area of classroom discourse appeared around 2013 and has gotten more attention since 2016, but the research attention decreased after 2019. Natasha Anne Rappa and Kok-Sing Tang b (2017) focus on how the metalanguage of the teacher's discourse strategy can be used in more specific ways to build subject-specialized genres of the discipline [19]. Then the research on *science education* and *higher education* gradually emerged and began to receive less attention around 2022.

3. The cluster of *heritage language* *Implicit* first appeared in 2004, and less attention was paid after 2010. Then the study of *explicit knowledge* and *the second language* gradually began to come to attention. The representative research is that in order to study the importance of metalinguistic knowledge in L2 task performance, Mahmoud Azaz uses quantitative and qualitative methods. He makes the case that teachers should incorporate explicit metalinguistic knowledge of complex grammatical forms into meaning-focused communicative teaching [20].

4. The cluster of *language awareness* *Autonomy* started the earliest in the cluster of *language awareness*. Jane Vinther uses computer-mediated communication and gives students a great deal of autonomy in their interactions so as to encourage students to participate in metalinguistic activities [21]. The research on *discourse semantics* and *bridging metalanguage* began to appear in 2020. Sally Humphrey based on the metalanguage toolkit assesses students' semiotic development and creates a bridging metalanguage [22].

5. The cluster of *English language learner* The keywords *academic language* and *functional linguistics* began to appear around 2008. Meg Gebhard, I. A. Chen, and L. Britton contend that English language learners could benefit from learning how to use systematic foreign language metalanguage to read and write disciplinary texts. SFL metalanguage can support teachers in developing effective academic literacy instruction for English language learners [23]. The research about design-based research appeared around 2017.

6. The cluster of *knowledge* The keyword *politics* first appeared in 2009. Martin Mills et al. regard productive pedagogies as a research tool and metalanguage is put forward as a redefined methodology for analyzing quality teacher practice and to support teachers to critically reflect on their practice [24].

7. The cluster of *image-schema* The keyword *image-schema* appeared around 2022. Hwang, Hyun-Bin puts forward that the overuse of metalanguage in class could place an unnecessary burden on learners; however, the image-schema-based-instruction enhances L2 constructions learning with the optimal balance between attentions to forms and meanings [25].

8. The cluster of *assessment* It contains the keywords *critical language awareness*, *elementary education*, *feedback*, and *classroom communication*. Sally Baker highlights the importance of teachers' assessment in students' writing and regards metalanguage as an assessment criteria [26]. And Jon Callow (2020) suggests the use of

a range of metalinguistic terms and concepts to assess students' multimodal knowledge, comprehension, and visual metalanguage [27]. The field of *assessment* has received less attention until around 2022. **9. The cluster of school english** It contains the keywords of *history*, *teacher-training*, and *content knowledge*. The *history* begins to appear around 2008. As to *teacher training*, it began receiving attention in 2013 and have received less attention until 2019. Macnaught, L., Maton, K., Martin, J. R., et al. put forward that teachers are supported to build a shared metalanguage of their discipline with their students [28]. **10. The cluster of early career teachers** The keywords to appear earliest is *multimodal*. In order to link students' outside-of-class gaming literacy practices with the literacy and English curriculum, Thomas Apperley and Christopher Walsh offer instructors and practitioners heuristics for comprehending gaming literacy and metalanguage for discussing digital games [29].

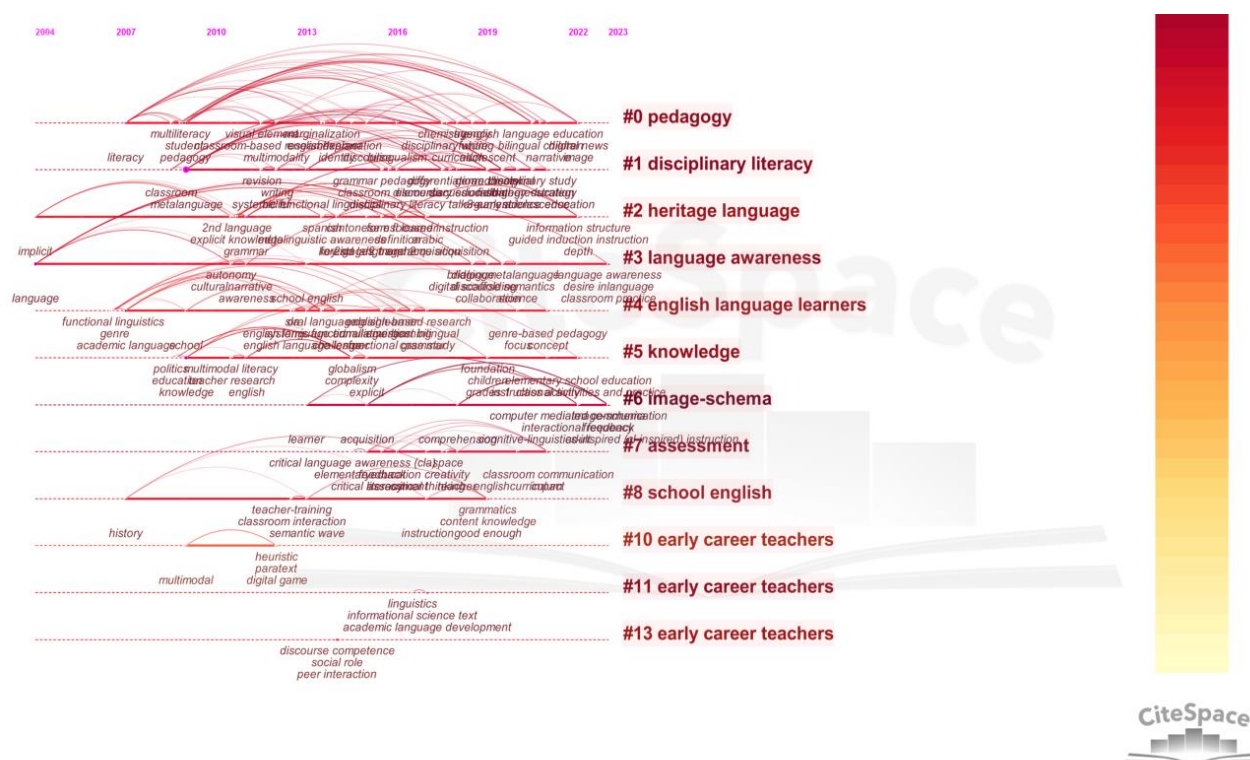


Fig. 3 The Timeline View of Keywords Clustering on Metalanguage in Educational Field From 1987 to 2023

3.6. The Analysis of Research Hotspots and Trends

The keywords with the strongest citation bursts could show the new trends in the research field, highlighting that a certain topic has attracted special attention in a certain period of time. The author uses the keyword bursting function of Citespace to analyze the research hotspots on metalanguage from 1987 to 2023, which is shown in Figure 4. The top 7 keywords with the strongest citation are selected. The red areas indicate the period when the keywords are studied with the highest frequency variation and have the strongest influence in this period.

According to Figure 4, from 2004 to 2011, the studies mainly focus on *implicit*. *Metalinguistic knowledge* was studied a lot from 2011 to 2014. Guangwei Hu (2011) adopts quantitative and qualitative analyses to reveal the positive relationship between metalinguistic knowledge and facility with metalanguage [30]. *Explicit knowledge* attracts more attention from 2015 to 2017. *Systematic Functional Linguistics* is the research hotspot from 2018 to 2020. Gail Forey (2020) finds that SFL supports teachers' and students' understanding of discipline literacy and the explicit teaching of language for curriculum learning has positive impacts on teaching and learning [18]. From 2021 to

2023, the research will mainly focus on *pedagogy*. Tracy Hodgson-Drysdale (2021) examines the key change process in the critical systemic functional linguistic praxis of a science teacher to develop genre-based pedagogy in the science of elementary education [31]. The areas of *Systematic Functional Linguistics*, and *language* and *pedagogy* could be the research hotspots in future studies on metalanguage in educational field.

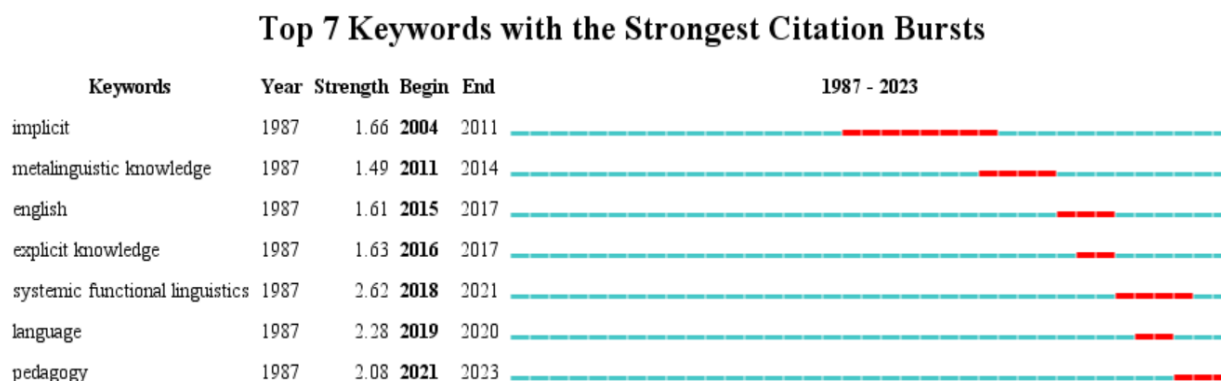


Fig. 4 The Keywords with the Strongest Citation Bursts of Research on Metalanguage in Educational Field form 1987 to 2023

4. Conclusions and Implications

According to the visualization analysis of the existing research, we can conclude that 1) From the perspective of theoretical basis, SFL could be regraded as the main theoretical basis for research related to metalanguage. Halliday's two monographs, *Language as Social Semiotic: The Social Interpretation of Language and Meaning* and *An Introduction to Functional Grammar*, systematically introduce the theory of SFL, which has great influences on general linguistics and language teaching. 2) The research contents have involved many fields, such as oral language, writing teaching, academic learning, teacher training, the relationship between metalingual knowledge and metalinguistic knowledge, grammar pedagogy, spelling, and teacher training. 3) The research subjects have basically covered learners at all stages of educational system. 4) The research methodologies involve qualitative and quantitative analysis. The qualitative analysis involves the case studies, interviews and observation, surveys, narratives, video and audio recording and so on. 5) Most of the research results advocate that students and teachers are expected to establish their own repertoire of metalanguage to improve their own metalinguistic awareness, which will better promote students' learning and teachers' teaching. It should be noticed that some scholars argue that teachers' excessive use of metalanguage may be burdensome to students. In addition, the study of metalanguage in students' learning processes not only finds out how SFL supports learners' learning but, more importantly, reveals students' learning processes from an academic perspective. The author hopes that the review of existing research about metalanguage in educational field could provide new perspectives for further studies.

5. Limitations of This Research

This paper visually analyzes the number of publications each year, the prolific authors, the keywords with the highest centrality, the clustering of keywords on metalanguage, the sequential development of keywords, and the research hotspots and research trends on metalanguage in the educational field. There are still limitations of this research to avoid in the future. First, there are 151 valid papers on metalanguage in the educational field analyzed in WOSCC, which are representative of the current research situation. However, the number of samples is still relatively limited and is expected to be expanded in future studies. Second, this paper analyzes the research characteristics of

metalinguage in the educational field. There are still a mass of studies related to metalinguage in other fields of study, such as linguistics and computer science, whose characteristics could be explored in future studies.

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