

Exploration on Applied Talents Training Model Based on Ideas of CLUB-CDIO

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ABSTRACT. *In exploring ways to cultivate applied talents, CDIO model as advanced ideas of international engineering education and talents cultivation has been spread widely in all kinds of professional teaching and curriculum reform in colleges and universities, especially in applied colleges and universities. The article takes Oracle club in TIANFU College of SWUFE as example and explores applied talents training model based on the ideas of CLUB-CDIO, which expects that the attempt would provide a reference for applied talents training model of other colleges. It can better cultivate talents that meet the needs of country.*

KEYWORDS: *CDIO, CLUB-CDIO, applied talents, training model*

1. Overview of CDIO

CDIO engineering education model is the latest results of international engineering education reform. The founder Edward Crawley has been awarded “Golden Prize” by National Academy of Engineering in 2010. This prize is praised “Nobel Prize in engineering”. CDIO consists of three core documents, including a vision, an outline and 12 standards. Its vision is to provide the product that focuses engineering foundation and establishes in real world. It also provides engineering education based on the background of systematic process of Conceive-Design-Implement-Operate. CDIO outline firstly expresses what engineer must possess ability, involving engineering fundamental knowledge, personal ability, team work ability and ability of the whole CDIO process by means of subdividing (3 levels, 70 sections and about 400 terms). That makes engineering education reform more directional and more systematic. 12 standards of CDIO has given systematic overall guidance in implementing and checking the whole model, which makes engineering education reform detailed, operable and measurable. And that has great significance for students and teachers. CDIO shows the unification of scientificity and advancement, which represents developing trend of current engineering education.

2. Domestic exemplary cases of applying CDIO

As new ideas of training talents, CDIO emphasizes dynamism and unification between theory and practice of training talents, which is just the deficiency of talents training model in our country. In 2005, Shantou University brought in CDIO and achieved great implementing results. That attaches great importance by Ministry of Education and promotes its development effectively. After ten years of developing and studying, a large numbers of exemplary cases has sprung up and gotten fruitful research results.

Gu Peihua (2008) et al. in Shantou University put forward EPI-CDIO training model. EPI means Ethics, Integrity and Professionalism. EPI-CDIO is a new model of advanced engineering education that focuses on the organic unity of professional ethics, integrity and ideas of Conceive-Design-Implement-Operate and targets on cultivating talents of senior professional engineers. Zhao Xingxiang (2018) in School of Education, Peking University started practical exploration of EPI-CDIO ideas and raised a series of operable measures.

Wentao (2010) in Dalian Neusoft University of Information came up with talents training model of TOPCARES-CDIO. This model pays attention to cultivate students' professional competence and comprehensive quality. Dongwei, Wang Shiyong (2017) explored an index system of assessing training scheme of specialized personnel.

Liujun (2016) in Shenzhen Institute of Information Technology presented reform in higher vocational school connected with online courses. The courses realize personalized theoretical study by learning network course. Connected with intensive teaching, teachers lead students to learn related theory autonomously and match practicality principle of theory study around the project carrying out conceiving step of learning deeply. And online courses can realize training integration of designing project, implementing project and operating project by intervention of real project. That can promote students' practical competent and ability of solving problem in practice.

Chenbo, Wanglin and Zhang Xuwei (2017) et al. put forward "N-CDIO engineering education model" based on network constructing real-true engineering education environment. The application of the model has improved school-enterprise cooperation and educational resources integration for colleges. And it enhances engineering ability, practical management and student employment for students. What's more, practical teaching level of teachers has been improved and students' ability has been recognized in society.

3. Examples of Oracle-Club in TIANFU College of SWUFE

As application -oriented institute, TIANFU College of SWUFE vigorously implements online teaching, case teaching, experiencing teaching and project-driven teaching as typical representative of Athens classroom reform and makes efforts to cultivate students' researching ability and innovation ability. College focuses on

integrating theory with practice. At the beginning of establishing school, college sets up Oracle-Club with Oracle by model of school-enterprise cooperation. Oracle-Club provides a place to learn actively for students and creates an environment of practice and innovation. Oracle-Club allows students from different majors enter the lab to learn together, and co-participate in enterprise actual projects and teachers' research projects. Learning in lab and participating in project can enhance engineering practical ability and innovation ability. After ten years of development, Oracle-Club continually has taken in new teaching ideas in process of operating and managing and formed a special model of Oracle-Club. It embodies as follows.

3.1 Management of open lab

Oracle-Club adopts open management. The management team that is at centre of students is formed by association elections and recruitment. The duty mainly consists of daily operation and management of lab, Club members' management, event planning and development. Students in Oracle-Club come from different majors. Students can choose different learning trends according to interest and professional competencies. Now the trends include EBS Financial, EBS SCM, PeopleSoft, Business Intelligence, Technique and Machine Learning. Every learning trend has a corresponding study group. Study group makes autonomous study plans; members can be independent learning or focused learning on your own terms. Focused learning gives full play to mentor activities between students and improves students' study efficiency. Meanwhile, it cultivates students' moral quality of cooperation, mutual help and common progress. Oracle-Club usually recruits at the beginning of each term and accepts some students with interest and willing to the group. In the management of members, study group urges and checks learning conditions of group members by launching lectures and reports regularly. And it sets up eliminated mechanism with learning conditions; Club management team will have general election regularly in order to urge and keep students' initiatives and persistence.

3.2 Team construction driven by project and competition

Oracle-Club is adept at team construction that is driven by project and competition. Under the CDIO ideas, every study group makes up many competition teams according to the principle of personal willingness and competence; and every competition team matches a related adviser. Guided by adviser, team conceives a research direction connected with social development background and demands, and investigates it fully. Then it can form initial design. Constant learning about knowledge and skills is done based on initial design. What we learn from constant learning further modifies design plan. When confirming the project fundamentally, team starts to realize the project with division cooperation. Results need to be checked. On one hand, college encourages students to take part in all kinds of student competitions organized by country and society, such as "Internet Plus" competition, competition of the university students' innovation and pioneering; on

the other hand, college provides a platform of presenting results for students by launching different kinds of competition in college, such as solution competition of information management of enterprise, programming competition and so on. Especially in “Internet Plus” competition and solution competition of information management of enterprise, students not only need to realize and show the project, but also consider the project operation fully, which lays the initial foundation of inauguration and work. The mechanism that is driven by project and competition helps students not only improve autonomic and extensive learning actively, but also motivate innovative awareness and practical ability, and cultivate competence of teamwork and communication, and improve professional knowledge and skills.

3.3 Report of historical achievements

At the end of every term, every study group reports results by ways of project. The report is not only exhibition of end result, but also declarative report with project based on four main processes of CDIO ideas. Specifically, conceiving stage involves subject source, preliminary investigation, and prime assumption, knowledge, skills; designing stage is about the design and improvement of project according to preliminary investigation and knowledge and constant learning of skills. Realizing stage mainly states the problems and solving methods in implementing process for students; operating stage mainly states the results and prospect of the project. Report on phase achievement requires students to comb and conclude the process of implementing the project clearly based on taking part in project practice. It requests students understand the content of one’s own work deeply and have a comprehensive understanding of the process of operating the whole project. It is helpful to cultivate communication ability, cooperation ability and engineering practical ability, which lays the foundation of careers.

4. Conclusion

Many practical results show that Oracle-Club in TIANFU College of SWUFE has grown lots of students who equips with solid fundamental knowledge and excellent engineering practical ability, which gains favor and praise from employer units. In the process of cultivation and education in the further, college will absorb more advanced education ideas, and focus on active innovation and inheritance. It can cultivate excellent students that meet development era and social needs.

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