

Course Construction from the Viewpoint of System Theory

Xin Yang¹, Chuanwu Zhang²

¹Business School, Chengdu University, Chengdu, China

²College of Electrical and Information Engineering, Southwest Minzu University, Chengdu, China

Keywords: Course construction, System theory, Elements analysis, Operation mechanism

Abstract: Course construction is the fundamental fundamental method to promote student cultivation for university. From the viewpoint of system theory, course construct mainly relates to teachers, students, course syllabus, course content and teaching methods, while it is also associated with cultivation programme, discipline development and industry development. We take course construction as system, and discuss its elements, the relationship among system elements from the viewpoint of linkage among system elements and linkage between the system and its environment. Thus we can obtain fundamental elements of the system and relationships among system elements. From the viewpoint of control theory, we can draw out the system operation mechanism which can continuously improve the performance of the system function. Ultimately, we can improve the teaching quality and promote student cultivation quality.

1. Introduction

Course teaching is the fundamental method to implement the student cultivation for university while the course construction is the mainly method to improve the performance of course teaching. Thus the course construction becomes the core and foundation in the student cultivation process for university. In the process of the student cultivation, the course construction selects the teaching content based on the requirement of subject cultivation programme, implement course teaching with appropriate teaching method, and monitor the whole teaching process. Finally, the elements related to course construction form a continuously improving system. Due to the role function in the process of student cultivation, the course construction become the hot issues in the academia, it is related mainly to the course content and quality course construct [1], course architecture [2], teaching reform [3], and subject construction [4], etc.. Until now, there are seldom discussion about the element analysis and their relationships for the course construction system, especially from the point of view of system theory.

2. The System Theory

System theory originated from the system thought, developed to system approach, and ultimately evolutes to system theory. Using the ancient simple system thought, mechanical system thought and dialectical system thought to solve the practical problems form the holistic approach, reductionist approach and system approach respectively. These approaches are formalized by the axiomatic tools such as logic and mathematics, and finally become to the holism, atomism and system theory respectively. System theory originated from the general system theory which is presented by the biologist Ludwig Von Bertalanffy. The general system theory emphasize that Gasp the motion law from the relationships of elements, study the parties from the relationship to the system, and study the system from the relationships to the environment. While in the study of the relationships among elements, the relationships among elements must be self-consistency. In the general system theory, the definition of the system as equal (1) [5]:

$$S = \{(e_1, e_2, \dots, e_N); r_{ij} | i, j \in [1, N]\} \quad (1)$$

Proceed from the system goal and adapt to the environment, the system analysis will discuss the

consist elements $E = \{e_1, e_2, \dots, e_N\}$ of the system, analysis the relationships $r_{ij} | i, j \in [1, N]$ among the system elements, and explore the optimal operation mechanism which is the interaction among system elements to obtain the optimal goal for the system.

The relationship among system elements is determined by the interactions among the system elements, while the interactions are driven by the goal of system elements. Thus exploring the driving goals of the system elements become the role process of the system analysis. In the course construction system, firstly we will discuss system elements of the course construction system; secondly, we must analysis the goal or requirement of the subject elements of the course construction system, and start from the feedback theory to construct the operation mechanism of the goal or requirement of the subject elements. Based on the requirement of the system theory “linkage among the system elements and the linkage between the system and its environment”, we must match the subject’s goal to implement the operation mechanism of the interactions among the system elements.

3. The Course Construction Model

In the process of the student cultivation, the course construction selects the teaching content based on the requirement of subject cultivation programme, implement course teaching with appropriate teaching method, and monitor the whole teaching process. Finally, the elements related to course construction form a continuously improving system. From the systematic thought, the elements of the course construction are consisted of the elements related to the improving teaching process. Starting from the teaching process, the system element is closely related to the teacher, student, teaching content and teaching method. Moreover, the teaching course of the teacher must match to the syllabus, while the syllabus is the fundamental element for the cultivation plan. In the end, the syllabus and cultivation programme must adapt to the discipline development and industry development. Ultimately, based on the analysis of the course construction system, the system element is interrelated to the teacher (T), the student (St), the course content (C), the teaching method (M), the course syllabus (Sy), the cultivation programme (P), the Discipline development (D) and Industry development (I). The course construction system from the viewpoint of system theory can be denote as equal (2):

$$S = \{(T, St, C, M, Sy, P, D, I); r_{ij} | i, j \in [1, 8]\} \quad (2)$$

In the course construction system, the system elements exist interactions relationship. The main issues about the relationships are as following:

(1)The core elements of the course construction are the teacher (T), the student (St), the course content (C), the teaching method (M), the course syllabus (Sy); while the cultivation programme (P), the Discipline development (D) and Industry development (I) can be taken as the environment of the course construction system.

(2)The course syllabus is subordinated by the cultivation programme.

(3)The course syllabus and cultivation programme must match to the discipline development and the industry development. While they also match to the student.

(4)The teacher organizes the teaching content according to the course syllabus and teach student by appropriate method. While the teacher need monitor the whole teaching process to continuously improve the teaching method, teaching content and course syllabus.

(5)The feedback from the student study to the teacher forms the improving mechanism of the course construction.

The interaction structure of the course construction (Course Construction Model) show as figure 1:

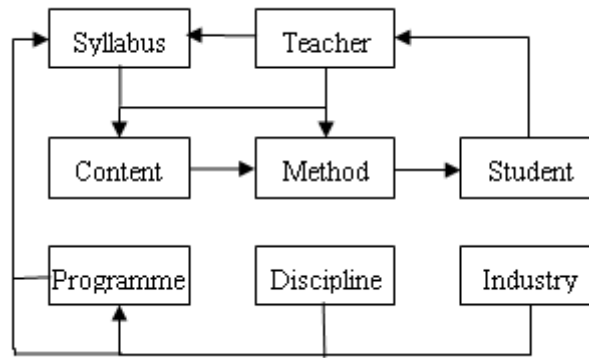


Figure 1 Course Construction Model

In the course construction system, there are two work flows. In one hand, teacher present the course syllabus based on the cultivation programme and the fact of the students. The syllabus determines the teaching content and recommends teaching method which guide the teacher to give lessons. On the other hand, teacher organize the teaching content and use the appropriate teaching method base on syllabus, and regulate the teaching content and method to match the student’s study from the feedback of student to teacher.

4. Conclusion

From the point of the view of system theory, we discussed the system elements of the course construction system, analyzed the interaction relationship among the system elements, and constructed the course construction system with feedback mechanism, which forms the improving mechanism of the course construction system to elevate the teaching quality and promote the major development.

Acknowledgment

Support Program: Soft Science Project of Sichuan Science and Technology Department (Project Number: 2018ZR0259).

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