Based on complex learning theory CDIO Project Master of Management education model Research

Wu Guangdong , Qiang Guofeng

College of Tourism and Urban management, Jiangxi University of Finance and Economics , Jiangxi Nanchang 330013

Abstract: faced with the complexity of the current high level project management personnel training , article attempts to set out from an engineering management professional education system , Mining Document Research Methods , for complex learning theory and CDIO An analysis of the application of the education idea in the master's teaching of engineering management specialty , Elaboration based on the complex learning theory of CDIO Engineering education system and the guarantee mechanism for its implementation . The result shows that , will complicate learning theory with CDIO education rationale read Organic fusion can form a more complete education system , more suitable for Master stage education in engineering management .

Keyword: Complex learning theory ; CDIO ; Project Management ; education system

with the complexity of the engineering management environment and the growing scale of construction projects , Social high- level complex the need for project management talent is growing . training of engineering management professionals to conform to " distinguished workers ″ Cheng schedule ″″ requirements , That is, people who are trained have a wide range of knowledge , to be able to apply theory to Practice , to solve complex problems in the actual project construction process ,. CDIO (conceive,design , Im - plement , Operate) Engineering education concept in China for more than 10 years, To the reform of engineering undergraduate education the has far-reaching effects . however , will CDIO extension of concept to postgraduate education level still more than less than , faces many new problems . For example : What is the competency standard for graduate students ? on CDIO large can I find an education method for postgraduate in the outline ?

in Engineering management education , The relationship between many concepts is intricate , and complex learning The theory is a learning concept that blends different single concepts into one whole. . Complex learning theory aim to make knowledge , skill and attitude Fusion , coordinating elements

and skills of various natures , and will learn knowledge migration to daily life and work , to achieve learner transitions , self-override and from main innovations . Complex learning process with nonlinearity , Initial condition dependency , Emergent , self-organizing Special .the Complex learning theory is currently used primarily for instructional design , about the knowledge and skills that will be learned close together , effectively resolve actual problem . More and more research shows , Higher Education complexity . This analyzes the based on complex learning theoryCDIO Engineering Education mode in the Master of Engineering Management program application , and try to put forward the teaching system and guarantee mechanism suitable for Master's education in engineering management .

Introduction to authors：Wu Guangdong (1984 -) , men , Associate professor, School of Tourism and Urban management, Jiangxi University of Finance and Economics , Dr , is primarily engaged in construction project management a , Research overview

Three learning theories（behaviorism , Cognitive , constructivism）Interpreting complex learning , , Combine ,

Complex learning is in complex the Miscellaneous learning environment fosters the ability to apply knowledge , skills , Emotional attitude merge together , and can be applied comprehensively to solve the actual complex questiontitle . Foreign Studies on Complex learning theory in practical teaching Application Research more mature . For example, cognitive load theory (CLT) recognize to , Real-life goal tasks should be complex learning moves Force [7] . Current domestic research on complex learning theory not more . Complex Learning as topic , time span 2006 year to2017 year searches for the full text database of the China Web journal 278 text offer , But the exact study of complex learning is only column Chapter , where The article is a study of instructional design patterns based on complex learning , 1 The article is about Explanation of the meaning of the theory of complex learning , chapter about complex learning platform Research on instructional design model . Research on Complex learning theory applied in the engineering tube Principles of professional education It's rare. , and project management The research results of professional teaching design patterns are relatively large . .

Research on instructional design patterns in China focuses on three sides face is based on mixed learning theory ,

constructivism theory etc basics research [8_ten] ; Two is based on the specific teaching environment and platform of the research investigate , 4UID teaching mode [E1] - ; Three is based on the teaching process ask problem solved research [E3] - [14] . Complex learning theory is based on complexity Basic idea of science , Learn about traditional learning theories and associations Theory Fusion application Research , and higher education itself has a complex Miscellaneous [M] , the studies the CDIO works on Complex learning theory Management Professional Teaching system more practical for present complex higher education meaning . This article is in the complex learning theory and the CDIO Engineering education mode on the basis of , Combining it with Master of Engineering management education , probe ask for complex learning theory's CDIO Master of Science in engineering management Study system and safeguard mechanism two , based on complex learning theory CDIO Engineering Management education Education system

1. Characteristics of Engineering Management specialty

Engineering Management is a combination of engineering technology and management _ Portal Complexity discipline . This discipline covers engineering construction technology ,

cost tuning， Network technology， systems such as management control， Is designed to integrate the use of the meter Computer technology for effective engineering management． Project Management Professional Training is with engineering， basic knowledge of management and economics， to apply The scientific theories that are in control， methods and Technologies consolidated， Comprehensive use of to complex projects， to solve complex problem compound height , level of administrative personnel． Previous project management emphasis on project development Process Management， actually， project management includes both major engineering projects The administration of the implementation of the procedure， for Example Engineering survey and design， under construction thread admin , project Run management, etc.， also includes complex devices， Product etc in development， Management in manufacturing .

more complex systems are encountered in modern engineering projects title , , engineers are required to master interdisciplinary knowledge and technology to place , , This brings new challenges to engineering management education . Project the main problem with management education is ’ Contextual awareness ″″ with View Engineering issues in a

broader context , provide solution and ability to predict consequences , cover Science , Technology , Economy , Legal , Social and culture all aspects of knowledge [7], also different degrees of association environment , ethics , Behavior Specification and health and safety issues .

2. Engineering Management Specialty teaching management

2.1 develop the development of the program

in the course of developing a master's degree in Engineering management , Topic Research , bi Industry thesis and engineering practice is the key link , The entire culture system needs The is carried out around the three links . so , apply CDIO The concept ties this Three links together. , blends into an organic talent training culture system , to make a master of Engineering Management Professional Master both professional Basics , with scientific research ability and creative thinking , can fast speed Adaptive Engineering Management Complex practical work .

2.2 Engineering Management Specialty Course System

Develop a comprehensive curriculum system for master education in engineering management critical . in a complex learning task design , to use holistic thinking Villay Schedule

Course . Course content to break chapter form , to class process modularity M, help students better integrate knowledge , skills such as fusion Get up , play overall benefit advantage . Course settings by level of discipline Consolidation course , main base course , Elective courses and compulsory course . basic courses include English , Political , Math etc . a Compulsory course is primarily set set Engineering Management Specialty Basic course , includes engineering technology , Manage , Legal and Economics courses , are designed to help students learn the basics of scientific research thinking method . Elective courses can be combined with postgraduate's own scientific research side always open , the contents of such courses _ must be deeper than the undergraduate stage into and rich , to reflect the latest research in this research direction , to let student Learning, . can pass several actual engineering questions , on case the Knowledge , skills are blended to explain , To help students mention High ability to respond to complex engineering environments , This is also a complex learning theory The advantages of overall task design .

Improve the model curriculum and core curriculum system of postgraduate students . demonstration The course refers to courses that embody the characteristics of postgraduate

teaching [M], courses should be able to reflect the frontiers of discipline， to promote graduate students autonomic and exploratory learning． also， in Project management internationalization background， promoting Engineering management education internationalization also has a lot of necessary， Training Engineering Management Internationalization high-level complex talent [M]. Engineering courses are the core of engineering management specialty course [M], You can use bilingual teaching， such as the introduction of English teaching material， Guide students to read foreign literature and other ways to achieve the international teaching Education convergence .

2.3 Practice Teaching Links

Practical teaching of Master's degree in engineering management through the case Teaching , Seminar Teaching and on-site practice reinforcement． specific "， " can combine CDIO Engineering Education Concept , through the Internet + " Challenge Cup ’ Math Modeling Competition for promotes student engineering applications

2.4 Engineering Management Specialty teaching evaluation Teaching evaluations play a key role throughout the teaching process， cause This , Develop a comprehensive evaluation scheme， to assess students ' ability to Training， learning about discipline knowledge # . CDIO teach Cultivate the knowledge required by the engineer， capabilities and quality decomposition To CDIO Professional culture standard , This is also a test for student learning effects based on ᴹ .

3. based on complex learning theory CDIO Engineering education system protect barrier mechanism

3.1 Perfecting Teaching supervision system Perfecting the teaching supervision system， First develop according to culture plan Clear Instructional goals . in the teaching process should avoid the traditional supervision of the " Price way to ignore the drawbacks of communication with students "， Core posts for instructional supervision can be feedback control， the traditional teaching supervision method should be established Birth Sustainability Relationship transition ᴹ, Keep up _ Step Optimization teaching Supervision Team Structure， the Inner learning of graduate students majoring in engineering

management Learning motivation and creativity have a positive impact [126]. plus， also hardening Instructional feedback mechanism， Reverse Student Evaluation and academic meeting information feed to courtyard teaching supervisor， then to school-level teaching supervision， entire teaching anti- Feed Steering information should be merged into a network information sharing platform， Convenient teachers and students check in time, Provides a basis for improving teaching methods．（two）Strengthening quality assurance system monitoring Quality Assurance System of postgraduate education in engineering management specialty for internal quality assurance system and external quality assurance system， where Quality assurance system mainly refers to postgraduate training methods， Teaching Links， Course settings and engineering practices ; External Quality assurance System are some certification bodies and services [127]. in complex learning theory perspective， the Complexity of the Master of Engineering management program determines the form to _ the need for a body quality evaluation system， to establish overall quality concept． the core of the overall quality evaluation system is graduate school， mentor and The close relationship between the three management teachers ~． also， also apply

inside Department and external Quality assurance system , Internal security system main Focus on the training of graduate students in engineering management , External security system focus on results , internal and external quality assurance system

combined to eventually form an integrated quality assurance system .

3.2 Building a multiple evaluation system and evaluation criteria

Master of Engineering management education with complexity , Single _ Comment estimate criteria no applicability , should establish a student-oriented philosophy , Activate a multiplicity of principals [2] . evaluating Master of Engineering management general capabilities of the , A master of Engineering Management Evaluation Committee should be established , member by school , Government , related people groups such as Enterprise and social organization into , training goals for different types of schools , using a different estimate Standard . Colleges and universities should establish quality evaluation in schools , Teaching Management

new mechanism . in the Innovation evaluation system , should take full account of enterprise and government Related resources , to make evaluation results more comprehensive , is also more representative of , Promoting the improvement of the quality of Master of Engineering management .

3.3 Strengthening cooperation between schools and enterprises and the construction of Off-campus practical bases

in Engineering management education , Strengthening School-enterprise collaboration is an increase in The effective way for students to practice is . University with Enterprise Deep cooperation , Bring the latest development results of industry enterprise line to teaching to learn . according to CDIO education philosophy for Enterprise engineers , Is both to introduce enterprise technologists to school lectures , also allows engineering The professional Master's degree to practice outside the field practice . enhancement The key to the construction of school-enterprise cooperation and Off-campus practice base is to form a "" Perfect Knowledge , technology transfer System , An Enterprise provides a practice base and a experts with rich engineering experience , Colleges and enterprises work together Project Management Master Talent

Training program , Finally promote the school-enterprise phase Mutual collaboration , Common development .

4. Epilogue

This article analyzes complex learning theory and CDIO Engineering Education based on , Combining Engineering Management professional features , Project Management the education system and safeguard mechanism for a master's degree . result table Ming , Master of Engineering Management teaching with complexity , traditional The teaching theory in the sense of does not solve the problem of "" Complex problems in teaching " . and based on the complex learning theory CDIO education mode vs education system , help Master of Engineering management education . The disadvantage lies in the complex learning theory and the CDIO Integration of engineering education Close also exists _ some questions , is still inconclusive for this theorists .

so , Subsequent research should focus on the construction and training of theoretical fusion models Get in _ step Perfect .

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