Research on the Development of Higher Vocational Characteristic Network Courses Based on Constructivism

Yun-Xing WANG\textsuperscript{a}, Wei-Shan ZHOU\textsuperscript{b}, Jing-Jing ZHAO\textsuperscript{c} and Meng-Wei WANG\textsuperscript{d}

Qing Zhou High-tech Institute, Qing Zhou, Shan Dong province, China
\textsuperscript{a}rzwyx@126.com, \textsuperscript{b}476748630@qq.com, \textsuperscript{c}jingjingnuo@126.com, \textsuperscript{d}wmw_xyz@163.com

Keywords: Network course; Teaching; Design; Strategy.

Abstract. Nowadays in higher vocational college, the design concept of network course still concentrates on teaching and the design philosophy is programmed, which ignores the requirement that curriculum design should correspond with learners’ cognitive rules. Guided by modern education instructional theory, this paper put forwards five main design strategies of teaching content, teaching strategy, interaction design, navigation design and learning resource design of the network course following the rules of adult learning and network learning.

Introduction

Developing network instruction and further improving the level of teaching informatization in colleges and universities are a general trend that can enhance effects and quality in colleges and universities teaching. As an important part of network instruction, network course instruction is concentrated reflection of college teaching informatization. After years of hard study and practice, network course of higher vocational colleges develops, constructs and achieves some results and benefits. However, at present the design concept of network course just like “e-book” teaching mode still concentrates on teaching and pays more attention to design and implementation of teaching aims. What’s more the design philosophy is programmed ignoring the requirement that curriculum design should correspond with learners’ cognitive rules. Thus the learners can only receive teaching content passively without fully exerting their initiative.

Guided by modern education teaching theory, this paper explores the design strategy of network course in higher vocational college following the rules of adult learning and network learning.

Enlightenment of Modern Education Instructional Theory to Network Course Development

Any design of curriculum is based on some kinds of theories, such as philosophy, psychology and pedagogy and so does network course. With the development of modern instruction, various instructional theories and learning theories emerge, such as behaviorism theory, cognitive theory, constructive theory, humanistic theory and cognitive flexibility theory. To a certain extent these theories can give guidance for teaching and learning or development of teaching design in their different historical periods. However, network instruction is a new open-ended form of education and network learning is a way of personalized learning, in which the learners fully play autonomy [1, 2]. This is in accord with many ideas of constructive theory. Therefore we suggest that constructivism learning theory should be followed and be exerted to guide the design and development of network course.

Summarization of Tyler Curriculum Theory

Ralph W. Tyler proposes the famous Tyler Rationale also named “Target Mode” in 1949 whose essence is a goal-orientation pattern, including four factors that is determining the education target, selecting learning experience, organizing learning experience and evaluating learning plan [3]. Tyler regards curriculum development as a certain value-neutral operating system that is universally suitable for various practical activities.
Tyler’s “Target Mode” implies technical connection between ideas and actions that reflects the essence of “technical interest.” Also Tyler’s “Target Mode” pays more attention to the control of target, efficiency and action which emphasizes students’ acquirement of knowledge and skill by controlling students’ learning actions and teachers’ teaching process. Although the “Target Mode” is described by Tyler linearly, the learning situation constructing according to experience is multidimensional. “Target Mode” is an orderly and systematic course preparation process. It divides the general and broad target into specific action targets, chooses and organizes curriculum content and then evaluates the curriculum by the realization of target.

**Summarization of Constructive Learning Theory**

Constructive learning theory proposes that individual’s acquirement of knowledge is a process in which the individual gradually forms cognitive structure by interaction between their own activities and situations [4]. It emphasizes the cognitive subject role of the students, regards learning is a process in which students construct knowledge on their own and construct their understanding of things instead of passively accepting knowledge. Constructive learning theory puts emphasis on “situation,” “negotiation,” “conversation” and “meaning construction” and it principal opinion is student centered. Educator should design appropriate learning environment and provide necessary learning resources and tools that help students under problem situation come into the cycle process in which students can discover problem, solve problem, re-discover problem and re-solve problem.

**Enlightenment of Constructive Learning Theory to Network Course Design**

Network education possesses scale benefit that is productive, industrialized and technical that is accordance with Tyler Rationale which is not fit for self-directed networking learning because Tyler’ curriculum ideas originates scientific rational view lack of attention to learn factor. Individualized learning is a principal feature of networking learning that stresses student centered in network teaching activities and student is the main body of self-education [5, 6, 7]. To achieve the goal students should be supported to positively explore and establish meaning construction. Thus guided by modern education instructional theory the design networking course development should represent following features: first, student centered that students form their own teaching design based on teaching situations; second, creating a real situation that is close to the reality that help students assimilate their original knowledge and construct new one; third, put emphasis on constructing learning environment, providing resources and conditions negotiating with other learns for students; fourth, evaluation system attaching importance to students’ ability of discovering problem, analyzing problem and solving problem [8, 9].

**Design Strategy on the Network Course in Higher Vocational College Based on Modern Educational Idea**

On the basis of above analysis this paper put forward that network course development in higher vocational college must be under the guidance of modern theory of learning and teaching, obey the rules of adult learning and networking learning and design five main aspects of network curriculum including the teaching content, teaching strategy, interaction design, navigation design and learning resource design.

**Teaching Content Design of Network Course**

Teaching content of network course is an organized teaching information system constructed under the guidance of the theory of teaching design. Teaching content design should be beneficial for finishing teaching aims and follows the cognitive rules. The organization and presentation of teaching content and the choice of teaching strategy are the key points of teaching design.

**Choice and Organization of Knowledge Point.** Gagne considers that learning any new knowledge and skill is based on the subordinate ones that student has already acquired [3]. Students’ psychology development is also the process that their various abilities are acquired and accumulated. Therefore network course should be organized coherently and represent the hierarchical relationship
from simplicity to complexity. In addition, network course will offer the framework of system information and enhance navigation function. Integration contributes to helping student obtain unified view and better explore social and personal concerns.

**Presentation of Network Course Content.** Firstly, how to present content reflects the characteristics of nonlinear, hypertext or hypermedia of network resource organization. Generally the level of knowledge structure of network learners differentiates greatly and their cognitive abilities also have great differences. By hypertext link or hypermedia link, students at different levels will choose different learning content according to their own ability level to satisfy the needs of individual development. Secondly, network course will present the teaching content with various media elements combining text, picture, cartoon and visual audio materials forming a fancy and vivid multimedia course, which enables good learning to form, produce and intensify.

**Teaching and Learning Strategy Design of Network Course**

Precondition of network learning is independence and its core is self-controlled learning with personality characteristics. Hence the choice of teaching strategy should be paid more attention during designing network course and learning centered teaching model will be constructed under the guidance of constructive cognitive theory. First of all, the meaning construction process of knowledge will be emphasized; next, focus on questions and the ways of answers. Improving students’ active participation will promote their meaning construction; furthermore, provide rich multimedia resources.

**Meaningful Learning Environment Design.** The specific design should focus on the following two aspects:

1. **Highlight situation creation**
   Constructive learning theory proposes that the world exists objectively while the understanding process of the world is a meaning construction one by learning subject himself based on his own knowledge and experience. Therefore, the teaching design under the guidance of constructive learning theory not only concerns teaching aims, teaching object and teaching content but also regards situation creation as the important content of teaching design to make students study in real environment reflecting the objective world.

2. **Highlight collaborative communication**
   Taking full advantage of the network to promote exchanges of students, self-learning environment based on network will have the function of cultivate new talents. When it is designed, various online learning activities will be supplied to help students make full use of rich online information resources to communicate positively. At present the common online learning activities to promote exchanges of students are two forms: debate and cooperation. It is difficult to fully embody collaborative learning and then a perfectly functional cooperative learning system needs to be designed and created. The key points of collaborative learning are resource construction and collaborative group and at the same time the recording and evaluation of learning process are also very important, which are not easy to realize. Actually the chat room and forum are one of the means of collaborative learning, which are supported by other relative subsystems.

**Design Learning Activities Centered on Learning.** Network learning is formed by a series of learning activities which not only concerns design and implementation of teaching aims but also the whole path of achieving the goals and the capability that students acquired during the process. Therefore, network course not only provides teaching materials but also elaborately organizes and designs teaching activities. The design of network course learning activities mainly includes:

1. **Autonomous learning design**
   The main feature of network course is study centered. Autonomous learning design follows the mode of “raising a question, situation construction, students’ self-study, negotiation discussion, evaluation, conclusion, practice and consolidation.” Every chapter will be designed to own its self-study outline and learning requirements and some questions related to the content of every chapter will be raised to help students be in purposeful learning activities. In addition, students’ current competence, learning type, learning style and perfection degree of learning support services
system will be concerned to satisfy students with various rational demand of teaching information during the process of autonomous learning.

(2) Collaborative learning environment design

Collaborative learning environment design is a very important part that directly influences the sufficient function of network. According to constructive learning theory, “collaboration and conversation” are two significant elements of entire learning tutor and whether a perfect collaborative learning environment is designed or not directly influences students’ meaning construction of knowledge. Therefore when network course is designed collaborative work environment design will be paid more attention. Commonly there are group discussions and consultations to further consummate and deepen the meaning construction of theme. The entire collaborative learning process is directed by teachers and the questions will be raised by teachers.

Interactive Strategy Design

Interaction is a great feature by which network course is superior to other types of teaching materials. Because network course is used in distance learning for students interaction design becomes particularly important. There are mainly three types of interaction in distance learning. The first type is interpersonal interaction, which is the information communication means between teacher and student or between student and student. The second type is self-interaction, in which students communicates with themselves according to learning content in order to make students not only understand learning content superficially but also process them deliberately. The third type is man-machine interaction, which refers to information communication between human and computer. Interaction design should obey some rules including simplification, consistency, fault tolerance and feedback. The principle of simplification refers to easy operation and uses graphic interface as possible as we can; the principle of consistency means that the style of operation interface such as input and output and the results before and after should be consistent; the principle of fault tolerance refers to the detection and treatment to possible mistakes that system adopts; the principle of feedback indicates that computer will respond to user’ action. There are immediate feedback and delay feedback. And immediate feedback is fit for the learning content of associative memory while delay feedback is suitable for the learning of concepts and principles that need to be comprehended. There are a variety of ways to feedback such as true of false statements, showing a suggested answer and communication by the way of E-mail, ICQ, call-board and discussion group.

Effective Navigation Design Strategy

Navigation management strategy will make students avoid deviating from teaching aims and direct students to study effectively to improve the efficiency of learning, which should be well-designed. Generally the available navigation methods includes: firstly, creating a directory index table, which lists the instructions of curriculum structure in a form by which students obtain the information structure of network course and directly reach learning pages in demand; secondly, listing the file structure of network course and constructing corresponding subdirectories according to chapter, general web page, module and medium types to make students have a general comprehension of the whole teaching content; thirdly, placing the section directory of the network course on the side of the page using a folding menu.

Learning Resource Design Strategy

Various information resources should be applied to support “study” instead of “teaching’ when learning resource is designed. Network course should be supported by a massive resource library. Online resources are plentiful and highly shared. Students will choose appropriate resources used as learning materials according to hobbies and interests. However, there are two problems: one is that it is difficult for students to determine which content to choose because of the massive online resources; on the other hand, online resources are of varying quality that may cause bad influences on students. Hence the designer of course should carefully collect resources and choose resource library related to course content as navigation link to make the selection of information for students narrow and keep the students’ goals clear. However, when students are browsing the navigation information, they
possibly deviate from the course in the end. Thus before the navigation system is used, prompt message should be given. Because internet is open, students’ age and level are not limited and anyone can log on to internet to learn leading to a big difference between learning ability and experience of students. It is significant to the organization of teaching resources that the organization and design of network course content is guided by cognitive flexibility theory.

References

[1] X.Q. Feng. Thought about the Design Strategy of Network Course. Open Education Research, Vol. 32 (2001) No.4, p.29 (In Chinese).

[2] Q.Y. Huang. *The Development and Study of the Foreign Distance Education*. Shanghai education press, China, 2001.

[3] H. Zhang, *Course Genre Study*. Shangdong education press, China, 2000.

[4] J. D. McNeel. *Introduction to the Course*. Liaoning education press, China, 1990.

[5] S.H Zhao. Design of Web-Course Based on Constructivism. Journal of Sichuan College of Education, Vol. 28 (2012) No.11, p.119 (In Chinese).

[6] S.Q. Yu, X.J. Yang and K.K. He. Teaching Design Mode based on Constructivism. E-education Research, Vol. 92 (2000) No.12, p.7 (In Chinese).

[7] D.H. Jonassen and L.R. Murphy. Activity Theory as a Framework for Designing Constructivist Learning Environment. Educational Technology Research and Development, Vol. 47 (1999) No.1, p.61.

[8] H. Zhang. The Design and Development of the Network Course about Modern Educational Technology. E-education Research, Vol. 99 (2001) No.7, p.48 (In Chinese).

[9] D. Q. Wang Dongqing, C.S. Zhang and X. X. The Thought of the Design and Development about the Network course. Chinese Electrical Education, Vol. 189 (2002) No.10, p.62 (In Chinese).