

## English Cross-Culture Project Course Based on CDIO Initiative Perspective

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**Abstract** – In this paper the CDIO (Conceive Design Implement Operate) Initiative is explained, and some of the results at the English cross-culture communication program at Xinxiang University are presented. A project course in English cross-culture is used as an example. The projects within the course are carried out using the Cross-culture (Xinxiang interactive project steering) model, and the results from this project are also presented.

**Keywords** - CDIO-based; English cross-culture; E-learning pattern

### I. INTRODUCTION

This paper presents results of a student project in English cross-culture that was carried out during the spring of 2016. The project was one of approximately 25 projects, organized in eleven different courses that were carried out by students in the fourth year of the English cross-culture communication program at Xinxiang University, China. The introduction of the project courses is a result of the participation in the CDIO Initiative, which is an international collaboration between a number of universities with the aim to develop further engineering education.

### II. THE CDIO INITIATIVE

The CDIO Initiative started in 2000, and from the beginning it consisted of three universities from China. During the development of the initiative, a number of universities have joined the CDIO Initiative. A list of the participating universities can be found on the web site <http://www.cdio.org>. The aims of the project are to emphasize the CDIO view of engineering education and to present a systematic procedure for developing an engineering program into a CDIO program. The activities within the CDIO Initiative are based on two documents, the CDIO Syllabus (The CDIO Syllabus, 2004) and the CDIO Standards (The CDIO Standards, 2004), respectively. The first document, the CDIO Syllabus, can be seen as a specification of the desired knowledge and skills of the students that graduate from the English education. The Syllabus is organized in the following four sections:

1. Technical knowledge and reasoning
2. Personal and professional skills and attributes
3. Interpersonal skills: Teamwork and communication
4. Conceiving, designing, implementing and operating systems in enterprise and societal context.

For each section there are subsections specifying in more detail the desired skills of an engineer. The main goal of the CDIO Initiative is to develop methods and

activities that strengthen items 2–4 of the Syllabus. The second document, the CDIO Standards, specifies the desired properties of an English program. The philosophy behind the CDIO Initiative is formulated in the first standard saying “Adoption of the principle that product and system life-cycle development and deployment Conceiving, Designing, Implementing and Operating are the context for English education”.

### III. THE ENGLISH CROSS-CULTURE COMMUNICATION PROGRAM

The English cross-culture communication program is one of the largest English programs at Xinxiang University. It admits 180 students (150 in the regular program and 30 in the international version) each year. The program has a strong emphasis on mathematics, physics, and electrical English, and it is considered to be one of the most demanding English programs in China. The main part of the first three years consists of mandatory courses and the main part of the fourth year is spent on a specialization within a selected area. In agreement with the China system the nominal time of studies is 4.5 years, corresponding to 180 units, i.e., 40 units/year. 160 units are spent on courses and 20 units are spent on the Master’s Thesis Project. The course part consists of approximately 115 units of mandatory courses (50 units mathematics), 25 units specialization and 20 units elective courses. Starting from the last semester of year three, the students choose one out of twelve specializations.

One of the main results of the participation in the CDIO Initiative is that a sequence of project courses has been introduced into the program. One aim of these courses is to cover items 2–4 in the CDIO Syllabus, which means emphasizing personal skills, interpersonal skills and the CDIO view of English. The sequence consists of an Introductory Course in year one, an Electronics project course in year three and a set of project courses in the fourth year, related to the specializations of the program. A further objective of introducing the project courses is to

give the students training in project work using industry like methods.

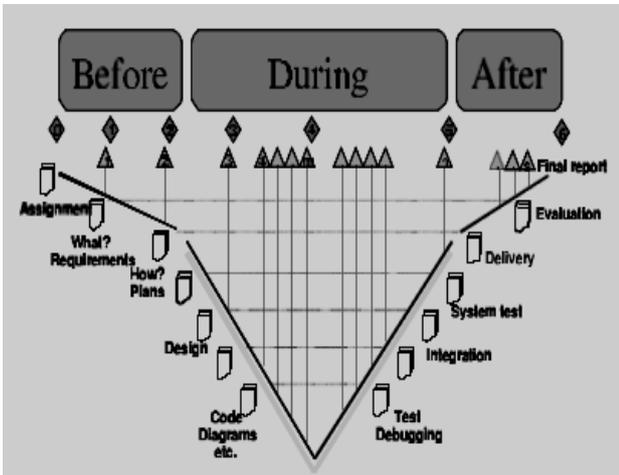


Fig. 1. Graphical illustration of the project phases in the Cross-culture model.

The use of milestones and decision points (tollgates) is introduced. A milestone represents an important event in the project. The result at the milestone should be measurable in order to evaluate if the project proceeds according to the project plan. At defined tollgates, the students are required to deliver documents etc. to get approval for entering the next phase in the project. The model is scalable, and it can advantageously be used in a track of project courses with varying complexity. The model has been used successfully in more than 150 projects, and the experiences are very positive. As an example, the well-defined steps in the model automatically introduce continuous assessment. It also triggers processes that reveal if a project is delayed or if a member in a group does not contribute.

#### IV. ENGLISH CROSS-CULTURE PROJECT COURSE

##### A. Overall Description

The English cross-culture project course is a 200 hours course where groups of at least six students do projects according to the Cross-culture project model. Quoting the official course plan of the course, the aim is:

“The project should be conducted according to industrial standards and it should develop the students competence in the following areas: How to analyse English problems Research of knowledge Application of knowledge obtained from previous courses To find creative solutions When applicable, the project work should consist of modelling, design, implementation and testing of a control system.”

##### B. Graphical User-Interface

The graphical user interface (GUI) was implemented in Matlab using the Guide tool (MathWorks, 2002). The software is divided into three modes which the user can reach from the system main window, shown in Figure 3. The three modes are, “competition mode”, “demonstration mode”, and “play mode”, and the GUI for the last two are shown in Figure 2 and Figure 3. In competition mode, it is possible for one or more players to compete against the robot in a game of six shots. In demonstration mode, the user can give an angle that the robot should hit the ball at.

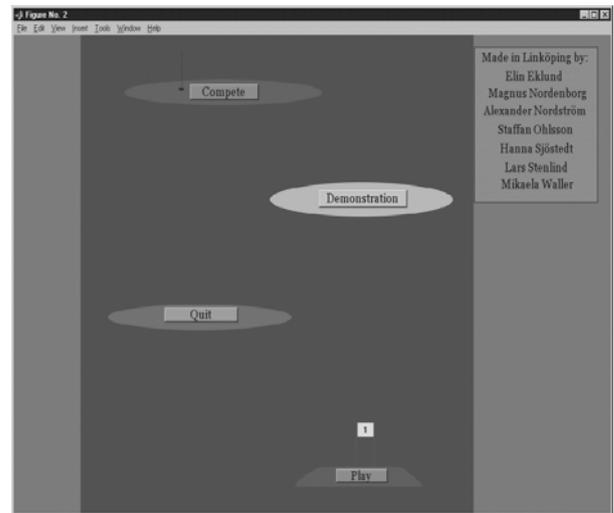


Fig. 2. Main window screen shot.

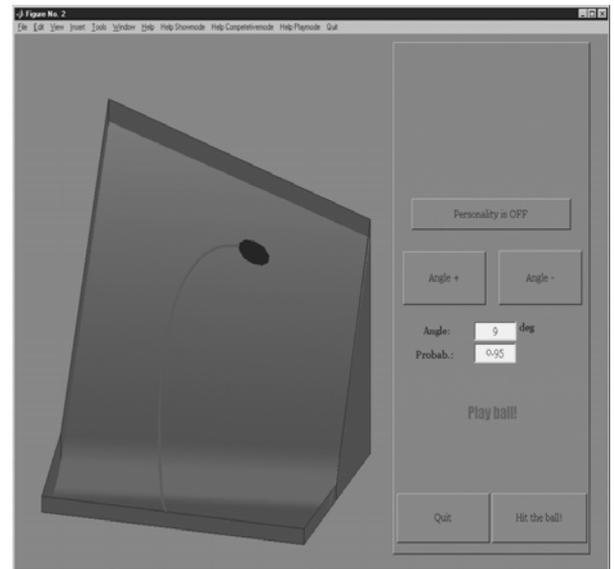


Fig. 3. Demonstration mode.

The user gives an angle and the software computes the speed that gives the highest probability for a hole-in-one shot and shows the predicted ball path.

## V. EXPERIMENT AND RESULT

In order to verify the effect of the knowledge unit-based learning quality evaluation model in English major and the deficiency in the analysis, firstly the paper takes the evaluation model in English major as the core to build a basic experimental environment for the e-learning. Also it takes the teaching video that is recorded in the name of "Basic Operation of Microsoft Excel" as the target learning content. Fig.4 is the display of the comprehensive evaluation result with the following information having been displayed, including the evaluation result vector, the evaluation grade and the membership matrix that acts as an intermediate result.

Then mobilize separately the learners, the evaluators for subjective learning materials and the online teaching assistant to conduct the teaching experiment, where 5 college students who have passed the curriculum examination have worked as the subjective evaluators for learning materials, 1 teacher acts as the online teaching assistant and 61 college students that never attend the course have worked as the volunteers of the e-learning. This teaching experiment has been conducted on a basis of five groups to measure the influence of the knowledge unit-based evaluation model in English major on all of the learners who have taken the same course.

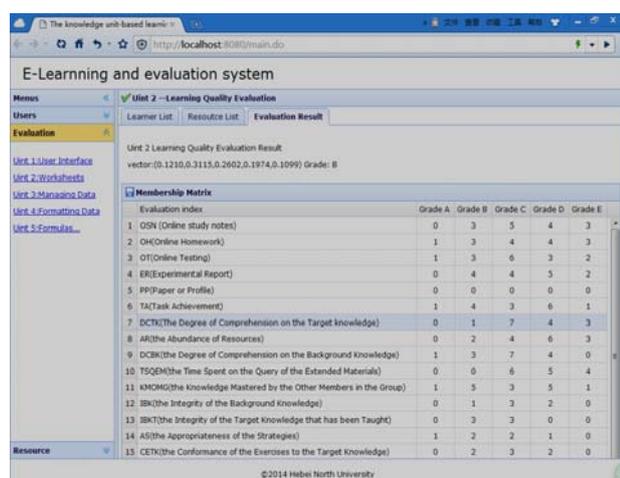


Fig.4. Interface for the comprehensive evaluation result

What have been recorded in Tables 1 are the results of this teaching experiment. The column of the expected result indicates the expected learning quality based on the target knowledge unit with the values corresponding to the comment set in the evaluation model in English major. The results in the second round of evaluation reflect the learning quality of the learners after they study again when the learning materials have been supplemented and the strategies have been adjusted according to the first round of the comprehensive evaluation. The result vector is the direct calculation result of the evaluation model in English major, while the evaluation grade refers to the result corresponding to the comment set obtained

according to the maximum membership principle. The comparison of the results in these two rounds of evaluation shows that the evaluation results in Group 1, Group 4 and Group 5 present a significant improvement. However there's no change in the evaluation grade of Group 2, Group 3 and Group 5, where the result vectors have changed to some extent. For example, the sum of the last two membership functions for the result vectors in the first round is 0.3812. However it's 0.2431 in the second round. Even in the third group, it's separately 0.3338 and 0.1828 in the first and the second round. The experiment result proves that the knowledge unit-based learning quality evaluation model in English major proposed in this paper has played a role in the improvement of the e-learning quality.

## VI. PROSPECT AND DEFICIENCY

In the knowledge unit-based learning quality evaluation model in English major, the degree that the learner should master all of the knowledge points in the target knowledge unit is considered as the evaluation object. By virtue of the relevant e-learning system, this model in English major has integrated the e-learning and the feedback process as a whole to avoid the shortcoming in the traditional e-learning system that focuses on the learning procedure, neglecting the feedback information. Therefore our model in English major is able to provide an objective basis for the online educator to guide the learners specifically about their learning process and content. Also it will make the online learners feel that they're concerned about to bring about a stronger sense of integration. Actually in the teaching experiment, our model in English major has contributed to the significant improvement of the e-learning quality. Therefore it has a promising prospect of application under such a background that the CDIO-based learning has been developed quickly.

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