

## Research Article

### Study of Teacher Development Based on the Ecological Perspective

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**Abstract:** Based on the understanding of the ecology background, the ecological system of Teacher Development (TD) is constructed and the influential factors, such as the natural, social environment, regulatory environment and the physiological and psychological environment, which have an effect on TD, are analyzed in the present study. Besides, with the combination of the ecological characteristics of TD, The sustainable model for TD is proposed. In accordance with the ecological principles of TD and with the help of group dynamics, TD community is constructed and TD has been divided into stages according to ecological evolution law. With the application of the “flowerpot effect”, platform for TD has been provided and the researchers are endeavoring to explore the sustainable ecological TD.

**Keywords:** Ecological environment, ecology, faculty professional development, teacher development

## INTRODUCTION

Teaching faculty has a leading influence on quality school education. With regard to professional Teacher Development (TD), some scholars concentrate on figuring out the difficulties teachers have encountered for their future development, some are trying to analyze the reasons for their tough development and there are other ones trying to offer strategic measures from various perspectives. But due to the superficial researching methods, many of the research findings are overlapped, so they cannot promote the constructing of a favorable ecological environment for professional TD. With the knowledge of ecology, for the purpose of formulating such a desirable ecological environment, the present study is carried out on the basis of the current ecological environment analysis as well as the ecological characteristics of TD, to explore the sustainable ecological TD by the way of building TD community, providing TD platform and identifying TD stages, etc. This study introduces the concept of sustainable development, For example, as to biological research, scholars have carried out persistent researches on bio-fuel, functioned as the alternative energy and renewable energy resources. It do with contribute to reducing emissions of greenhouse gases to limit the earth warming. And studies have confirmed that “Ecological Engineering, is an effective tool for sustainable development” (Mitsch and Jørgensen, 2003; Brüll *et al.*, 2011). Reference the methods to achieve

sustainable development in the field of biology, applied to the field of TD, there are many fruitful research findings in the sphere of TD and pedagogy (Luppi, 2011; Lampă *et al.*, 2013; Badjanova *et al.*, 2014). To explore professional TD from ecology perspective is to reflect teacher-centered humanistic solicitude and resort to the logical starting point of education. TD, just as the creatures in the natural world, would be affected by various ecological elements, thus its development should always observe the ecological order. The present study proposes that the ecological system for faculty professional development and the sustainable ecological development mode are the close integration of the subject of ecology and education. And it has provided effective suggestions and threw new light on TD.

## METHODOLOGY

**Ecological system for faculty development:** The term “ecology” is originated from Greek, consisted of “oikos” and “logos”, indicating the settlement base with the implication of the environment and settlers. In 1869, German ecologist proposed the concept of “ecology” and defined it as a science concerning the relationship between the individuals and the relationship between the community and the environment (Liu and Zhu, 2007). While, the notion of “ecological system” was proposed by Clapham and then Tansley formerly adopted the notion in his research, indicating the

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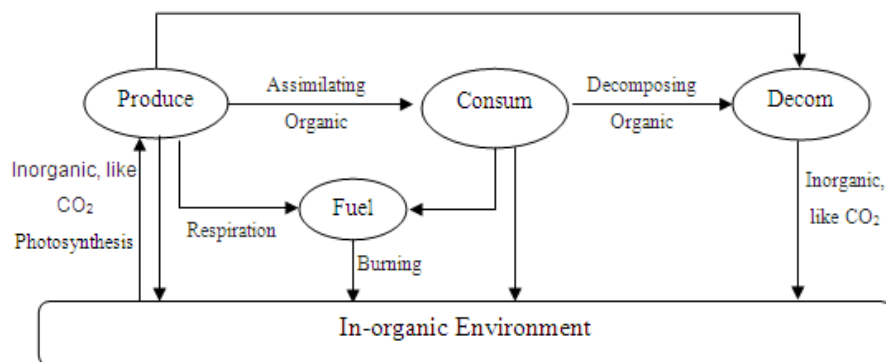


Fig. 1: Material recycle process in ecosystem

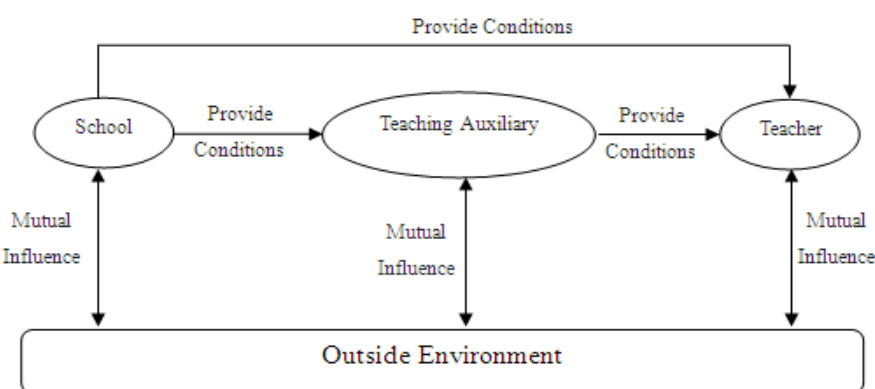


Fig. 2: Material recycle process in TD

creatures with intimate related relationship in the given environment (Willis, 1997). In other words, ecology is the theory on the two kinds of relationships, not only among creatures, but also between creatures and the environment. Researchers should always take it as an integrated, systematic and balanced subject. As a major branch of ecological research, ecologic system is the integrated entity formed by the interaction between biotic communities and the in-organic environment. The material circulating process is listed in Fig. 1.

Each ecological functional unit is composed of organism components, non-organic ones as well as the raw material and energy circulating in the given space. The mutual influence and dependence between organism components and non-organic ones is regarded as a coherent entity (Minjie *et al.*, 2011). Ecological system can be divided into producers, consumers, decomposers, non-biological substances and energy. While the producer is functioned as a major component and the decomposer as the crucial one. Generally, the producer refers to a variety of green plants, the autophytic organism with the ability of generating organic substances via photosynthesis; the consumer functions as the “activator” in the ecological system, promoting the circulating of substances and energy; the decomposer can decompose and process the inorganic

substances, providing raw materials for the producer and completing the circulation of substances in the ecological system.

Various phenomena, principles and regulations in ecology are also applicable to educational field. Faculty development is also an ecological phenomenon, the ecological process for the development of teacher belief, teaching ethics, economical competence and teaching, etc. It is the process of continual interaction between teachers and the environment and the process for teachers to adapt to the surroundings gradually. The interaction between teachers and the ecological system formulates the interactive ecological system of information, emotions and energy. The system is composed of the school authority, teaching auxiliary departments, teachers and the surrounding, etc. The substance circulating process is listed in Fig. 2.

By the comparison between Fig. 1 and 2, it is observed that the circulations of all the substances in the two figures are similar. While, the only difference is that it is the one-way process between the two groups: consumers and decomposers as well as the inorganic environment; while the interactive influence between teaching auxiliary departments and teachers as well as the environment is a two-way process. School is regarded as an integrated macro-concept, the producer,

providing survival necessities and material energy for other substances. In the present study, teaching auxiliary departments comprise various kinds of departments of different levels. Their functions are aiding professional TD, enhancing the connection between school authorities and teachers and promoting the circulation of materials and energy; teachers are played as decomposers, gaining material energy from school and auxiliary departments directly. With the developed professional faculty, the school development will be greatly promoted accordingly. As to the ecological system for professional TD, more attention should be paid to the integrity, dynamics and balance of professional faculty development. In this way, TD can be restored to the logical starting point of education, with concentration on the value of teachers and their all-around development in educational career.

**Analysis on ecological environment for faculty development:** It's universally acknowledged that environment is defined as the external surrounding in which all the creatures dwell and maintain mutual relationship (Çepel, 1992; Çevre, 1998). The comprehensive environment, affecting various ecological factors, is referred as ecological environment. From the macro perspective, creatures will be affected by various factors of ecological environment in the evolution process; while as to the micro standpoint, cell development is affected by numerous factors. A simple and rapid agarose immobilization method of microbial cells was developed to study the behavior of a single living cell in the changeable environment and this method can be used to monitor real-time responses of a microbial cell toward change of environment, (Yang and Liu, 2012). And another research shows Oxygen tension has a direct repercussions on cultured primary BMSCs (Brown *et al.*, 2014). Some adopted the control method to improve the rate of the production of Biobutanol (Al-Shorgani *et al.*, 2012). In the meantime, teachers will be influenced by the complicated multi-functional ecological environment (Liping, 2007). The ecological environment human beings develop is human-centered and it is the multi-functional and lateral environmental system. And it is a comprehensive system, incorporating natural, social and the regulated environment (Guorui, 2000). The major factors affected TD are natural, social and the regulated environment as well as psychological states, etc.

**Analysis on the natural environment:** The natural environment, refers to the physical and geographical environment. It is the nature where teachers are living, including the elements of the earth, trees, rivers and air, etc. Natural environment is functioned as the basic prerequisite for the survival of all the creatures,

including human beings. The geographic location of the school also has an influence on TD. For instance, due to the differed conditions of different parts of China, for example eastern, central, or western regions, the regional information and ideology are varied. It is the beautiful campus that makes the happy mood of teachers, exerting positive effects on TD.

**Analysis on the social environment:** Comparatively, social environment exercises a greater influence on TD, playing as one of the essential factors. It is composed of the environmental factors such as politics, economics and school, etc. Political environment indicates the general environment, including the rules and regulations for education, school leadership style etc.; economical environment concerns the material conditions, the fundamental guarantee; campus environment is mainly defined as the campus atmosphere and the relevant exterior working environment. It's understandable that desirable social environment promotes TD.

**Analysis on the regulatory environment:** Regulatory environment is defined as the integration of various attitudes and values, including educational standpoint, teaching belief, norms and regulations, etc. With the interactive influence of society, school, the expectation and attitudes of the others, teachers' value system is formed. Generally, teachers' developmental regulations consist of two domains: regulations applied to the society and that of schools. Because only human beings enjoy regulatory environment, value-orientation and government lead from the outside world exert great influence on TD.

**Psychological status analysis on TD:** To some extent, individually, physical and mental factors have some effect on TD. Generally, the physical factors refer to the external health status, while mental factors are the inner ideological status. Based on dualism, there're inner and external factors. One the one hand, the external factors exert influence on the development and on the other hand, the inner ones are decisive. Compared to physical factors, psychological factors have a n even closer relationship with their development. Because it mainly indicates the personalized psychological characteristics, feelings consciousness and mood, etc. Psychological factors are classified into positive and negative ones. Understandably, they exercise opposite effects on TD.

#### **ECOLOGICAL FEATURES OF TD**

It's known that the ecological system has the functions of energy and material circulation together with information transfer. These three major functions are also reflected in TD. The present study is based on the understanding of the influential factors with

analysis on the ecological features of TD. The ultimate goal is for the promoting of the all-round sustainable TD. The notion “development” is interpreted as a vector in philosophy, with clear direction, implying the transformation from ancient to modern and from primitive to advanced stages. Individual development is achieved in the active interaction between teachers with the surroundings. In other words, it is achieved via the diversified activities carried out by the subject. As a matter of fact, it is the process of multi-potentials transforming into reality (Lan, 1991). TD is the balanced development in the fields of teaching belief, teaching ethics, economic potentials, teaching competence, etc. The ecological characteristics reflected in the process are naturalness, balance and dynamics.

**Naturalness of TD:** Teachers are identified as the natural people, social men and professional people. And the basic role is the natural people. Accordingly, In terms of TD, priorities should be given to the demands of teachers as natural people. According to the need hierarchy theory of Maslow, the needs of human beings are divided into five domains: psychological needs, security requirements, requirements for the sense of belonging, the needs for being respected and self-actualization. In terms of the naturalness, it is the reflection of the people-based concept. The above-mentioned five requirements should be respected and satisfied. TD cannot be simply interpreted as the promotion of knowledge and skills but the process of realizing. To realize their perception for life should base on their naturalness and focus on their development as the natural and professional people. Eventually, to promote the comprehensive all-around development of teachers, the researchers should shift their focus from the study on professional knowledge to social morality construction, citizens’ morality and professional sentiment, etc.

**Balanced TD:** Ecological balance plays as one of the key mechanisms of the ecological system. If the impact from the outside world exceeds teachers’ ability for physiological adjustment, in other words the resistant stability and the restoring stability, the ecological stability will be disturbed. As ecological stability is dynamic, the maintaining of the structure and functions of ecological system is relative. Kate and Kurt hold that genes and species play an essential and crucial role in the prediction of global carbon balance in the ecology system (Bradley and Pregitzer, 2007). Comparatively, there are the interactions among information, emotions and energy. This process is also disturbed by the outside world. Consequently, to maintain the balance of the complicated enormous ecological system, the factors from the outside world must be held within limits and control.

**Dynamic TD:** From the perspectives of the whole group and individuals, TD is dynamic. As to the whole group, the development of the whole teaching staff is dynamic. The major development subject transfers from the whole teaching staff to individuals, the form of development changed from active and passive and the contents for development from singleness to comprehensive and integrated. As to individuals, each teacher’s development is divided into several stages, from newly graduated students to novice, then experienced teachers, expert teachers, educators, the complicated process. Specific goals and plans should be set for each respective development stage.

The naturalness, balance and dynamics of TD contribute to the integrity of the TD. Emphasis should always be placed on the harmony and integrity of these three factors. Respect the needs for naturalism and maintain the dynamics and balance.

**Sustainable ecological TD:** In 1987, World Commission on Environment and Development (WCED) adopted the concept of sustainable development in their report *Our Collective Future*. A frequently-quoted definition of sustainable development is defined in the report as: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987).” And sustainable development has been recognized by UNESCO, which has declared the years 2005 to 2014 to be the Decade of Education for Sustainable Development (Szitar, 2014). As to TD, sustainable development indicates that TD has to abide by the objective laws and choose the adaptive developmental routines. On the basis of analyzing the ecological characteristics of TD and close observation of the related ecological phenomena, the present study slices through the factors holding back TD and formulate a scientific and rational model for TD to achieve sustainable development, as shown in Fig. 3.

As exhibited in Fig. 3, TD is affected by diversified factors, such as natural environment, social environment, regulatory environment as well as physiological and psychological status, etc. With the characteristics of naturalness, dynamics and balance, TD community is forged by the group dynamics. Besides, TD is divided into stages according to ecological evolution law. What’s more, this development mode utilizes flowerpot effect to forge TD platform and achieve sustainable development via a sequence of measures.

**Construction of TD community by group dynamics :** Group dynamics refers to the interactive influence among the members of the community, including symbiotic relations, competition and

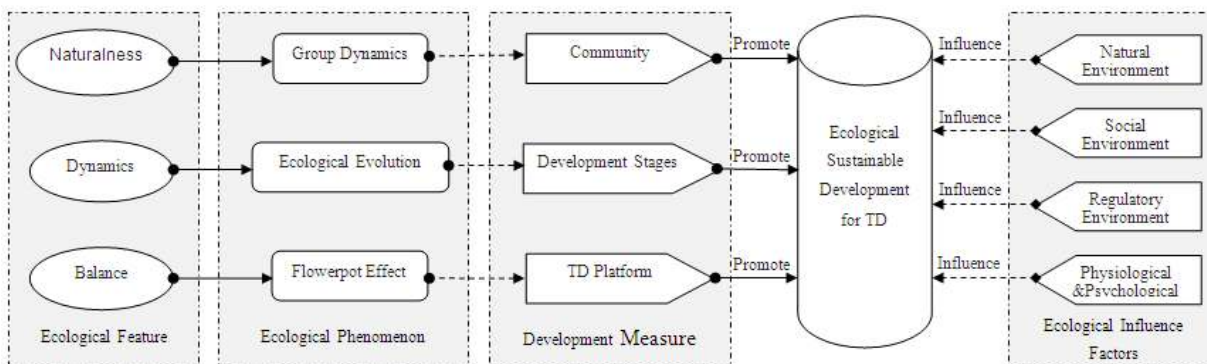


Fig. 3: Sustainable ecological development for TD

cooperation, profit group, etc. In the ecological system, all the members are dependent on one another, so does the principle for TD. As an ecological concept, co-existence means the intimate relationship of living together and co-evolution in the ecological system. Co-existence is the reflection on relationships among human beings as well as that among human beings and animals, aiming at the achievement of sustainable development (Lan, 2011). The relationship between individuals and the outside world can be represented by the equation  $B = f(P, E)$ , B is the individual behavior, P is the internal needs of individuals and E is the external influence. The interactions among the individuals are defined as group dynamics, including cohesions, motivation and dissipative forces. The cohesions can be defined as the centripetal force, drawing the community together and closer, having the stability of the community guaranteed; motivation is the power to promote community development; dissipative forces are the negative effects which hinder the development of the community. The above-mentioned three forces co-existed in the community. Besides, they influence and control each other.

To construct community for TD, group dynamics and motivation should be fully encouraged. In this way, learning from each other and cooperation among the teachers can greatly promote the growth of the teachers and avoid the dissipative lost. Teaching community means the learning community, aiming at the fulfillment of their all-round development by communicating, sharing and cooperating with members of the group. Learning community can be classified into three implications: the relationship in which members learn from each other, the learning environment and the learning organization. Teachers can play as learners or teaching assistants, accordingly there are various types of learning communities in practice. A case in point is the overseas teacher training schools. They are the combination of university faculty members as well as teachers from primary and secondary school and teachers cooperate by preparing lessons collectively and subject researching. The problems, such as the

restrictions of time and place for the learning community, have been worked out by the use of the network and media, such as online-forums, blogs and QQ groups, etc. And it is convenient and efficient for the sharing of learning resources and promoting TD.

#### Segmentation of TD stages by ecological evolution

**rules:** According to ecology, things are changing constantly with the development of the environment. For instance, butterflies have to go through the whole process-from caterpillar to chrysalis and then-to butterfly; the mass media also undergoes the evolutionary process of prints to TV broadcasting and then audios and videos; similarly, the human society has passed through primitive society, slave society and feudalistic society step by step. So the ecological evolution rules can be significantly used for reference for the TD.

A lot of achievements in the field of stages of teachers' professional development have been achieved. For example, Fuller has proposed a concern-based four-stage model, moving from "pre-service preparation" to "concern about self" and then "concern about tasks" to "concern about students and the impact of teaching"; Burton presented teacher career stages as "survival, adjustment, maturity"; Scofield suggested five-phase career model as "preparation-expert teachers-" "preparation-expert- retrieve-flinch- regeneration-withdrawal"; Chinese scholar Zhong Zurong conceptualized the four-phase theory as stages for "preparation to adaption to development to creative period"; Shao Baoxiang suggested the four-stage theory, "adaption, developing stage, qualified stage and matured stage"; Wang Qirong, Taiwan scholar, maintained the 3-phase theory, "pre-service training--field trip-qualified teachers". Although the criteria are diversified, the universal characteristic is highlighting the periodical features. Due emphasis has to be placed on the periodical features for TD. Thus, appropriate developmental purpose and aims can be formulated on the basis of the features of each developmental stage and working status, etc.

**Development platform introduced by flowerpot effect:** Flowerpot effect is also named as local habitat effect. Flowerpot refers to the half-natural and half-artificial environment, with restrictions to the space. In other words, flowerpot effect indicates that plants can thrive in an appropriate artificial environment, while its growth will be disturbed without intensive care of human beings. Inspirations are given by the effect that in the process of TD, teachers do will be affected by flowerpot effect, so schools should provide teaching staff with a friendly and desirable platform. School authorities should make plans for TD and provide effective policy support, such as working out training plans for newly inducted teachers, young and middle-aged teachers as well as framework teachers.

As to newly inducted teachers, training programs should integrate the programs of the school and that of the departments. School training should be macro and involve the history and culture of the school, school regulations and rules, teaching ethics and quality, modern education technology and model classes by expert teachers, etc.; department training should be in accordance with the developmental objectives of the department, characteristics of the discipline and make targeted medium and micro content. In terms of in-service teachers, tailored training programs should be designed to meet practical needs and offer supporting with pertinent assistance and helping. Due to the difference between newly inducted teachers and in-service teachers, these two groups of teachers are studied separately. Because new teachers are not familiar with the campus culture, lack of teaching experience and low in teaching competence. While, in-service teachers have accumulated certain requisites so it is advisable that school authorities should design appropriate platforms for the development of each group of teachers respectively.

## RESULTS AND CONCLUSION

As the entity of TD, teachers enjoy the whole individualized living systems. So in the developmental process, due respect should be paid to the ecological attributes of individuals and observe the principles of the naturalness, balance and dynamics. With deep examination on the natural, social and regulatory environments as well as the physiological and psychological factors, continuous efforts will be made for the measures of promoting TD. A new perspective of TD has been introduced by ecology and the promotion of sustainable development is based on the in-depth analysis on the ecological features and ecological influence factors of TD. It's note-worthy that the ecological system for TD is huge and complex. Ecological contexts vary from school to school and even school to school. Accordingly, measures for TD should be taken in accordance with the realities.

Besides, with unremitting efforts to seek sustainable TD, promotions for the comprehensive TD is pursued.

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