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A Brief Review About Chinese Informatizing-based English as a Foreign Language (EFL) Classroom Ecology Balance

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ABSTRACT: Ecology is a science which studies the interrelationship between organisms and the environment (Harckel, 1866). Ecology has become a new interdisciplinary subject with structural integrity. The concept of "educational ecology" was first introduced in 1932. The American educator Walle Willard (1932) firstly put the idea of classroom ecology in his research. In China, the classroom ecology is a study focus which attracts many researchers since 2000. The Chinese National Educational Reformation requires all the schools from primary schools to universities to incorporate their English teaching and learning activities with modern information technology. It is a great challenge for the traditional classroom ecology because the utilization of the technologies has changed the ecology factor, here, the classroom environment. The classroom is no longer balanced (Law, 2014). To figure out methods which can make the informatization-based Chinese EFL classroom balance again are a hot subject that researchers are scrambling to study these days. To analysis, the Chinese informatization based EFL classroom ecology balance, the classroom ecology structure should be studied first. The relevant researches are mainly driven from these two perspectives: the structure view and the dynamic view & process view. In this research, both views would be applied to study the classroom ecology structure and try to present a clear view of the current Chinese EFL classroom ecology balance situation. Meanwhile, for the classroom ecology functions are also a significant part in this research. The general functions of an ecological system are information flow, materials circulation and information transmission. Classroom ecology is a micro-ecological system in the field of education, and that makes it gains the general functions of an ecological system (Liu Changjiang, 2011). For EFL classroom, it should have basic four functions to meet the country's English teaching and learning goal: the structure optimization function; the relationship coordination function; the evolution promotion function and the education function. Only if the informatization-based Chinese EFL classroom ecology makes its structure, as well as its functions, suits the country's education development target, the classroom teaching and learning could have high efficiency and sustainability.

KEYWORDS: Classroom ecology balance, Classroom ecology structure, Classroom ecology functions

I. INTRODUCTION

The ecology theories are used as interdisciplinary theories in many fields. When using the ecology theories to analyze a classroom, the classroom is a special ecosystem which contains different ecological factors like the lecturer, the students, and the elements in the study environment. The factors are mutually dependent and interrelated with each other. The classroom ecology focuses on the classroom

micro-system, seeking to describe and explain the interactions of students' thoughts and behaviors with lecturers' management of academic goals and learning tasks (Peter Hastie, 2010).

The Balance of nature is a theory that proposes that ecological systems are usually in a stable equilibrium or homeostasis, which is to say that a small change in some particular parameter should always be corrected by some negative feedback that could bring the parameter back to its original "point of balance" with the rest of the system. It applies where populations depend on each other (Zimmerman, Corinne, 2007).Started at the end of the twentieth century, researchers broaden the study scope of classroom ecology with the Balance of nature theory. Researchers like Guzdial (1997), Boylan (2010) and Barowy & Smith (2008) had successfully using the theory to study the classroom ecology problems.

In China, Fang Binling was one of the first who used the word 'Balanced' to describe classroom teaching and learning process in 1995 (Liu Changjiang,2013). The classroom ecological balance means a stable classroom teaching and learning condition. The factors that contribute to this condition are interdependency and interrelation based on cooperation as well as interaction. The teaching and learning effects could be maximized in this ideal classroom ecological balanced condition (Wang Tingting, 2012).

The informatization based Chinese National Educational Reformation is a new change which happens in the classroom in recent two decades. Chinese education development aims to use information technologies to push the modernization of education. The requirement is writing in the National Medium- and Long-Term Plan for Education Reform and Development 2020 which issued by the 17th Communist Party of China National Congress in 2010. Chinese English as a foreign language (EFL) classroom is undergoing deep-seated intergradation with various kinds of modern information technology. The introduced newest information technology is a new factor in current Chinese EFL classroom ecology. The original relatively balanced classroom ecology was broken, and the original factors' roleof the classroom ecology also need modification(Wu Guosheng, 2018). (The in a traditional EFL classroom ecology, the roles of factors are always: a lecturer is a producer in the classroom ecosystem, he or she transmits the knowledge from external world and self-experience to the students by EFL classroom environment, and students are digesting the information which transmitted by a lecturer and gives feedbacks to the lecturer through EFL classroom environment (Liu Changjiang, 2011) The informatization is a trigger of the development of education; it is also the direction where future education would lead (Gall & Borg, 2003).

By this research, based on the Balance of nature theory, current Chinese EFL classroom ecology structure and functions would be reviewed under the informatization.

II. LITERATURE REVIEW

Based on the balance of nature theory, the factors in one particular ecology not only have its inner force to push its operation back to the trail but also need the outsider force to help the factors to modify themselves when the ecology is imbalanced. In the EFL classroom ecology, because of the introduction of information technology, the classroom teaching environment, as well as the requirement for both lecturer and students, are changed. In this educational informatization trend, the EFL classroom ecology is imbalanced which the classroom ecology factors still remain to its traditional roles. With the roles' modification of each classroom ecology factors, the structure, as well as the functions of the classroom, should also be optimized for a balanced informatization based classroom ecology. Also, only if the suitable structure is applied, the factors in the ecology could cooperate and function well, and the classroom

teaching and learning process would reach its goal (Ning Yunzhong, 2016).

1. The analysis of EFL classroom ecology structure.

In china, one of the most significant developments of EFL classroom ecology structure is proposed by Li Sen (2011). He thinks that there are two methodological prerequisites for the research of EFL class ecology: First, the research must use the structure view and the relation thinking to explain the relationships between the different class ecological factors. Second, the research must be conducted in the perspective of process view and dynamic view to reveal the interactions between each class ecological factors. These two methodological prerequisites are critical for this research in analysing the current informatization based Chinese EFL classroom ecology structure, the relationships between factors of the current Chinese EFL classroom ecology would be referred to the general EFL classroom ecology factors analysis which would be discussed in the following section. In the following part, the general EFL classroom ecology structure would be discussed based on Li Sen's thinking by discussing the factors' relationships with each other.

(i) The EFL classroom structure under the structure view and relation thinking.

In traditional class structure, the class teaching is the process which the lecturers deliver the knowledge to the students by certain means. In this process, there are many teaching elements involved, like the lecturer, teaching material, teaching concepts, teaching methods, students, learning environment, and so on. Knowledge is delivered through a single strand flow, and the lecturers' instructions is the main way of teaching. The traditional teaching aim is to help the students' development in one subject.

In the ideal situation, which we could also call the balanced classroom ecology, the core idea is to peruse the overall harmony, which especially emphasizes in the commensalism of all different factors. In educational ecology, the class is a complicated ecosystem, the interactions between distinct components (lecturer, students and class environment) are changing and the factors even integrating as well as interconverting all the time (Li Sen, Wang Mu & Zhang Jiajun, 2011). In the class ecosystem, the lecturer is the main producer of the information or knowledge in the internal ecosystem, but longer be the only one. Other factors in the class ecosystem could also produce information or knowledge, like the internet based multi-media. There is no strict regulations or customs about the fixed identity of the producer. The students are the learners in the class; they are the consumers and the decomposers of the information or knowledge. However, in some cases, the students also could be the producers in the class ecosystem and provide information or knowledge to other learners and fulfil the obligation of the lecturer. In the balanced ecology, lecturers could either transfer their roles between the producer and the consumer or decomposer. They also observe the knowledge from their students, colleagues and the environment. Thus, both the students and the lecturer in the balanced class ecosystem have three functions. They are the producer, the consumer and the decomposer at the same time. However, these identities have a differentiation between priority and others. Lecturers are the main producer; students are the main consumer. The lecturers, the students and the environment are operating together to realize the energy flow and information flow by the class interactive activities.

Regarding the classroom environment, the traditional view thinks it mainly means the classroom atmosphere and the objective classroom environment (Huo Fengyuan, 1989). However, modern ecological education did not have a unified concept about it.

Walberg & Anderson (1968) divide the class environment as the structural dimension and the emotional dimension. Moos divided the class environment as the relationship dimension, individual development dimension and the system maintenance as well as change dimension (Liu Liyan, Liu Yongbin, 2010). Ellison, Christopher (1995), Wade Boykin (1986) and other researchers divided the class

environment into five dimensions: the social and physiological relationship; the core teaching technics; physical structure and systematic program; disciplines and class management; system culture environment and the spiritual and mental environment (Li Sen, 2011).

Another popular way of defining the class environment in modern educational ecology is to separate the class ecological environment into the external ecological class environment, the derived ecological class environment and the objective ecological class subjects (Zhang Hongda, 2016). The external ecological class environment means the existence of the ecological factors which are independent of the subjects' subjective consciousness. These factors are mainly the physical factors like the decoration of the classroom and the class equipment conditions. The derived ecological class environment means those ecological class environment factors are derived from the ecological class subjects like teaching materials, teaching methods, class study style and class management regulations. The derived ecological class environment is the combination of the social environment and the regulatory environment.

The ecological classroom objectives mean the environmental factors which existed in the classroom eco-system. It includes of the lecturers' and students' factors, like lecturers' professional quality and the personality indications of both lecturers and students. As a way of class ecological environment division, these ways are hard to understand. Not only the name of the so-called 'objective ecological class subjects' is ambiguous, but also many researchers think the teaching methods from the ecological class environment should belong to the scope of the objective ecological class subjects (Liu Liyan & Liu Yongbin, 2010)).

The generally accepted idea about ecological classroom environment is that it could be divided into the dimensions of the structure, the dimensions of relationships and the dimensions of culture. The structure dimension means the ecological factors which consist of the class environment. It contains the facilities in the classroom, the modern information technology teaching media, teaching methods as well as concepts, students' learning attitude, and so on. The relationship dimension means the interacting relationships among the class ecological, environmental factors. It mainly refers to the lecturers' and students' emotional attitude and the emotional attitude between lecturer and students towards the environment. The culture dimension means the various class cultures which maintain and improves the class ecosystem operation, like class honours and study atmosphere.

From the dimensions of the structure, relationship and culture, the classroom environment not only continually influencing the classroom teaching and learning activities, but also be influenced by the lecturers and students' practices. Lecturers, students and the environment are interacting with each other and formed a web-like classroom ecology structure. Li Seng (2010) also regards that the structure of the classroom ecology is intersectional. He also thinks the fact of the classroom ecology is the development as well as the interactions of both students and lecturers, which using the classroom environment as the intermediaries. Also, the classroom environment has been brought in many new changes and presenting different new classroom ecology structure. (Refer to Figure 1.1)

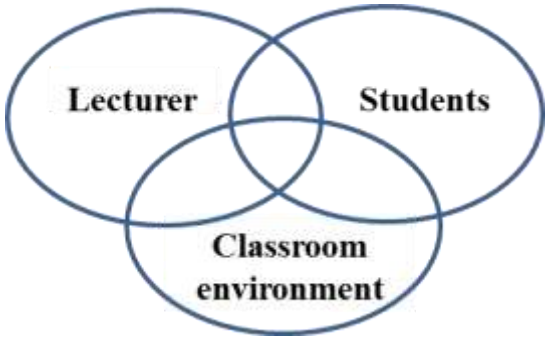

Figure 1.1 Classroom ecology structure (Li Sen, 2010)

In this research, in order to fully present the interaction of classroom ecosystem and its external environment, the interaction of classroom ecological factors and their external environment, the interactions between individual factors and the interactions between classroom ecological subjects, there is a newly designed graph which based on Li Sen's (2010) idea to show the balanced classroom ecology structure. The information technology is separated from the original classroom environment and to be an independent factor in the EFL classroom ecology under consideration. (Refer to Figure 1.2)

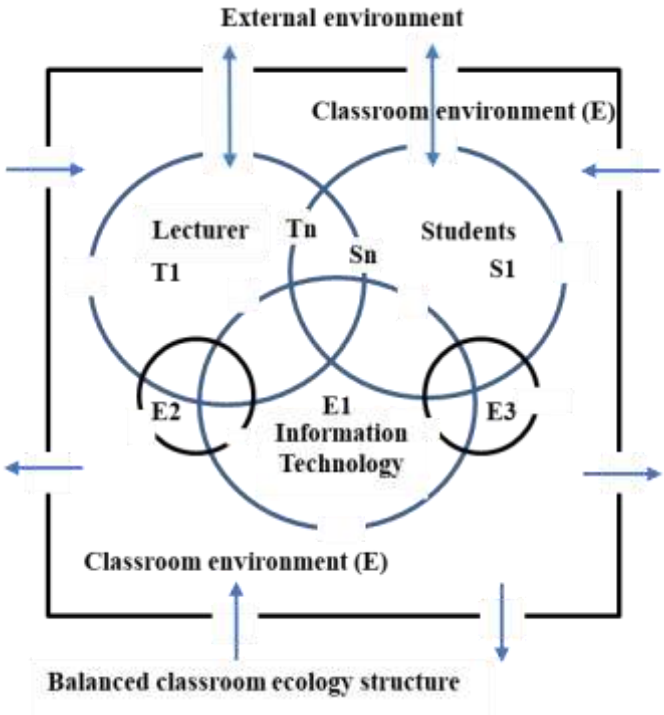

Figure 1.2 Information based general EFL classroom ecology structure in this research. (Li Sen, 2010)

The T1, E1, S1, Tn, Sn, are representing individual classroom ecological factors; the arrows in the graph are presenting the interaction between ecological factors in the classroom and external environment. The quadrangle in the graph presents classroom ecology system. And there are gaps in the walls of the quadrangle which demonstrates the openness of the classroom ecosystem; they are the channels for the interactions between ecological factors and external environment.

From the original Li Sen's model, the EFL classroom environment is a summary for many different classroom ecological factors, such as the electronic teaching facilities, the textbook, the teaching methods and class curriculum arrangement. In this research, the informatization is the base, and the turn of current

Chinese EFL classroom ecology from balance to imbalance is on account of the introduction of information technologies into the classroom. Thus, it is quite necessary and appropriate to discuss information technology in the EFL classroom ecology environment. Based on this general EFL classroom ecology structure, the problems which occur in the current imbalanced Chinese EFL classroom ecology environment would be revealed by comparison in later sections.

(ii) The general EFL classroom structure analysis under the dynamic view and process view

The following discussions are the analysis of the EFL classroom ecological factors' relationships which based on the view of the structure. Meanwhile, many previous researchers use the views of the process to describe the dynamic trait of EFL classroom ecological structure. The classroom ecology structure is not monotonous; it is a dynamic process which would change combined with the changes in environmental factors in it (OECD, 2009).

Lecturers' responsibility, learners' altitude, the application of the information technology and even the decoration of the classroom would have more or less impact on the methods and paths of information flow. The British educator Chris Watkins (1998) extract six key elements from comprehensive classroom ecology system, they are the target, the commission, the social structure, the role, the resource, the schedule and the teaching pace. Educational informatization is also bringing about changes in information technology in teaching methods. Based on these six elements of classroom ecosystem, he deduced three classroom teaching methods, and these three teaching methods show different classroom factors' relationship and different classroom ecology structure model: Teaching by lecturing, constructive teaching and co-built classroom teaching.

-Lecturing teaching method

The lecturing teaching method is the traditional teachercentred classroom teaching way. In this kind of classroom ecology, the ecological information flow is mainly controlled by the lecturer. According to the saying of Huang Zhenyuan and Chen Weizhen (2010), the traditional teachercentred classroom ecology would no longer suit the informatization based EFL classroom's development, and the classroom ecological factors could not cooperate concordantly. (Refer to Figure 1.3)

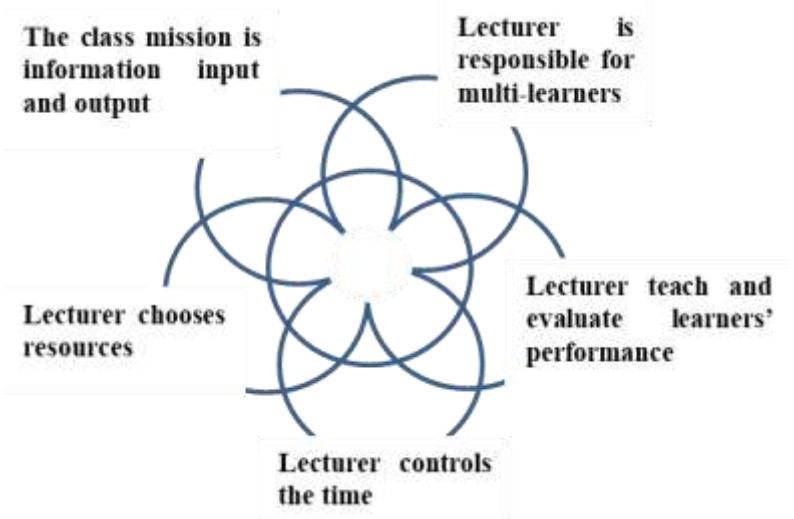

Figure 1.3 the traditional classroom ecology structure of teaching by lecturing. (Van Klaveren, C., 2011)

- Constructive teaching method

The constructive teaching method was a student-centred classroom teaching way based on constructive theories. The information flow in this classroom ecology is controlled by the students. They

realize multi-development by exploration and discovery. This teaching method is improvement based on the lecturing teaching method. However, this method is not created based on educational informatization. Although it enhanced the classroom teaching and learning efficiency comparing with the lecturing teaching method (Liu Changjiang, 2011), the increasingly introduced and developed EFL classroom information technology do require a more advanced EFL classroom ecology teaching method in the classroom environment. (Refer to Figure 1.4)

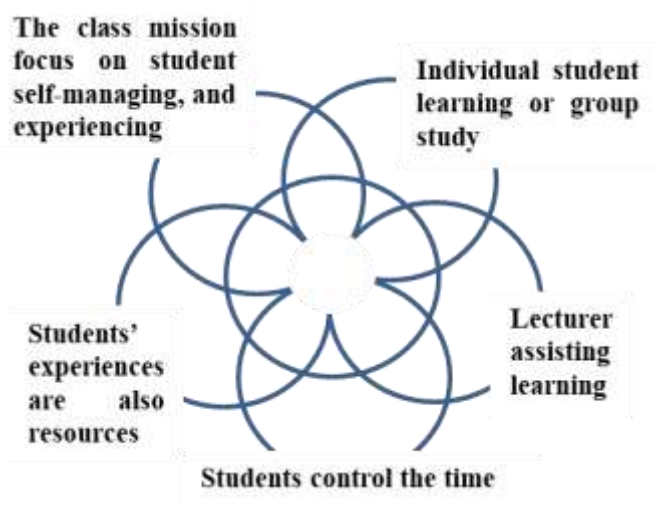

Figure 1.4 the improved classroom ecology structure under constructive teaching method. (Van Klaveren, C., 2011)

-Co-built teaching method

The co-built teaching classroom teaching method is based on the symbiosis principle in the ecology theory, and it is an ideal classroom ecology structure. In the classroom which using this method to conduct the learning activities, both students and the lecturer are the subjects of learning and creating. During the classroom teaching and learning process, both the lecturer and the students sharing study resources and forming learning communities. The teaching and learning time would also not be limited by the class arrangement because of the application of information technologies. This is the ideal teaching method of classroom ecology environment and the currently most suitable ecology structure. (Cheung, Lau & Shim, 2010) (Refer to Figure 1.5)

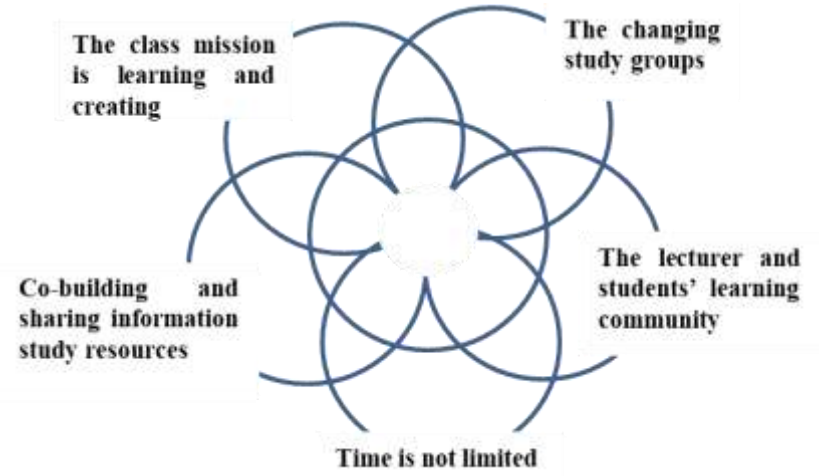

Figure 1.5 the classroom ecology structure under co-built teaching method. (Van Klaveren, C., 2011)

These three kinds of classroom ecology structure are the dynamic relationship structures of different classroom ecological factors in the classroom ecology environment. The classroom which adapted the constrictive teaching, or the co-built teaching is ecological and balanced in its ecology. Although each of these three methods has its pros and cons, from the view of informatization, the co-built teaching method is more reasonable and suitable for the informatization based current Chinese EFL classes to adopt. In this research, the ecology environmental factor of general EFL classroom ecology structure would adapt the co-built teaching method to comparing the current Chinese EFL classroom ecology structure.

In conclusion, since this research is an exploratory case study of ecological balance in informatization based Chinese EFL classroom, the classroom ecological balance is one of the most critical focuses point to study. Based on the literature review about classroom ecological structure and dynamic ecological structure, it could be deduced that: if the classroom teaching is now still adopting the traditional teacher centred lecturing method or the constructive method to teach with the utilization of information technology, the classroom is imbalanced. The information flow in these kinds of classroom ecology would not be effective (in which the function of information technology could not be realized), and the classroom teaching aims would be contrary to the requirement of educational information (in which students need to be autonomous in learning and creativity in practice). In this research, the informatization based general classroom ecology structure (which was developed based on the model given by Li Sen) and the co-built classroom ecology environment structure would be considered as the general balanced classroom model and compared to the current Chinese EFL classroom ecology structure.

2. The analysis of EFL classroom ecology functions.

Function means the fundamental purpose of something and every system has its function(s) (Cambridge Dictionary 2019). The functions of one system are the effects caused by the system behaviours, and benefits for specific one factor or entire environment which the system exists in (Li Zhenji, 2015). The general functions of an ecological system are information flow, materials circulation and information transmission. The classroom ecology is a micro-ecological system in the field of education, and that makes it gains the general three function of an ecological system (Liu Changjiang, 2011). To be specific, the function of classroom ecology means the interactions in classroom ecosystem which between different ecological factors, or the positive impacts which brought by the interaction between the classroom internal and external environment (Sun Zhenyun, Zhou Dongxing, 2010). The function of the classroom ecology system would only be presented by ecological factors' interactions. Also, the classroom ecology structure, as well as the environment, influences the functions of one ecosystem (OECD, 2009).

Classifications of the classroom ecology functions present two kinds of understanding of classroom ecology: one is the classroom ecology which is considered as an ecosystem. The other is classroom ecology as a classroom environment. In this research, the function of a general EFL classroom ecology could be separated into four parts (Refer to Figure 2.1): 1. The structure optimization function; 2. The relationship coordination function; 3. The evolution promotion function and 4. The education function, which could be detailed explained and seen as follows:

(i) The structure of optimization function.

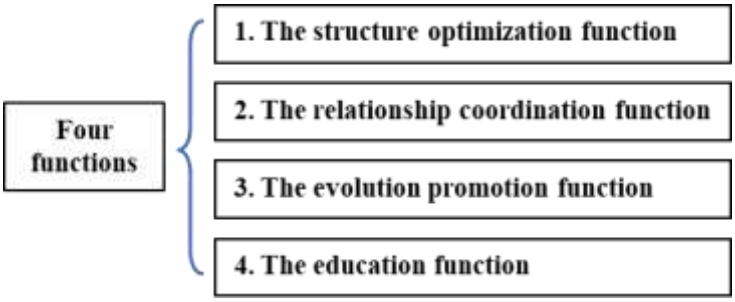

Figure 2.1 four functions of general EFL classroom ecology in this research. (Li Sen, 2011)

The classroom ecological structure is made up of the classroom ecological subjects and classroom ecological environment, which is relatively stable. The trophic structure of current Chinese EFL classroom ecology is also reasonably clear: Lecturer delivering the knowledge and learners consuming the knowledge, in which the classroom ecological environment plays the role of intermediary in this process (Sui Xiaobin, 2017). In the classroom ecological environment, paper-based teaching material is the most critical sections. However, along with the educational informatization, paper-based textbooks are no longer the only carrier of knowledge or information. Internet-based language learning software and multi-media are becoming another important part of the classroom ecological environment.

Learners are also not the passive receivers anymore; they are the experiencers, explorers, discoverers and creators of the knowledge and information. Pushing by the change of educational informatization, the interactions between different classroom ecological factors are changed. Classroom ecology is transforming from the traditional lecturing teaching model to a constructive and co-built teaching model. During this process, the classroom ecological structure is continuing and optimizing. Also, it could be said that this transformation is the process which the EFL classroom ecology is pursuing its balance.

(ii) Relationship coordination function.

Lecturer and learners are the ecological subjects in the classroom ecology; their relationship is one of the essential parts of the classroom ecology construction. The relationship between these two subjects is flowing, interdependent and changing through classroom teaching activities. Under the perspective of ecology, the current relationship between lecturer and learners require more interaction than before; it encourages learners to participate in more classroom activities.

The new classroom activities based on information technologies are inputting new functions to the classroom ecological system and promoting new mutual respect as well as a harmonious relationship between lecturer and learners. The classroom ecology, which has undergone the educational informatization, has broken the opposition of the lecturer and learners. The interactions between these two subjects are emphasized in mutual ways. In the lecturer's and learners' interaction, there must be communication of emotions and feelings. The communication of emotions flow in different classroom ecological subjects and build a dynamic web of communication (Liu Changjiang, 2011). Lecturers' emotional behaviours could influence the learning process of students, and also the students' altitudes could have impacts on lecturers' teaching. The relationship between lecturer and learners are continually self-adjusting through the emotional feedbacks from each other. Meanwhile, the subjects and objects in the classroom ecological system also continuously optimize themselves by the feedback and the entire classroom ecology structure tend to be more concordant. And that is, the classroom ecology tends to be more balanced.

(iii) Evolution promotion function

The regular operation of an ecological system must depend on the materials, energy and information flow within the system and the internal and external environment (Leather, J, & Dam, J.V., 2003). Classroom ecology is a specific social ecology, the energy of its system does not come from the sun, but the interactions between lecturer and learners and the influences from the external environment. The excellent teacherstudent relationship, excellent teaching methods, useful learning resources and positive social expectation (about how the students' English performance would be) could all promote the EFL classroom teaching.

Combining with the input of energy and information, motivation and information flow are created within the ecological system. The flow of information and energy, or the created motivation, not only promotes the development of both lecturer and learners, but also optimize the entire classroom ecological environment. The ecological system of the classroom, as well as the classroom ecological evolution, are stimulated by this process. The knowledge or the information which are derived from the external environment would finally be absorbed by the learners and return to the general big social ecology by the contributions to the public good. (Barowy & Smith, 2008)

(iv) Ecological education function

The most basic function of the ecological system is to increase the productivity, and the primary function of classroom ecology is to educate learners (Tudor, 2001). Ecological education here has three layers of meanings.

One, ecological education means the mutual development of ecological subjects. Learners are the primary subject of classroom ecology in education and educate them is the essential task of education. After all, the classroom ecological function is to educate the learner. Harmony and mutualistic symbiosis are the two traits of the ecological classroom. Also, the co-development of learners and lecturer is the final target. In the traditional classroom, learners' development is the most focused part. In the informatization based ecological classroom, lecturers' development or the students' individual growth are respected.

Two, it means balanced as well as the sustainable development of the ecological subjects. The traditional classroom ecology treats learners as commercial products to produce, and their academic achievements are the most crucial part. However, the comprehensive abilities and emotional experience in the classroom are neglected. The informatization based current classroom ecology pay more attention to individual's free comprehensive development, and it advocates the diversity and coexistence in its ecological system. The sustainable development means to educate the learners in a longer-term of view and promoting the ability of independent study as well as lifelong learning. Then, through the sustainable development of an individual to support socially sustainable development (Gall & Borg, 2003). The concept of sustainable development is an important idea and field of modern ecology study.

Three, ecological education means the ways to cultivate learners who are more ecological and more scientific. In the traditional teachercentred classroom, lecturers think there is no student who could not be taught right. In the new informatization based classroom, lecturers are paying more attention on learners' individual initiative. Learners generally believed that knowledge should be explored and experienced, and they should not blindly believe in the lecturer's authority. Thus, lecturing teaching method is not what the ecological classroom is pursuing. Instead, the constructive, as well as co-built classroom teaching, is the best way to conduct classroom ecology structure.

These four functions may signify the effectiveness in which a general EFL classroom ecology could bring to the students' learning process as well as the effects. In the general EFL classroom ecology, the classroom ecology structure always has its stability (Li Sen, 2011), but the external environment of the

ecology would be changed (just like the traditional classroom ecology has changed by the application of information technology). The changing external environment would also influence the classroom ecology system itself; the materials, information and energy flow would also change accordingly. The interaction process and effects between the ecological system and environment would be altered. Thus, the function of the classroom ecology has more variability compared with the classroom ecological structure.

III. CONCLUSION

For the Chinese informatization-based EFL classroom, the classroom ecology factor of the environment is the part which greatly changed by the developing science and technologies. The traditional classroom ecology structure, as well as its functions, need to be modified for adapting the changing situations. The new language learning and teaching environment do stimulate the new educational development in classroom ecology. However, it is not enough purely depending on the EFL classroom ecology itself to complete the modification, other methods like schools' administration policies and national support should be involved in the process. The classroom ecology structure should be gradually changed toward the student-centred type and the co-built teaching method should be used as the mainstream in classroom teaching and learning process. Also, the informatization-based EFL classroom ecology should also realize the four functions, thus, the actual classroom teaching and learning could reach the country's educational development goal and have practical efficacy for culture as well as economic growth.

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