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## Design System Construction of Teachers' on-Job Education and Representation Analysis on Effectiveness

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### Abstract

Design system construction of teachers' on-job education is based on system theory and subjectivity theory, pays attention to four-dimensional design system of "purpose design—curriculum design—mode design—review design", and is representation of effectiveness for "four-dimensional" design system with pertinence, applicableness, integrity and dynamics.

**Key words:** Continuing education; Design system; Effectiveness; Representation

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### INTRODUCTION

At present, teacher professional development turns into a topic concerned by education circle gradually. Teachers' on-job education, on the one hand, is an important approach to teacher professional development, so effectiveness of teachers' on-job education becomes a key factor. On the other hand, design of teachers' on-job education is the core area and impacts effective implementation of teachers' on-job educational activities directly. As a result, constructing a scientific and reasonable design system with strong operability has the important theoretical and practical significance of developers, researchers, administrators and implementers of teachers' on-job education courses

### 1. DESIGN AND DESIGN SYSTEM

The word design is applied widely in our daily life. It often refers to the planning process before implementing a scheme. Scholars also conduct multiple interpretations by centering on "design": "design is an explorative systematic process prior to creating a certain new thing with actual utility or solving a problem." (Sun, 1998, p.1) "Design refers to formulate a method or pattern, etc., in advance on the basis of a certain purpose and requirement before implementing the work officially." (Dictionary Editing Room of Language, para.6, 1983, p.1013) "Design is the exploration for the sake of creating a certain new thing with actual utility." (Rowland, 1997) Based on it, design of teachers' on-job education refers to a systematic process of planning a target, developing course content, selecting the mode of execution, and constructing security system in advance on the basis of some demands. Moreover, the design system of teachers' on-job education should be paid attention to constructing the four-dimensional system of "purpose—curriculum—mode—review".

### 2. DESIGN SYSTEM CONSTRUCTION OF TEACHERS' CONTINUING EDUCATION

#### 2.1 Theoretical Foundation on Design System Construction of Teachers' Continuing Education

##### 2.1.1 Design Idea of Zoology: System Theory

The so-called ecology, as a matter of fact, is the existential state of biology or organics, while system is the entirety or the whole unit constituted by compositions with mutual relations (Morin, 2002, p.92). Ecological system is the optimized entirety formed by interaction, inter-coordination and coadaptation among elements. Each element that constitutes ecological system can't be interpreted by restoring the paradigm. Thus, design

system of teachers' on-job education, based on theory of ecological system, has characteristics of integrity, dynamics and diversity. The number of specific situations of teacher education will bring the same number of ecological systems. If we pay excessive attention to any single element but neglect other elements, the balance of system will be destroyed. Thus, it not only requires designers to deal well with the relationship of intercoordination and coadaptation between elements in the system, but also needs them to deal well with the relationship between presupposition and generativity of design. A new system theory thinks that "system is a basic concept, because it can be developed into the system of the system..." (Morin, 2002, p.149) From this point of view, the design system is an ecological system itself, and also is a subsystem in teachers' on-job education. Design system not only emerges before implementation of teacher teachers' on-job education, but also is accompanied with the process of the entire organizational implementation and monitoring evaluation, etc.. On the basis of ecological system, the optimized way of realizing design system is a review. Review means that design group discusses problems in a specific situation over and over again, for the sake of obtaining consistent comprehension and interpretation and ultimately making a proper and consistent decision and the corresponding strategy. In this sense, designing system of teachers' on-job education, based on ecological system theory, exceeds analysis reductionism and realizes integrity from the methodology, surpasses technical purport and moves towards practical interest from value orientation, and exceeds linear relation and embodies the value of the design subject from the organization mode.

### **2.1.2 Design Idea of Teacher Oriented Theory: Subjectivity Theory**

The design idea of teacher oriented theory is the deduction of people first. It looks at demands of teachers, and roots in self-development of teachers. The subject of teacher oriented is "based on teachers and for teachers". "Being based on teachers" directs at current demands of teachers, requires design subjects to focus on teachers' experience, realistic difficulties and development vision. On the other hand, "for teachers" aims at the ultimate goal of teacher development, namely teacher professional development. From the perspective of teacher oriented, the self-development process of teachers is the process to develop teachers' initiative, release drive of subject development fully, as well as realize self-value. Teachers not only are the people who engage in practical activities of education teaching, but also are subjects in teachers' on-job education. They have characteristics of autonomy, initiative and creativity. Self-development exactly is a necessary approach to realize autonomy, initiative and creativity of teachers. Thus, based on teacher-oriented subjectivity theory, design system of teachers' on-job

education reflects uncontrolled purport from the value orientation and realizes individual liberation of teacher development by awakening awareness of teachers' self-directed development. From the perspective of teacher-oriented subjectivity theory, design system should be paid attention to promote natural knowledge and ability of teachers (subject literacy knowledge and teaching knowledge) under the lowest level, while it should be focused on teacher development of educational emotion (awareness and power of teachers' self-directed development) under the highest level.

## **2.2 Design System Construction of Teachers' Continuing Education**

Constructing design system path of teachers' on-job education scientifically and effectively, from the macroscopic perspective, is related to teacher education specification. From the microscopic perspective, it involves in quality of teacher education. Proceeding with the theoretical basis of teachers' on-job education design, four dimensions of the design system include: goal determination, curriculum provision, mode selection, and review and evaluation of the whole process.

### **2.2.1 Object Design**

Object design is about value orientation of design system. Based on system theory and subjectivity theory, object design of teachers' on-job education should concentrate on learners, namely demands of teachers, integrate with social factors and subject development factors in teachers' continuing education system, and determines potential problems and existing problems in teacher professional development by screening. It is necessary to analyze three dimensions for sources of teachers' on-job education demands comprehensively: One is the demand of social dimension. It mainly comes from demands of society, schools, parents and students on teachers. Generally speaking, social demand is presented in the form of files from the competent department of teacher education, while demands of schools, parents and students should be focused in the form of forums. The second one is self-demand of teacher growth. If teachers want to become core teachers from new teachers gradually, they should experience a process of professional growth. However, every process has different growing characteristics and principles for teacher development. Object design of teachers' on-job education should be based on analysis of teachers characteristics and principles at different stages. Continuing education object should be classified and designed hierarchically. Meanwhile, existing advantages of every teacher, namely growing point and demands of teachers, should be found out. Under the overall consideration, teaching objectives should be designed comprehensively in accordance with the zone of proximal development. The third one is demanded of disciplinary development. The disciplinary development status is the realistic attention on design of teachers' on-job education. Under the realistic background, different subjects have diversified development status. Meanwhile, different subjects

and regions also have diverse features. As for scarce and weak subjects, rural and urban teachers, the required continuing education obviously has different characteristics and demands.

### 2.2.2 Curriculum Design

Curriculum design is about material representation of the design system and is a key element and carrier of teachers' on-job education. Teachers' on-job educational courses mainly refer to content composition, form of composition and proportional structure between constituent parts. Based on it, as for teachers' on-job education, we should pay close attention to three key elements: logical starting points of curriculum design, modules of curriculum design and curriculum structure. Curriculum design of teachers' on-job education mainly contains three logical starting points: subject knowledge, physical and mental development of learners and problem solving in real-world situations. The advantage of subject-centered curriculum design pattern lies in strong systematicness and logicity. However, it doesn't fit for short-term teachers' on-job education. Learner-centered curriculum design pattern emphasizes on beginning with physical and mental development characteristics of adult learners and formulates courses that conform to characteristics of learners. Moreover, it should be paid attention to cognition, emotion, motivation and belief of learners. Problem-centered curriculum design pattern exceeds subjects and learners, but more focuses on teaching reality. It generates problems and solves problems in practice, and promotes teacher professional development in problem solving. Curriculum modules should be combines with analysis of teacher professional quality. Through scholars' analysis of teacher professional quality, we can divide teacher professional quality into: professional quality, professional skills and professional ethics. Curriculum structure should be paid attention to longitudinal organization and make content of curriculum modules deepen spirally and gradually. Meanwhile, it also should be paid attention to horizontal relationship between curriculum elements, enhance gradual integration of curriculum structure, and deal well with the relations between theoretical property and practicalness, subject and activity, uniformity and optionality.

### 2.2.3 Mode Selection

Mode design focuses on operational expression of a design system. This is a key step to implement teachers' on-job educational courses. To a large extent, it impacts the effect of teachers' on-job education. By virtue of medium, which is depended on by teachers' on-job education, teachers' on-job education methods in our country can be divided into language class, practical class and remote class. Under the professional guidance of experts, language class depends on explanations and exchanges between teachers and students, students and students to realize integration of theoretical knowledge and practical knowledge between teachers and students,

students and students, and promote their comprehensive quality. This class mainly contains instruction, students' forum and group discussion, etc. Practical class mainly refers to ways of carrying out teachers' on-job education activities with the orientation of educational and teaching practice, with the center of problem solving and with the carrier of cases. It mainly involves in problem solving, topic lead and shadow training, etc. Under the guidance of experts, remote class mainly refers to ways of guiding teachers to realize professional growth by virtue of network course resources and teachers' on-job education relying on network. The methods have diversified characteristics, advantages and disadvantages. Mode selection for teachers' on-job selection should be based on the target and course dimension to realize scientific integration of modes.

### 2.2.4 Design Review

Design view looks at process monitoring of a design system. The concept of review was proposed by Schwab at the earliest, who is an expert of American curriculum theory, in line with the concept of curriculum review. Design review of teachers' on-job education refers to a process that design subjects discuss and weigh a series of problems (including object design, content design, mode design and evaluation design) in design process repeatedly so that they can acquire consistent comprehension interpretation and ultimately adopt corresponding strategies. In the review process, we should keep a watchful eye on diversity of review subjects, practicalness of review process, and reflexivity of review. Diversity of review process emphasizes that the structure of designers should be equipped with heterogeneity. Members of the design team come from different regions and different levels. Thus, they can realize mutual integration and complementation of review. Practicalness of review process emphasizes on design presupposition and unification of generativity. In practice process, it realizes tradeoff of multiple schemes. As for reflexivity of review, we should pay attention to the whole process of design, implementation and evaluation. In the process of designing and implementing practice, teachers' on-job education should be modified and perfected for realizing the principle of optimization.

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## 3. REPRESENTATION ON DESIGN SYSTEM EFFECTIVENESS OF TEACHERS' CONTINUING EDUCATION

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### 3.1 Targeted Representation of Objects

Object pertinence of teachers' on-job education reflects in appropriateness required by learners. Object design, under the perspective of four-dimensional design system, becomes targeted in view of sufficient investigation, full-dimensional demand screening and the whole

process of review. Based on pertinence of objects, it conforms to learners' demands and has validity. Major characteristics of effectiveness indicate, first of all, that object design conforms to teacher professional standards and learners' practice. Requirements that conform to teacher professional standards include knowledge, ability, emotional attitude and value, etc and are consistent with stage characteristics and teachers' professional development disciplines of realizing teachers' professional development. Secondly, object design has operability. Object design should be definite and specific and have good degree of realization. Thirdly, object design has differences. Demands and origins for every teacher to accept teachers' on-job education have differences. Based on perspective of four-dimensional design system, object design can be adjusted moderately in line with teachers' demands of different characteristics and stages, so as to make every teacher realize gains professional development at the most extent.

### **3.2 Representation on Applicableness of Course**

Based on course content of four-dimensional system, it has applicableness. Applicableness involves in three connotations: applicableness between course content and learners, applicableness between course content and activity objects, and applicableness between course content and learners. Based on characteristics of applicableness, course content has effectiveness. In other words, subjects of implementation for teachers' on-job education have applicableness. Moreover, it can select the most appropriate subject of implementation in line with different course contents. For instance, course content with the topic of promoting teachers' theory or scientific research ability is fit for regarding teachers who teach teaching methodology in normal universities as primary bearing subjects. Courses with the topic of promoting teachers' teaching skills are more suitable for teachers who engage in the department of research and training or act as top-ranking core teachers as primary bearing subjects. Of course, the way of integrating subjects is more beneficial to deep front-line teaching of normal universities and promotion from practice to theory for front-line instructors and researchers, and core teachers. Teachers' on-job education should be suitable for learners' demands and continuing education. Designed courses must be based on derivatives of object design and are material expression of objects. Every module course is based on and points to specific objects. Longitudinal and horizontal construction of curriculum design embodies integration, generativity and openness and aims to teacher professional development in line with spiral promotion of teacher professional development.

### **3.3 Representation on Integrity of Modes**

In the form of four-dimensional design system, design has effectiveness based on integrity of modes. Characteristics

of effectiveness mainly reflect in, first of all, coupling degree after implementing teachers' on-job education subjects. Based on design review of the whole process and acceptability of review objects, design subjects, subjects of implementation, subjects of evaluation and review subjects have coupling degree. Such the design, implementation, mode and evaluation are paid attention to advantages of subjects of implementation (normal universities, institutions of teachers' research and training, and top-ranking primary and secondary schools) with different levels and coupling degree of subjects of implementation, so as to reach the integrity of optimization for modes. Secondly, subjects of learners have degree of participation, including participatory attitude of learners (attention on problem situation and personal initiative motivation of activities), breadth (the larger number of participators, diversified methods and full time), and depth (proposal of significant problems, publication of profound understanding, active listening, cooperation and sharing, and further integration between educational theory and teaching practice on the basis of reflection). Thirdly, there is interaction of double subjects in the implementation process of teachers' on-job education. Effectiveness of interaction mainly reflects in: harmonious classroom atmosphere, mutual respect, sufficient research and discussion between double subjects aiming at problems, harmonious relationship between double subjects, well-aligned classroom, good mental state for double subjects, full emotion and passion of guiders, enlightenment for learners and further desires for learning.

### **3.4 Representation on Dynamics of Review**

The design system of teachers' on-job education brings in review of the whole process. This is the highlight and characteristic of the four-dimensional design system. Dynamics of review aims at effectiveness of a design system, while dynamics of review reflect in procedure and reflection of the design. The procedure of review means that review intervenes in the whole process of design, implementation and evaluation. Objects of review root in problems produced in teachers' on-job education activity practice. The purpose of review aims at promoting modification and improvement of teachers' on-job practice and teacher professional development. It is exactly based on the procedure of review, so four-dimensional design of teachers' on-job education always is in dynamics. Objects, course contents and modes are kept in integration between presupposition and generativity, so as to embody systematic openness. Ultimate goal of review directs at reflection of the basis of guidance on design. Review itself is a kind of reflection. Subjects of review with reasonable hierarchical structure conduct a kind of reflection for the sake of perfecting practice in the teachers' on-job education practice, promote integration of subjects of review with reflection, enhance ability building of subjects

of implementations, perfect design of teachers' on-job education and direct at teacher professional development.

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## CONCLUSION

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Based on zoology and subjectivity theory, the four-dimensional system designed by teachers' on-job education mainly includes: goal determination—course organization—mode selection—review and evaluation on process. Object design, on the basis of attaching importance to demands of teachers and students, integrates with social demands, characteristics of learners and disciplinary demands. Pertinence of objects has representation of effectiveness. Course content organization should be paid attention to three elements of logical starting points, course modules and curriculum structure. Design courses of logical starting points contain demands of learners, subject content system and problem solving, respectively, combine with teacher professional development, and regard teacher professional quality, professional skills and professional ethics as modules, and organize curriculum structure with longitudinal connection and horizontal integration. Applicableness

has representation of effectiveness. Implementation methods emphasize on integration of subjects of implementation, activity of participatory subjects and interaction of double subjects from the perspective of subjects of implementations, participatory subjects and double subjects. Integrity of implementation methods has representation of effectiveness. The process of evaluation and review should be paid attention to the whole process and reflection. In the whole process of reflection and review, dynamic construction of courses can be realized to direct at teacher professional development.

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