

The Application of Visualized Tools in English Writing Teaching from Perspective of Key Competence: A Survey Study

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Abstract

Writing, as one of the expressive language skills, plays a significant role in learning and teaching of English. In the new round of teaching reform oriented to "key competence", thinking visualization tools have been widely welcomed by teachers and students. What's more, they are becoming an important tool for teaching transformation. Questionnaire, interview and classroom observation were implemented to analyze the current situation of writing tasks in high school English classrooms, to reveal its actual use in classroom teaching, to analyze teachers' understanding of thinking visualization tools and key competence, as well as to know about different levels of students' perceptions of using thinking visualization tools in writing, based on schema theory, visualization theory and constructivist theory. It is found that teachers were lack of the understanding of thinking visualization tools and key competence. Different thinking visualization tools were implemented in different learning stages. In addition, a part of thinking visualization tools is used by teachers as auxiliary teaching means, such as mind-map and concept-map. This study sheds light on the understanding and application of thinking visualization tools and key competence.

Keywords

Thinking Visualization Tools; Key Competence; English Writing.

1. Introduction

Thinking, as one of the most important skills for students in the new era, has become a key research focus and lots of researchers pay attention to the study of it. The National English Curriculum Standard mentioned that thinking ability, which belongs to the four key competence of the English subject, should be highlighted in English teaching practice. In recent years, thinking quality has been extensively studied in English teaching in high school. How to develop students' thinking quality has become one of prominent research focus to many researchers. Previous research paid much more attention on one of visualized tools, such as mind-map, concept map and so on in China. What's more, the combination of thinking ability and key competence has not been fully considered. It seems to be necessary and meaningful to reveal that its actual use in classroom teaching, analyze teachers' understanding of thinking visualization tools and key competence, as well as know about different levels of students' perceptions of using thinking visualization tools in writing, based on schema theory, visualization theory and constructivist theory. What's more, the previous research has not addressed the difficulties of the teachers encountered and some relevant teaching suggestions has not provided for them.

Therefore, this study intends to investigate the current situation of the application of thinking visualization tools in English writing teaching in Nanchong through questionnaires, classroom observations, and teacher interviews, with the aim of synthesizing the findings and understanding the current situation of its application. At the same time, by understanding the current situation of the application of thinking visualization tools, discovering the problems

and analyzing the causes, this study aims to promote thinking visualization in English writing teaching, as well as make the application of thinking visualization tools in the process of teaching English writing in high school more scientific, more extensive and more effective, so that the thinking visualization tools can really help the writing classroom, not just limited to the form or slogan. Finally, some suggestions will be proposed to help students avoid the shortcomings of the tool, make use of its advantages, and develop their creative thinking. This will enable teachers to use visualization tools consciously and improve the effectiveness of writing teaching.

2. Organization of the Text

2.1. Literature Review

2.1.1. Introduction to Visualized Tools

Thinking always happens in students' minds invisibly. Teachers need to use visualized tools to make it visible and logical so that students' thinking ability can be better developed. Thus, key competence can be better achieved. In this part, the definition and classification of visualized tools will be presented.

Visualized tools are also called cognitive tools and thinking tools (Zhao Guoqing, 2019). Edward de Bono used the name of thinking tools. He promoted sixty thinking tools in six modules: breadth of thinking, organization of thinking, interaction of thinking, creativity, information and feeling, and action (De Bono, 1991). Although de Bono mentioned many times about thinking tools, he did not give a specific definition about them. Jonassen (2006) defined visualized tools as "the external, computer-based equipment and the realization of the thought process that is able to expand learners learning.

Visualized tools were introduced into China around 2000. Scholars in China mainly use the concept of visualized tools. Liu Zhuoyuan first put forward the concept of visualized tools in China. Before the emergence of visualized tools, thinking visualization first came into Chinese scholars' eyes. Influenced by that, Zhao Guoqing (2005) further mentioned that visualized tools refer to the application of visible graphs or diagrams to show the structure of certain knowledge. The key of it is to show the information or knowledge in a graphic way that can directly affect the manifestations of human senses. Zhao Guoqing (2005) further divided visualized tools into five categories, which include mind map, thinking maps, concept map, cognitive map, and semantic network. In this research, the author is going to adopt Zhao Guoqing's definition about visualized tools and his classification about them to analyze teachers' understanding and application of visualized tools in class.

Although different scholars put forward different concepts about visualized tools, there are something in common. First of all, thinking is invisible. Through the application of visualized tools, learners' thinking paths can be presented clearly. Besides, without the use of visualized tools, learners may think in limited ways, while visualized tools can help them broaden their thinking horizons and let them think through different perspectives. Thus, learners' comprehensive ability can be promoted. Thirdly, through the use of visualized tools, learners' cognitive load can be decomposed as well. These visualized tools can help them avoid large amount of information presenting in words, and expressing information in certain graphs. Therefore, learners learning pressure can be reduced to some degree.

According to Zhao Guoqing (2005), there are many kinds of visualized tools, the most commonly used are mind map, thinking maps, concept map, cognitive map, and semantic network, and each of them has different functions.

Thinking maps are developed by Hyerle in 1988 to help learning. Teachers and students can use a total of eight tools to help reading comprehension, problem-solving in the studying

process, and improving thinking skills. According to Novak (1984), a concept map is a tool used to organize and analyze certain information. It usually places the concepts that are related in a circle or a square, and then uses a line to connect the related concepts together, and the line shows the meaningful relationship between the two things. Cognitive maps, also known as causal maps, are proposed by Steve, Eden, and Ackerman (1990), which take ideas as nodes and connect them to each other. Ideas are different from concepts. The implied meaning of the connecting line is cause and effect, and there is no hierarchy between the sub-brunches. Fisher (2010) connected semantic network with neurology and further defined it as a network which is consisted of node connections with connectives, it can be viewed as multidimensional rather than two-dimensional so that its size can be very large and hundreds of interrelated concepts can be contained.

These five kinds of visualized tools are five kinds of most popular ones nowadays. In this thesis, based on the classification about visualized tools by Zhao Guoqing, and combined with the observation, interview and questionnaire to reveals its actual use in classroom teaching, analyzes teachers' understanding of thinking visualization tools and key competence, as well as different levels of students' perceptions of using thinking visualization tools in writing.

Furthermore, based on the limitation of mind map that it is limited to show the radioactive relationship with the center and its brunches, Novak put forward a concept map usually places the concepts that are related to certain topic in a circle or a square, uses a line to connect the related concepts together, and the line shows the meaningful relationship between the two things.

With the development of society, scholars tend to study more logical clear visualized tools through the use of internet so as to better make use of the resources and the convenience from the internet to solve problems. Therefore, cognitive map and semantic network appeared. Through the search of the information about cognitive map and semantic network, the author found out that they are mostly about presenting logical and well-structured knowledge, mainly in mathematics and geography, such as the cognitive maps used by Mazzuto and Antomarini (2021), which is mainly about the use of cognitive maps to solve mathematical problems. Researchers in education tend to use that type of visualized tools which are more pictorial, such as mind map and thinking maps.

Visualized tools came into China around 2000. The results of the study are fruitful. In terms of studying visualized tool in general, the following scholars made great contribution to it. Liu Zhuoyuan first pointed out the concept of thinking visualization. Liu Zhuoyuan(2013) mentioned that thinking visualization refers to the use of graphs or diagrams to show the invisible thinking paths, thus can make it visible. Based on Liu Zhuoyuan's thought about visualized tools, Zhao Guoqing (2005) further promoted that there are five most commonly used kinds of popular visualized tools, which are mind map, thinking maps, concept map, cognitive map, and semantic network. Based on that, Zhang Qianwen (2018) further promoted that the use of visualized tools shows a great development trend, which mainly shows in three aspects: it can be applied to more areas, more tools can be used, and thinking computer software has been paid more and more attention to as well. The author intends to adopt Zhao Guoqing's classification of visualized tools in this study so as to observe teachers' application of these kinds of them to promote key competence.

At present, the application of visualized tools in teaching is getting more and more focused. A lot of materials that combine visualized tools with subject teaching can be found. But less people focus on distinguishing the different functions of different visualized tools in English teaching, such as mind maps, thinking maps, concept maps and so on, and some teachers are still not clear about the differences between them. Thus, more researches are needed to investigate the application of visualized tools in teaching practice and try to find out more differences between different visualized tools.

2.1.2. Introduction to Key Competence

Key competence was first introduced by the Organization for Economic Cooperation and Development. From the point of view of value orientation, key literacy tests the quality of students' learning, whether they can achieve lifelong learning and whether they can achieve socially acceptable values.

Cheng Xiaotang(2016) proposed that the key component of key literacy cultivation is healthy personality, which is a kind of pioneering and innovative knowledge and skills that can be acquired by learning in social practice. It can be seen that key literacy is of great significance to both society and individuals. It emphasizes the need to put human development in the first place. With the development of China's economy as well as the advancement of education, key literacy has become a key factor in the implementation of education as well as basic curriculum reform in a comprehensive manner and has become a new trend in China's education sector.

Key competence of English subject stipulates what literacy students should have in the education process, which is conducive to the implementation of the Party's education policy. The key competence of English subject mainly contains four aspects, namely language competence, cultural awareness, thinking quality and learning ability.

Language competence mainly refers to the freedom to understand and feel the meaning of a particular social environment through listening, speaking, reading, watching and writing. Language competence is an important key factor in developing students' key English literacy, which recognizes the importance of English as an international language. Cultural awareness means understanding not only our Chinese culture, but also foreign cultures. It is also important to identify with the best culture of each country. In the current context of international globalization, we should also identify with cross-cultural understanding, humanistic cultivation and value orientation. Thinking quality is also to examine whether people have strong logical reverse thinking, critical multidimensional thinking and creative thinking ability and thinking level. Thinking quality mainly reflects the various key thinking qualities and various mental quality characteristics of a student in international English learning. The quality of thinking, which is different from both the ability to understand thinking in a general sense and the ability to understand and express. Learning ability development means guiding students to broaden their access to English education and enhance their learning effectiveness and competence by adapting their English learning strategies on their own. So, it is an extremely important that we learn and master English in the field of education, especially for our students. However, due to the lack of language environment, the road of learning English for our students can be a difficult and dangerous one. Therefore, the most important thing for this current situation is for teachers to teach students how to learn English well and to adopt effective learning strategies.

In the 1990s, the OECD began the Programme for International Student Assessment (PISA), which aims to compare student performance in mathematics, science, and reading across countries and regions to determine whether students in different countries have the basic knowledge and competence to guide educational policy. The research in this area in China can be divided into two stages, the first stage is before 2014, no scholars defined the concept of English subject key literacy in this period, and the number of literatures in this period did not increase significantly, so it can be called the "budding period". The second stage is after 2014, when scholars began to research and define the concepts of key literacy, subject key literacy and English subject key literacy, and the number of literatures in this period has grown significantly, so it can be called the "developmental period".

From the overall trend, English subject key literacy has become one of the research hotspots at this stage and is still under development. The research trend is mainly in two parts, one is the research on curriculum development based on key literacy, and the other is the research on the implementation of educational philosophy under key literacy. The empirical research based on

key literacy includes research from the perspectives of teaching substance and reading teaching strategies. However, there are few cases of how to apply key literacy to reading teaching, mainly focusing on reading teaching strategies and reading teaching design.

2.1.3. The Relationship between Visualized Tools and Key Competence

Through the discussion above, it's quite obvious that visualized tools and key competence are highly related. Key competence includes language competence, cultural awareness, thinking quality, and learning ability. Visualization tools can visualize the tacit knowledge and enable students to better sort out the knowledge. In summary, unlike previous studies, the author applies key literacy and visualization tools to high school English writing teaching, in which the teacher will lead students in visualization tool drawing training, and the students are the main subjects in the teaching session while the teacher plays a supporting role, and explains through teaching cases how to guide students to use visualization tools to better master writing skills and enhance their interest in writing, so as to improve The teacher's role is to help students master writing skills and enhance their interest in writing, thus improving their overall writing literacy. Based on this, the author integrates key competence and visualization tools to explore the application of visualization tools in writing teaching under the perspective of key competence.

Thinking always happens in an invisible way. Therefore, if teachers want to develop students' key competence, it's quite necessary for them to use some methods to make invisible things into visible. Visualized tools are good ways. Zhao Guoqing (2005) mentioned that visualized tools refer to the application of visible graphs or diagrams to show the structure of certain knowledge. The key of it is to show the information or knowledge in a graphic way that can directly affect the manifestations of human senses. There are five kinds of visualized tools, which include mind map, thinking maps, concept map, cognitive map, and semantic network. In a word, if teachers can use visualized tools correctly and properly in class, students' key competence can be developed. To put it simply, if teachers want to develop students key competence, visualized tools, including mind map, thinking maps, concept, cognitive map, and semantic network, are useful and effective.

2.2. Theoretical Foundation

2.2.1. Schema Theory

Schema theory has experienced a development history of 200 years, and researchers have made significant achievements in this area. The word "schema" means to describe the characteristics of things with simple or abstract graphics.

Language schema refers to the knowledge about language storing in readers' brains, which is a precondition for success reading. The content schema refers to the background knowledge of reading topic readers have already known. The form schema relates to students' understanding of the organization, the structure, and the genre of texts. The form schema will be used in this study. Form schema can help readers know better about the structure and logical relationship of texts. It requires readers to master features and structures of different stylistics so that they can inspire the form schema in their brains. Some processors have used form schema in their reading teaching.

Mind mapping aims to combine new knowledge with old knowledge, teachers should enhance their awareness of the importance of mind mapping, make full use of mind mapping to help students understand English reading materials and shorten their reading time in English reading activities.

2.2.2. Knowledge Visualization

Different scholars have different understandings of the definition of knowledge visualization. Martin and Burkhard(2004) gave a formal definition of knowledge visualization, oriented

towards a new discipline and its application areas. The field of knowledge visualization studies the improvement of visual representation of two or more people, the application of knowledge creation and interpersonal transfer. This is a sign that knowledge visualization has officially become a novel study area.

The practical significance of knowledge visualization for teaching lies in the fact that teachers can use visualized tools to systematically present implicit and difficult-to-understand knowledge in an explicit way, which helps students better understand and analyze the passage and express content, and develop students' higher-order thinking skills.

2.2.3. Constructivist Theory

In the 1960s, Piaget, a Swiss psychologist, proposed the constructivist theory of teaching and learning. Constructivist theory is student-centered and emphasizes spontaneous exploration, discovery and construction. According to constructivist theory, learning is not only a one-way process of knowledge transfer, but also a process of communication and cooperation between learners and others in a certain environment, while using effective learning materials to construct meaning.

The understanding of constructivist theory on teaching ideas is as follows: constructivist theory attaches importance to student-centered teaching. constructivist theory holds that teachers should encourage learners to take the initiative in meaning construction, and cultivate learners' learning initiative and curiosity. Teachers should not be "the guide of knowledge", but the promoter and helper of students' meaning construction. constructivist theory emphasizes the development of learning activities around real problems, and creates a real social situation that can promote students to actively construct knowledge, so that students can solve real problems.

The use of mind maps helps students to integrate old and new knowledge. The role of the teacher is to use the mind mapping method of teaching, based on which a variety of graphics are used to stimulate students' attention and guide them to discover the connections between old and new knowledge and integrate them. In addition, mind mapping can be linked to cooperative learning, where students can learn from other members' suggestions and constructs. Therefore, teachers can have students draw mind maps based on the knowledge system and identify problems in them based on their mind maps.

2.3. Research Questions

The study aims to research the current situation of teachers' understanding about visualized tools and key competence, then the author tries to find out what visualized tools that are used by teacher in senior high school English writing class to promote students' key competence, and the difficulties teachers meet in the application of visualized tools to promote learning in teaching practice. The three research questions of this thesis are designed as follows:

1. What is senior high school English teachers' understanding about visualized tools and key competence?
2. What visualized tools do teachers use to promote key competence in senior high school English writing class?
3. What difficulties do teachers meet in the application of visualized tools to promote key competence in senior high school English writing class?

2.4. Method

2.4.1. Participants and Context

Five English teachers from a senior high school in Nanchong are chosen in this study. They are chosen randomly in order to see their understanding about visualized tools and key competence, and how do they conducted it in their English writing class to promote key

competence. As a consequence, the research is comprehensive and practical to be further explored.

2.4.2. Measures

In order to analyze the visualized tools in senior high English writing class and its influence to key competence, this study includes three research instruments, namely, questionnaire, interview and classroom observation so as to analyze the three research questions and to make the research more effective and proper. Specifically speaking, the purpose of the questionnaire is to find out the application situation of thinking visualization tools in teaching English writing in high school interview which is designed for the five teachers is to know teachers' understanding of visualized tools, key competence, and the relationship between them. Furthermore, the classroom observation which is designed for the application of visualized tools and the difficulties teachers meet have been conducted so as to get the most authentic data about the actual condition of visualized tools in English writing class.

This study also utilizes the questionnaire method, which is one of the most common methods of social surveys. The questionnaire method can be used to design a questionnaire so as to obtain relevant data, and the results of the survey can be obtained through statistical analysis of the data. The purpose of this questionnaire survey is to find out the application situation of thinking visualization tools in teaching English writing in high school. The student questionnaire aims to find out students' knowledge of thinking visualization tools and their use of thinking visualization tools. The teacher questionnaire aims to understand teachers' mastery of thinking visualization, teachers' teaching style of thinking visualization tools and the application of thinking visualization tools. The questionnaire was improved and reformulated on the basis of "Research on the Application of Mind Mapping the Teaching of English Vocabulary in Primary Schools" written by Yang Yanyan (2018) from Huaibei Normal University. Research on the mind mapping in English writing Teaching of senior High Schools Based on key competence. In order to make sure the comprehensiveness of this research, the subjective research instrument of interview will be included in this paper. The author chooses five teachers as interviewees randomly from each level of three grades. The interview was conducted privately before class, and the whole process was recorded and then text-transformed. The questionnaire was improved and reformulated on the basis of Research on the Application of Visualized Tools in English Reading Teaching of Junior High Schools Based on Deep Learning written by Zhong Xiaoyan(2021).

Before the classroom observation, the research participants of the five teachers are interviewed so as to further discover their thoughts about the application and teaching of visualized tools' influence to key competence in senior high schools. The interview is a fundamental research method, in which interviewers and interviewees can talk directly, so that the interviewers can observe the authentic behavior of the interviewees and the interviewees can express their thoughts in a more comfortable environment. Based on the standardization of different interview process, the interview in this research with the five teachers in senior high school was semi-structured. The interview questions are designed based on Zhao Guoqing' classification of thinking visualization in English teaching. Zhao Guoqing (2005) mentioned that visualized tools are relates to five aspects, namely, the concept of visualized tools, the forms of visualized tools, the effects of visualized tools, the ways of evaluating visualized tools, and the ways of improving visualized tools. And the author combined it with Zhang Hao's five characteristics about key competence so as to see the teachers' understanding about visualized tools and how to use visualized tools to achieve key competence. The author made some changes based on that in order to better know teacher's understanding of visualized tools. The first part is about the background information about teachers, the question items are related to Q1 to Q5. The second part is about the influence of thinking development to language learning, the question items are related to Q6 and Q7. As for the types of visualized tools, the types of

class that teachers may apply visualized tools and how often they may use visualized tools in senior high school English class, the questioned that relate to is Q8 to Q11. In terms of the effects of visualized tools and key competence, Q12 to Q14 are involved. Finally, for the suggestions of improving the application of visualized tools and key competence, Q15 and Q16 are related. The questions are set up in the interview to explore teachers' understanding about visualized tools and key competence. The semi-structured interview was conducted in a good environment after the classroom observation for each teacher to ensure reliability.

Moreover, the questions about how visualized tools are constructed to promote key competence and the difficulties teachers meet in English writing class have been investigated through classroom observations about the teachers. This is a crucial step to gather authentic and raw data about how do the teachers apply visualized tools in senior high English writing class. Classroom observation is frequently used in teaching researches nowadays. Through the use of classroom observation, the observers can collect the information that is needed in their research, based on their own research purposes. Classroom observation needs the author to make sure the aim of the observation first, to select the appropriate observation angle, to make the observation table, and to record objectively according to the plan.

In order to see an authentic situation reflecting the application of visualized tools to promote key competence and the difficulties that teachers meet in senior high school English writing class, the author observed teacher A and teacher B's class. The whole classes were recorded so as to make sure the reliability of the data collected. The author mainly takes teacher A's class, teacher B's class and teaching and the research class which holds every week, as the major observation class. Before carrying out the classroom observation, the author prepared a consent form to show the teachers of the principles of the classroom observation and teachers were told that all the resources collected were only used in this research. Therefore, the teacher could teach just as what they usually did instead of adjusting or changing on purpose.

The author transcribed the video recordings of each lesson at the end of the research observation period in order to guarantee the authenticity of the gathered information. What's more, the author chooses to use the table of classroom observation as the major study instrument, and the scripts as the auxiliary tools. The table mainly focus on the different types of visualized tools used in class and the frequency of it. The table is called "The Classroom Observation Table about the Application of Visualized Tools in Senior High Schools". The main observation point is the construction of visualized tools and the organization of language integration. Among them, the activation or construction method of visualized tools is about how teachers use these tools to reorganize information. According to Zhao Guoqing(2019), the common visualized tools include mind map, concept map, thinking maps, cognitive map, and semantic network.

2.4.3. Research Procedures

Research procedures will be carried out as follows. In the preparatory stage, the author is going to introduce something that need to be done before the data collection stage. In the implementation stage, the method of questionnaire, interview and classroom observation will be adopted.

On the preparatory stage of the research, the author looks up a large amount of literature works, and find out that visualized tools are good ways of transforming invisible knowledge into visible graphs, so it is worth attaching enough importance to the role of visualized tools. During the internship in Nanchong No.1 Middle School, the author intends to know teacher's understanding about visualized tools and key competence, what kind of visualized tools that they use in teaching practice to promote key competence and the difficulties teachers meet. In that case, the author designs an interview before the implementation stage which aims to explore the current situation of teacher's understanding about visualized tools and key

competence in this school, in order to find out the gap between what they think and what they actually do, and give some practical suggestions based on the results of the research.

After everything gets ready, the author gives out an interview with the five teachers who are chosen randomly. Before taking the interview, the author makes it clear that the purpose of the interview is only used for scientific research in an anonymous way. Teachers' interviews are conducted in their free time privately to ensure the objectiveness and comprehensiveness of the research. After that, the classroom observation will be conducted. The purpose of this stage is to gather the visualized tools that teachers adopted in their teaching practice. The lesson will be carefully recorded and some major information will be specially written down based on the classroom observation table.

After all the data collected, the author tries to find out the related reasons by analyzing the data. Then the author gives some suggestions from a comprehensive perspective based on the requirements of developing students' key competence.

3. Conclusion

This part mainly deals with the major findings, the related suggestions and some implications, and the limitations in this research. First of all, a brief summary about this research will be shown, the problems will be analyzed as well, and relevant suggestions will be given accordingly. Secondly, implications and suggestions for the further study will be given. Thirdly, the limitations of this research will be presented.

3.1. Summary of Research Findings

As presented above, although there are lots of studies on visualized tools and deep learning, current researches either focus on one single aspect of them or focus on studying the relationship between each kind of visualized tools and key competence. While the investigation on the application of visualized tools to promote students' key competence in English teaching of senior high schools with the mainly subject of teachers has not been fully developed. In that case, this study chooses five teachers as the research participants. They are selected randomly from the three levels of each grade in one junior high school in Nanchong to further explore teachers' understanding and the actual use of visualized tools in promoting students' key competence, the difficulties that teachers meet, and give some suggestions to solve the current problems.

According to the interview, it is quite clear that teachers all think visualized tools and deep learning are important in English language learning and teaching. As for visualized tools, first of all, teachers mainly use visualized tools in well-structured stage, such as the presentation and summary stage. Besides, teachers agree that visualized tools have great effect on students' English language learning and thinking disposition cultivation. As for key competence, teachers mentioned that they know about it literally.

In terms of the relationship between visualized tools and key competence, the author finds that visualized tools can promote critical understanding, information construction, application and problem-solving, and student-centered if teachers can use visualized tools correctly and appropriately. Students can use visualized tools to promote their key competence as well if they can be the center of teaching and learning. Through the interview with the five teachers, the author also finds out that there are four features existed, including that students' learning initiative advocated by teachers, teachers mainly use visualized tools to achieve understanding and knowledge construction, teachers are confused about the different functions of different visualized tools so that they don't know how to use the correct tools to express the right thinking paths, and teachers want to use visualized tools to develop students' higher-order thinking ability. While through the observation of the classroom by the author, there is a gap

between what teachers think about using visualized tools to develop students' key competence and what they actually apply visualized tools in teaching practice.

In terms of the classroom observation, on the one hand, it's quite obvious that what teachers thought will greatly affect what they actually do in their teaching practice. Therefore, teachers mainly use mind maps, thinking maps, and concept map in class. They always use these visualized tools to sort out the structure of the reading passage as well. In the process of applying visualized tools to develop students' key competence ability, first of all, teachers mainly use bubble map, mind map, and brace map to develop students analyzing ability. Tree map, double-bubble map, and mind map are used by teachers to promote students' evaluating ability.

Tree map, mind map, and concept map are the most commonly used visualized tools to develop students' creating ability. By analyzing relevant researches on visualized tools, the author also finds out that there are some difficulties that teachers meet in the application of visualized tools to promote deep learning. First of all, teachers lack understanding of the types and functions of visualized tools, and can not correctly use visualized tools to improve deep learning ability. For one thing, teachers understanding about visualized tools are limited in mind map and some types of thinking maps, such as tree map and brace map. And they may mix the use of different visualized tools to promote deep learning. For another thing, what teachers thought will different from what they actually do in their teaching practice. Besides, critical understanding is the basis of cultivating high-order thinking ability and realizing deep learning, but teachers have some misunderstandings about critical understanding, which is easy to confuse understanding with critical understanding.

Through the interview and the observation, the author finds out that teachers mainly use visualized tools to help students understand certain language points, while this is different from critical understanding which requires students to question and discriminate things. While in the process of practical use of visualized tools, teachers can not correctly use visualized tools to reach the level of knowledge construction or application transfer. In their teaching practice, most of them just use visualized tools to sort out the structure, to help students memorize some language points, or to help students simply understand the structure of the reading passage, which is not about key competence.

3.2. Implications and Suggestions of this Research

Through the research of this study, it is quite obvious that if teachers want to develop students' key competence, visualized tools are one of the best methods that can get them a lot of assistance. Only by correctly and appropriately using visualized tools can teachers better develop students thinking disposition and promote their key competence. Through the questionnaire, interview and classroom observation, the author finds out that there are some difficulties that teachers meet. Because of the difficulties that teachers meet in teaching practice, there are some related solutions as follows.

To begin with, more professional training about visualized tools and key competence is needed. Just as what has been mentioned above, teachers may misunderstand the definition of critical understanding and they lack of certain professional knowledge about visualized tools, so that they do not know how to apply visualized tools in class correctly and appropriately. These professional training includes the collective training in school, and the development of each individual teacher. As for the collective training in the school, the author thinks that more lectures about visualized tools can be hold and some other English studio like the mind map studio can be established as well. In terms of the development of each individual teacher, it means that every teacher should establish the thought about visualized tools and how to better apply visualized tools in class. In order to achieve this purpose, teachers can read more related professional books, magazines, journals, and other related materials.

Secondly, some intelligent Apps can be used to help the teachers and students better use visualized tools to promote deep learning in class, such as the Mind Master, Mind Line, and Mind Vector. Through the use of these kinds of Apps, for those who are not clear how to use visualized tools to achieve information integration or knowledge construction, it is very convenient and thus more professional guidance could be given in English teaching. With the help of these apps, teachers may not mix the function of different visualized tools to promote deep learning as well. Take Mind Master as an example, there are different types of visualized tools in this APP, including mind map, brace map, bubble map, and so on. When people are using it, they need to click in certain kinds of visualized tools which will directly show the functions of different visualized tools, the App will make it directly and people just need to fill in the important words about it.

Finally, teachers and students need more meaningful interaction as well. Teachers use visualized tools to interact with students, and students actively participate in the drawing of visualized tools, which can stimulate students' association ability and creating ability, encourage them to actively explore new things, shallow learning can be change into deep learning, and passive learning change into positive and meaningful learning. The entire classroom atmosphere is self-evident, and a learning class that unites and cooperates, learns from each other people' strengths, and learns together was born.

3.3. Limitations of this Research

In this research, even if some positive information is proposed and analyzed above, there are still some problems existed, which can be briefly presented as follows. Hope the limitations of this paper can provide some reference for future research.

Firstly, as for the research participants in this thesis, for interview, there are totally five senior English teachers included. And for the classroom observation, only two of them are included. The number of the participants are not very big comparatively. Because of that, whether these five senior high school English teachers can show the thought of other teachers should be doubted. Secondly, the findings only present the situation of students in senior high school teachers, not representing the other grades or other areas. Thirdly, this study gives suggestions from a general point of view to guide the thinking disposition cultivation in English language teaching. Finally, the classroom observation time duration of this study is only for about three months. The observation time is rather short, the analysis of the data collected is not very comprehensive, and the research results still need further to be further improved.

In consequence, these limitations should be taken into consideration in the future studies. And the future researches about that should include more research participants from more schools so as to improve the credibility of the survey results and give more specific suggestions on the application of visualized tools and key competence.

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