

A Study of Chinese “Dual Class” Teaching Focusing on Students’ Ability of Self-Regulated Learning

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Abstract—The dual class teaching pioneered by a middle school in Beijing has become a typical case of the development of informatization application in regional education. The dual class teaching in the middle school combines the traditional teaching methods (tradition classroom) with the online forums (online classroom). Exploratory experiments were carried out based on how to evaluate the teaching effect (of dual class teaching) and how to monitor the learning state of students (in dual class learning), and some results have been achieved. This study uses the platform of Tsinghua Tongfang zhihaole as online learning platform, focusing on the students' ability of self-regulated learning (to the answer of questions above). The study present the results of student learning by digging the interactive process data of the platform in the 2016 fall semester and the 2017 spring semester. As a result we can see the students' disciplinary ability, logical thinking ability and innovative ability have been improved and developed from the number, key words and typical opinions. With the help of the technology, dual class teaching mode makes the class gradually transit to student-centered and realize the personalized development of students. The integration of information technology and subject curriculum makes the teaching and learning in the classroom full of vitality, diversifies the way of presenting knowledge, and realizes the ecology of teaching and learning. The next research will select some students to conduct structured interview or questionnaire survey, and build a data model that can objectively present students' participation in interactive contribution.

Index Terms—dual class thematic teaching, study analysis, self-regulated learning ability

I. INTRODUCTION

The interactive classroom teaching is the highlight of classroom teaching reform under the background of the big digital age. Dual class teaching is a kind of teaching mode based on hybrid learning theory, which is combined with online forum ("virtual classroom") and traditional classroom ("real classroom"). With the help of the technology, this mode makes the class gradually transit to student-centered and realize the personalized development of students. In Chinese teaching, the

teaching of reading is the process of a conversation which occurs between students, teachers and texts. It is the main way for students to collect and process information, understand the world, develop their thinking and gain aesthetic experience. The dual class teaching through theme reading aims at expanding the breadth and depth of students' knowledge through the self-regulated learning of students in virtual classrooms, combining with the traditional classroom teaching to cultivate students' Chinese literacy and truly achieve the goals of Chinese teaching. [1]

The NMC Horizon Report: Higher Education Version 2017 released by the New Media Alliance takes "Growing focus on measuring learning" as one of the emerging technologies in the short-term that will have an impact on the study, teaching and innovation of higher education, and pointed out that in the online and hybrid courses, data can reveal how students' behaviors contribute to their progress and specific learning gains. [2] Schools are actively thinking about how to use the data to better visualize them and to guide teachers to use the data in a multi-dimensional way. Tracking learners' cognitive behaviors can not only better reveal the learning needs reflected by students' daily behaviors, but also hope to change the school's curriculum and service system more comprehensively by learning measurement.

Wang, a middle school teacher in Beijing, implemented the practice of Chinese dual class teaching with the help of Tsinghua Tongfang zhihaole Platform. The teacher has many years of teaching experience, and has a profound experience and understanding of the dual class teaching, and is pursuing the influence of dual class teaching on students' learning effect at a deeper level. In October 2017, our research team focused on the implementation of the dual class teaching model. Relying on front-line teachers' research groups we collected the data of students learning process in real time from the 2016 fall semester and the 2017 spring semester. According to the results of the implementation of the teaching curriculum and the level of development of students' thinking, the evaluation and analysis are basically carried out. From the analysis results, this study basically achieved the effective combination of SOLO theory, IAM model and students' interactive text analysis,

which has been widely recognized by front-line teachers in Dongcheng District of Beijing. (Fig. 1)

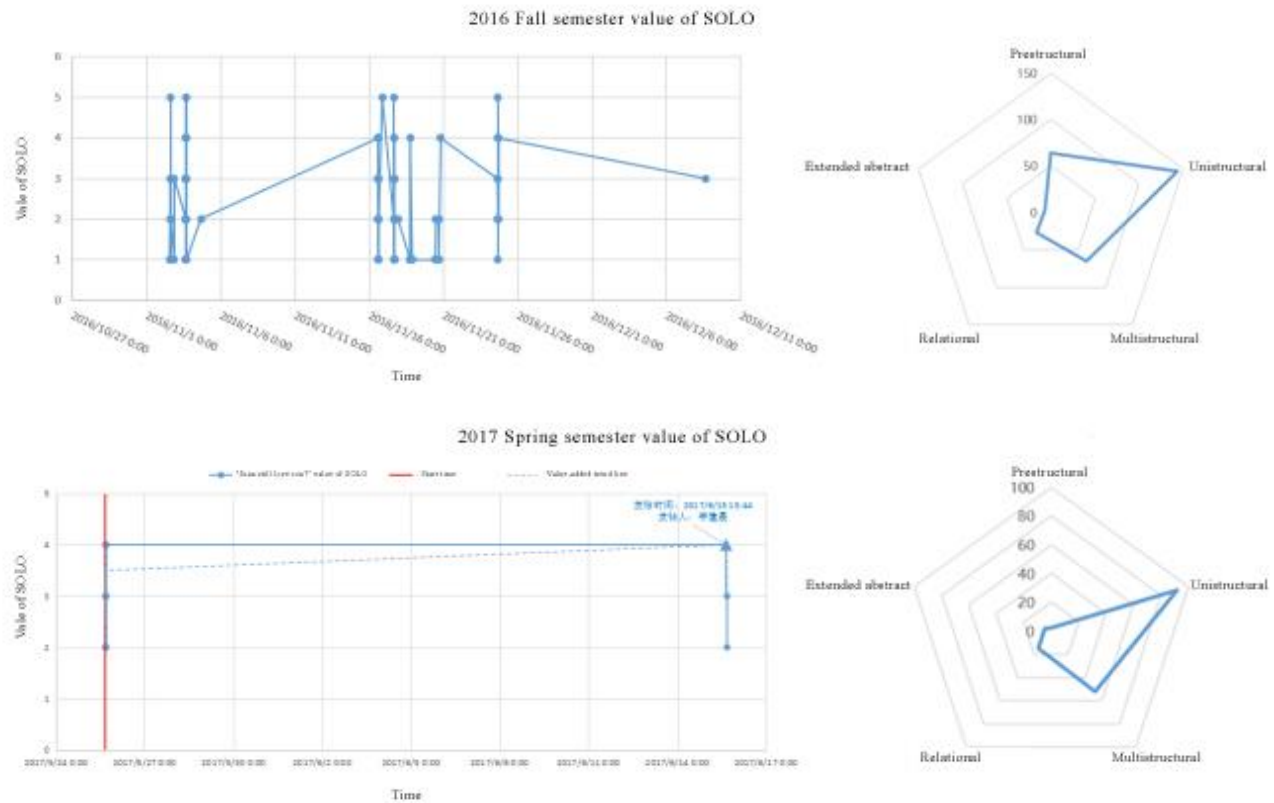


Figure 1. Two semesters students' thinking quality trends

This study focuses on students' abilities to learn independently, trying to explore a new evaluation model and deeply evaluates students' learning in order to investigate the changes brought by the dual class in Chinese teaching, evaluate the teaching effect, as well as

the impact on the development of students' self-regulated learning ability. Moreover, with a view to put forward further development proposals for the future development of Chinese dual class teaching.

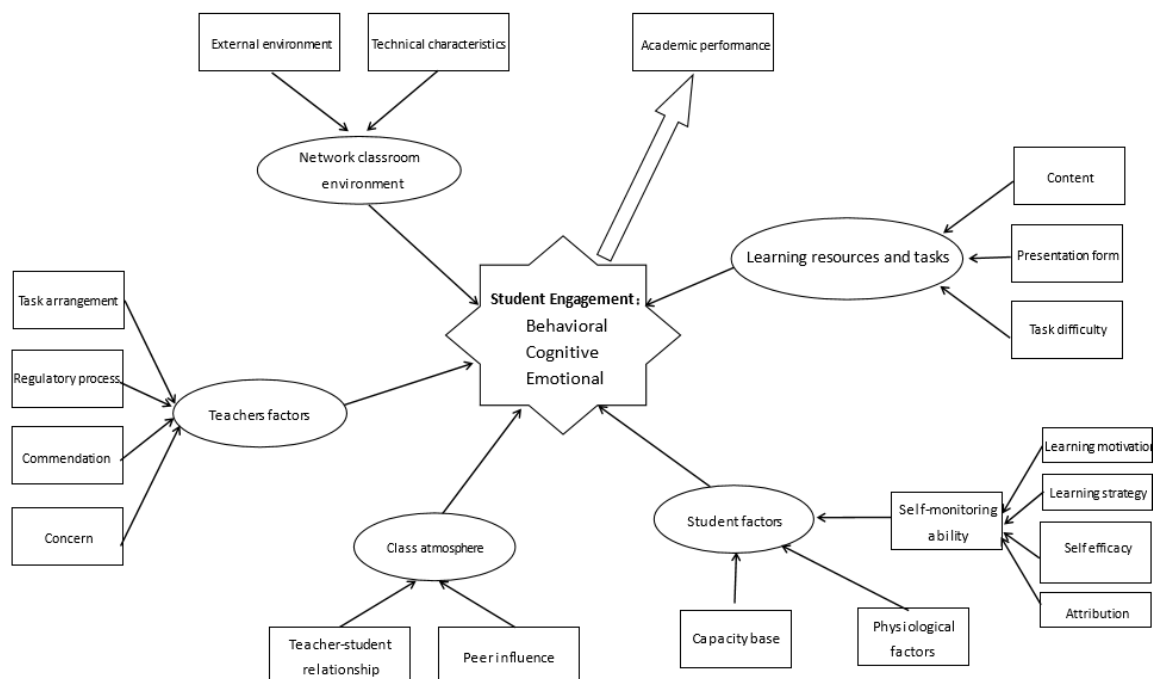


Figure 2. Model of influencing factors for students' engagement in online classroom environment [5]

II. RELATED WROK

This study intends to associate the dual class - virtual classroom data with the students' self-regulated learning, and evaluates the students' self-regulated learning ability through data mining and interactive text analysis. Self-regulated learning generally refers to the process or ability of individuals to consciously determine their learning goals, make learning plans, choose learning methods, monitor learning process and evaluate learning results. [3] In this study, we selected the five factors influencing self-directed learning activities in the network environment, such as "environmental of network classroom ", "teacher factors", "student factors", "learning resources and task " and "class atmosphere factors".[4] In order to deeply explore the relationship between these

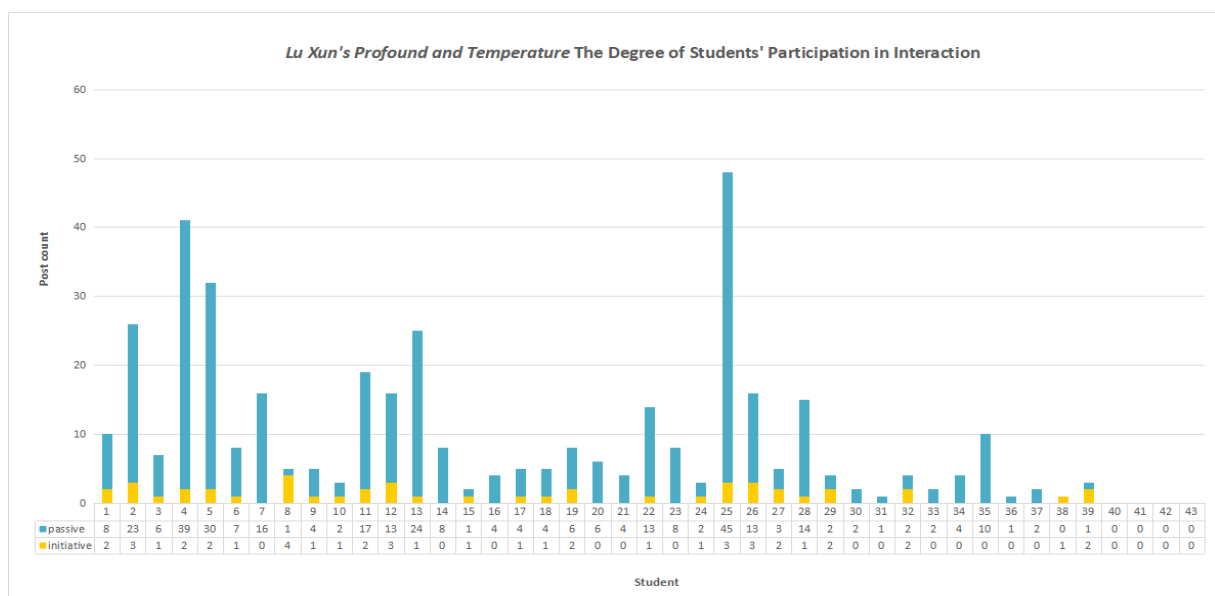
impacts, we can establish a structural equation with "student achievement", as shown in Fig. 2. Based on the existing platform data and teaching mode, this study focuses on the presentation of objective data presented by "student factors" in the overall teaching environment.

III. METHOD

Based on a wide range of literature research,synthesize the perspectives of social cognition theory, metacognition theory, attribution theory and other schools of thought, and Zimmerman's deep interpretation of self-regulated learning theory in different dimensions, we integrate process data to evaluate students' learning outcomes and self-regulated learning ability in the following ways. Please refer to Table I for details.

TABLE I. RESEARCH METHOD[5], [6]

Scientific Questions	Self-Regulatory Attributes	Research method
Why?	Intrinsically or self-motivated	This stage is mainly to complete the self-plan part. Independent process embodies self goal, self-efficacy, timing and effective use of learning strategies and personal effort. It is suggested to use the self-report inventories (self-evaluation form, learning motivation and strategy questionnaire, etc.).
How?	Planned or routinized	
When?	Timely and efficient	Collect time for students to participate in the interaction, and reflect the degree of students' participation based on the time dimension. (Note: Due to the objective environment and teaching design patterns, students' participation in the interaction occurs mainly in the virtual classroom machine time, very little extra-curricular time and the quality of speech is not high)
What?	Aware of own and performance outcomes	Collect interactive contexts of students' participation, and analyze students' speeches by Natural Language Processing technology to acquire the relevant information (emotion distribution, keyword extraction, typical opinions, and participation motivation). Learning evaluation results are suggested to combine students participation in the interaction. Some students (such as speech active participation enthusiasm high / medium / low, significantly enhance the student academic achievement) need interviews (autonomous learning interview table); or we can evaluate (self-learning learning assessment results: teacher scale)students based on teachers' understanding to students' learning.
Where?	Environmentally sensitive and resourceful	Due to the objective environment and teaching design patterns, students' participation in the interaction occur mainly in the virtual classroom (few extra-curricular environment and the quality of speech is not high).
With whom?	Socially sensitive and resourceful	Co-ordinating the frequency of students' participation in different topics' discussion, observing the distribution of its initiative speak / passive speak.



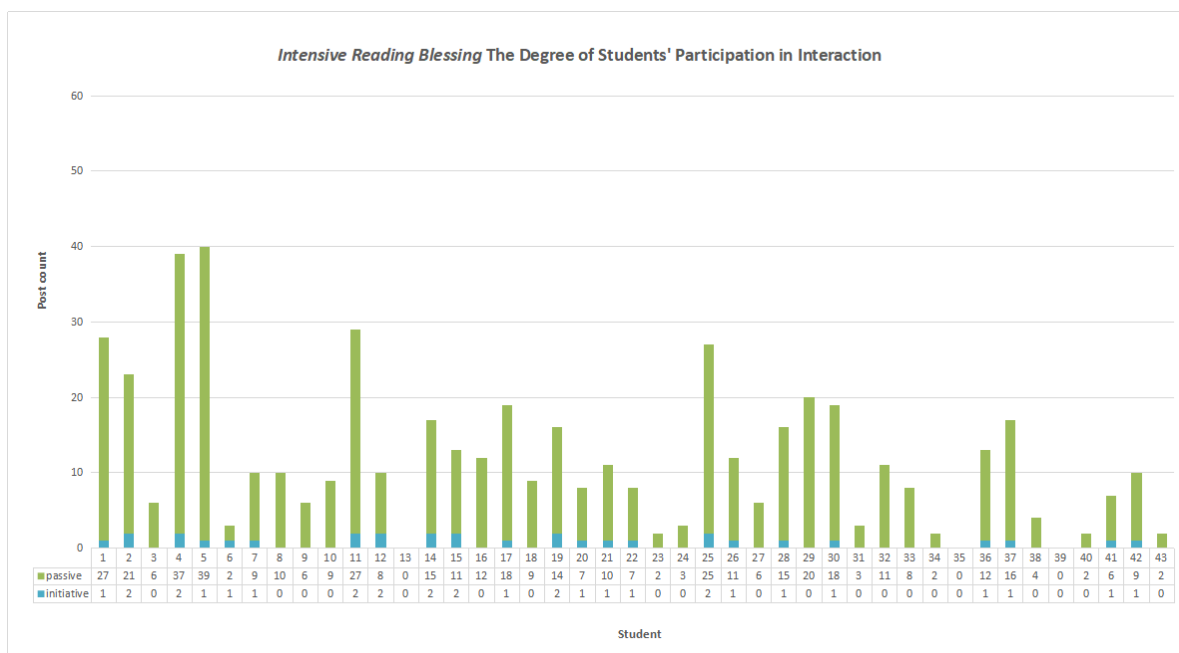


Figure 3. The degree of students' participation in the interaction

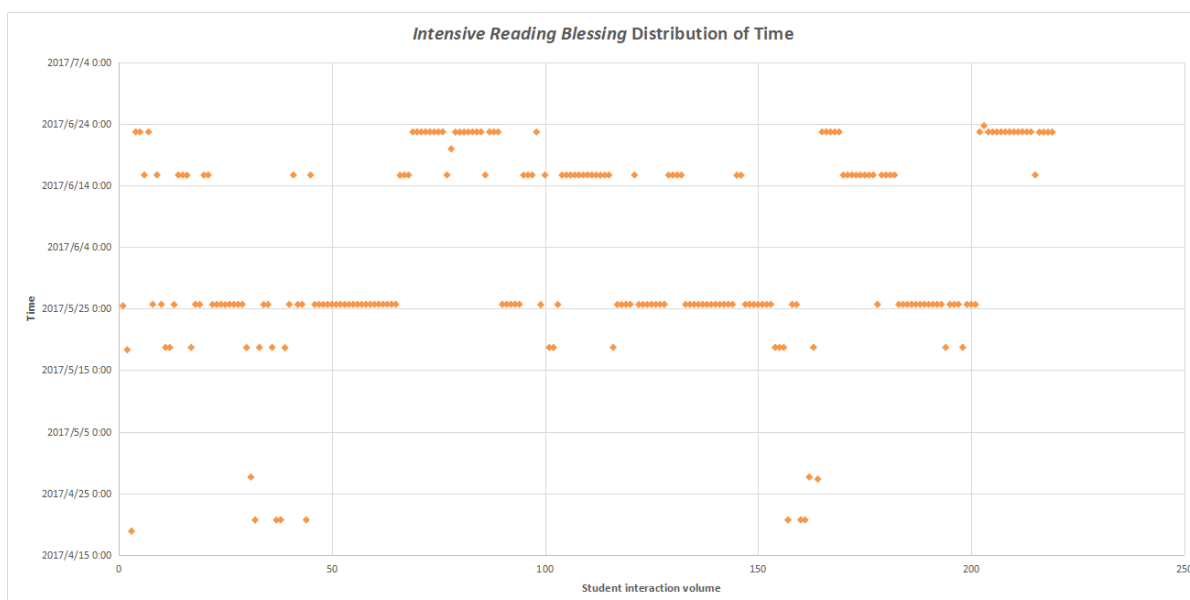
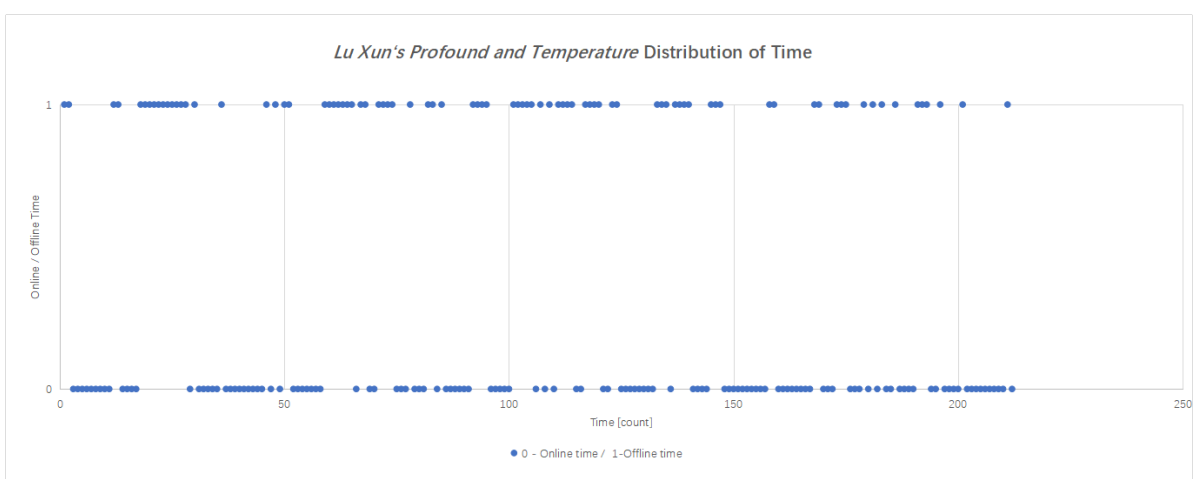


Figure 4. Distribution of time

IV. RESULT

This study chooses the dual class teaching practice implemented in autumn 2016 and spring 2017, and selects the topic "Writing Like Lu Xun" which is relatively has higher students' participation as the research content for further analysis.

A. Degree of Students' Participation in the Interaction

By counting the frequency of all the students under this topic, the degree of students' participation in the interaction is evaluated from two aspects: active posting (moderator of the post) and passive posting (participate in commenting on other people's topics), as shown in Fig. 3. Among them, student Wang (No.25), Lee (No.4), Zhang (No.5) participate in speaking most frequently, and their number of active postings is also in the forefront. Some students such as Lee (No.36), Chen (No.33), Yan (No.31) and other students did not take the initiative to post, and they did not make too many exchanges in the evaluation of other people's point of view. Very few students have not participated in any communication, and most of the time spent skimming on other people's posts. Overall, most of the students participate mainly passively, that is they are involved in the construction of the meaning of others. It can also be understood as these students in the reading process rarely found and asked questions, or these students have a higher level of thinking, they can fully understand other students' related issues, and thus rarely speak to discuss. As for what kind of situation specifically, we can make a comprehensive assessment of the quality of speech, daily performance and language achievement of the student in this thesis.

B. Distribution of Time

On the time dimension, observing students' speaking point-in-time under this topic, drawing a timeline, locking individual isolated points and analyzing the causes is necessary, as shown in Fig. 4. The abscissa is the total frequency of speaking time, the ordinate is 0 and 1 (0 means online time and 1 means offline time), which shows the time distribution chart of the students participating in the subject interaction. It can be seen from the figure that more time is distributed in the online time, but there are also some topics that can stimulate students' interest in the offline study. This figure also shows that students are emotionally willing to share their views with more people after class. Similarly, teachers can better analyze and judge the students' learning interests and reading preferences by capturing the distribution of discussion in offline time.

C. Emotion Analysis

The text is divided into two or more types according to the meaning and emotional information expressed in the text, such as commendatory or derogatory, and the purpose of the emotional analysis is to find out the attitude of the speaker / author on some topics or one

text. This attitude may be his / her personal judgment or assessment, perhaps the emotional state of the author at the time of making the remark, or the author's intended emotional exchange (ie, the feelings that the author wants the readers to experience). In this situation, all interactive texts under the topic are extracted to make a positive and negative emotional analysis. As can be seen from Fig. 5, 63.66% of the students convey positive emotions and the high-frequency emotional words are in the middle. Exclude the emotional factors of the topic itself, on the one hand it shows that students can see the issue from both positive and negative side, and can express their own point of view. On the other hand, most of the students showed positive attitudes in the presentation process.

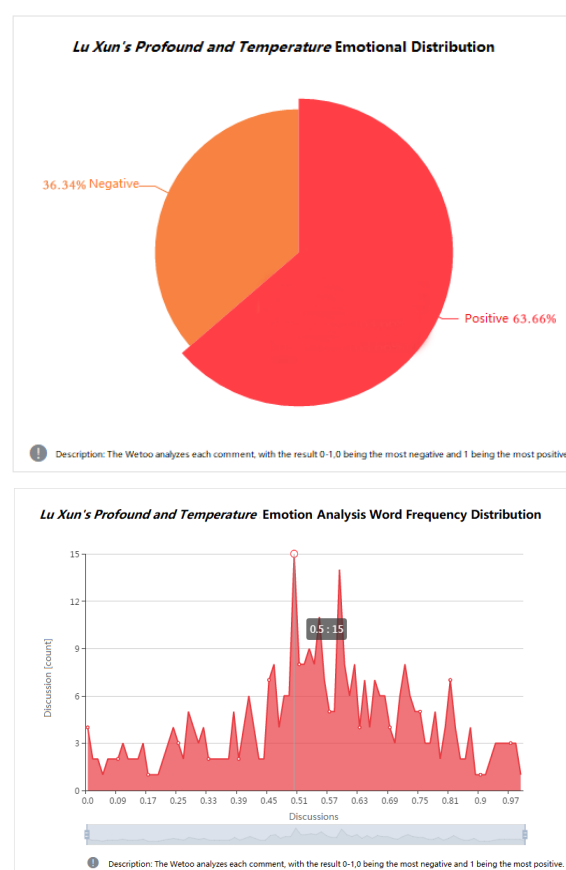


Figure 5. Emotion analysis

D. Keywords Extraction

By getting the keywords of interactive text, you can quickly understand the student's focused points in discussion. By counting hot words and presenting word cloud images, you can intuitively feel the number of words (including nouns, verbs and adjectives and so on) and the number of core keywords that appear in a topic. As shown in Fig. 6, the effective and efficient way of information transmission can help teachers to understand more accurately the vocabulary and hot topics discussed by students. If there are meaningful or meaningless hot words, teachers can participate in the intervention in a timely manner to guide them to think from a better side.

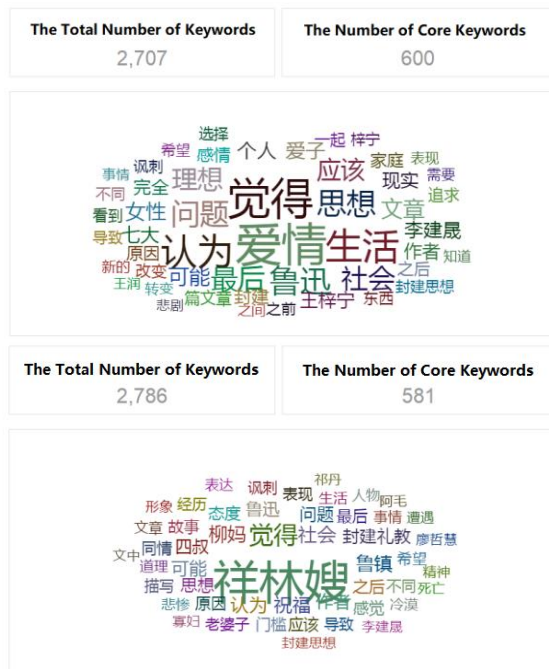


Figure 6. Keywords extraction

E. Typical Opinions

Concerning about the students' interactive texts, presenting various views of the same or different opinions and present a textual interactive word network graph on the basis of extracting key words, and comprehensively establishes a comprehensive cognitive system based on the students' exchange of information, as shown in Fig. 7. Starting from the central point of issue, expand the breadth of the discussion of the topic, observe whether the students can make meaningful knowledge construction, and whether they can perfect the topic information. Teachers can guide students in a timely manner to provide supplementary reading materials or other learning according to the interactive word network graph to help students deepen their understanding of knowledge.



Figure 7. Typical opinions

V. CONCLUSION AND FUTURE RESEARCH

A. Conclusion and Suggestions

Based on the interactive information of students in this semester, using the big data analysis tools and coding

analysis of some speeches, the development of higher-order thinking of students has been obviously improved compared with the overall situation of this class in the fall semester of 2016 and the spring semester of 2017. In the level of self-regulated learning, it can reflect that the students in the reading process have the basic reflection and thinking skills of the discovery, and is willing to share with others to build awareness of point of view, which can be seen from the fact that the students as the moderator to create the main body of information; From the perspective of students' participation in discussions, the amount of students participating in discussions is far greater than the amount of students initiating discussion, which shows that the vast majority of students participate actively in cultural discussions with positive learning. The key words and typical opinions extracted from the interactive content can reflect that the students are building around the theme without any other unrelated content. A small number of posts can extend beyond the classroom time period and produce meaningful knowledge building, showing an overall positive emotional attitude. The word-graph shows the constructive exchange of students around the topic and can clearly present the combining and comprehensiveness of the argument content and logical structure. Part of the interactive content involves a comprehensive comparative analysis of similar articles, expressions or knowledge points, indicating that students can grasp the key words before solving the problem and find out the starting point of the problem by means of effective information retrieval. In a relatively open virtual classroom environment, any student can be a role model or a helper. [7] In addition, due to the objective conditions, the vast majority of students are concentrated in dual class time in the virtual classroom, the learning environment is controlled in the computer room, thus students can seldom choose or organize learning environment in non-class time. Few students will extent and talk about the topic beyond the classroom, but effective learning takes place in terms of the level of thinking that students interact with.

B. Next Research Project

When self-regulated learning is treated as a competency aptitude for assessment, the measure taken is based on the integration and abstraction of a number of independent learning practices to arrive at an independent learning quality. There are currently three types of assessment: (1) self-report inventories a method of measuring individual-related psychological characteristics or behavioral attitudes by unifying a strictly designed questionnaire; (2) structured interview: the general requirements of the researcher are to determine the dimensions and situations of the self-regulated learning which need to be investigated, and then design the relevant issues, and analyze the content of the interview; (3) teachers' assessment: based on the teacher's comprehensive understanding and long-term observation of students' learning.^[3]

Obviously, these three commonly used evaluation methods are not suitable for this round of data research

and analysis. Therefore, based on the previous objective information generated during the student learning process, we dig out some of the descriptive learning outcomes that students learn independently. In the latter part of the program, we select some students to have a structured interview by using the above three methods (For example: Students who participate in interactive activities and have high quality of speech; Students who participate in the interaction but have a higher quality of speech; Students who have significantly improved their scores through dual class.)

In the dual class teaching of Chinese, this paper deeply studies the evaluation of students' self-regulated learning under the network environment and constructs a data model that objectively describes the students' self-regulated learning ability or the contribution degree of students' interactive participation in the form of ten-point/centesimal system, thus to provide a better theoretical basis for teachers to improve their teaching.

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Media. Now, she focuses on intelligent teaching system.



include: mobile learning, intelligent teaching system, digital campus and regional education informatization.



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Function of BYOD into College Classroom under the Background of 'Internet + Education' in GCCCE2016.

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