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Research Article

Research on Cultivation Mode of Early Intervention, Practical Guiding towards Talents Majored in Food Electronics

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Abstract: This study put forward the cultivation mode of "early intervention, practical guiding", discussed the organization and implementation plan, method, as well as defined a set of Food electronic production project, which was "combining major, front and back correlation, progressive difficulty and leave leeway". Aiming at lacking of professional guiding and learning method by the phase of junior grade are key elements that cause students have non-explicit learning objectives, insufficient learning initiatives and impact cultivation quality of the students. The practice showed that problems of vague in recognizing major and insufficient in learning motivation during freshman period were solved, students' interest in extracurricular production was extremely stimulated and students' innovation ability, practical application ability were greatly improved.

Keywords: Early intervention, food electronics major, practical application

INTRODUCTION

Nowadays, it becomes an important and urgent task to cultivate students' development of comprehensive quality, improve students' self-learning ability and self-innovating ability (Gao-Feng, 2010; Li *et al*., 2007). Taking the students majored in Food electronics at Agricultural University of Hebei, School of Information as example, this study concluded the current status of students' learning in recent years, carried out analysis towards the main issues that impacted talent cultivation quality, explored the new approach that stimulated students to self-study and put forward new mode of talent cultivation (Xiang-Ping, 2009).

The main problems that influence cultivating talents: Through surveying and analyzing the changing process of learning states during 4 years towards many students, it is found that the key elements that influence quality of cultivating students are non-explicit learning objectives and insufficient learning initiatives among students. The reason is that to a great extent, the students have not grasped the basic theoretical knowledge in junior grade phase. For the main reasons that influence acquisitions of knowledge are: the junior grade students are lacking of professional guiding and learning method guiding, which results in many students pay insufficient importance to basic theoretical course and when they are at senior grade, it turns out their basic theories are not solid so they cannot study professional course well, but it is too late and irretrievable (Liang *et al*., 2013).

MATERIALS AND METHODS

New approaches that stimulate students to learn initiatively: In order to solve "slacking off caused by blindness" among junior grade students, it puts forwards the cultivation mode of "early intervention, practical guiding" (Wen-Xiang *et al*., 2011). As to the former one, it refers to students start to have close relationship with teachers of specialized courses through extracurricular practical activities in the first semester, meanwhile extracurricular practical activities are maintained to conduct in the second, third and fourth semesters, so the issue that freshmen cannot see teachers of specialized courses in the first three semesters has been solved. The latter one is the important approach to cultivate students' innovation ability and practical ability (Xiong and Onstar, 2011). Innovation comes from practice. "Practical guiding" refers to elaborately design the extracurricular practical activities that are in consistent with cultivation target for freshmen during the first four semesters and allow students to know the professional knowledge through these activities (Guo and Yang, 2013). What's more, through practical activities, students' learning interest could be produced, the importance of the basic theoretical courses that are offered in the same semester could be recognized and thus the problems like vague in recognizing major, insufficient in learning motivation during freshman period could be solved.

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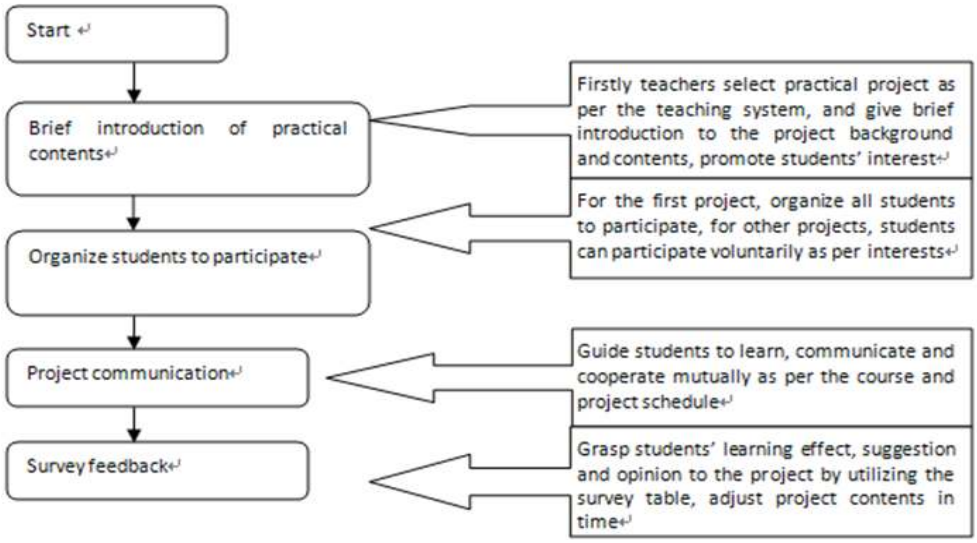

Fig. 1: Implementation process to the project

Implementation plan of food electronic production organization about "teachers-oriented, students attend autonomously" is established: According to the 3 years' experience about organizing Food electronic production for 5 grades relevant to Food electronics major, in order to give full play to the promotion function by the mode "early intervention, practical guiding", especially to promote freshmen to learn initiatively, the following organization and implementation plans are put forward.

Leading function of the teacher: The Food electronic production practice is not a step-by-step course. Students' preparation work is very important, which includes selection of project, pre-fabrication of project, preparations of all kinds of consumables, tools, instruments, etc. The project of Food electronic production practice covers multiple courses, so separating the responsibilities among all faculty teachers is the effective approach. Teachers are appointed with specific projects respectively according to the courses they taught. Not only they have rights of speaking in selecting project, but also could conduct relative guiding towards students by combining with the course contents. The standard procedure carried out by each project is shown in Fig. 1. During the concrete implementation, senior students in innovation lab of the college could assist teachers in operation guiding. In this way when freshmen operate, it will make the procedure more smoothly going and reduce fault, also senior grade students could set good example for freshmen, it is an exercise for them.

Organization form of students: Before starting the Food electronic production, students' initiative and responsibility in attending this activity became a concern. Therefore, aiming at the initiative, the imagination of voluntary participation or selecting participation was once put forward. Aiming at the responsibility, the plan of proper paying or completely free was proposed. Even the strategies like pay-production by all people was considered, which is for those who complete the targeted function, return the fees and for those who stop producing during halfway, fees will not be returned. Through several years' practical operation, it is found that the above-mentioned concerns are unnecessary. The initiative of students' practice is beyond expectation. Meanwhile they show strong responsibility. Due to everyone focuses on his production fruit with great passion, all of them are careful in debugging and troubleshooting. Consequently, from the perspective of organizing students, the implementation plan is fit for entire participation (Fig. 1).

Teachers could provide projects that could be developed according to students' learning objectives and interest points.

Set open lab of innovation: The College provides lab, computers and necessary equipments for students, so students could utilize spare time to arrange learning and research. During the development process, for the devices, the college allocates expenditure to purchase and if the students attend in teachers' scientific research, teachers' scientific research funds will bear. Some devices are purchased by students themselves and if students participate in awarding, funds could be reimbursed. The lab is operated by students. Setting beside of the teachers' office, students could communicate and discuss with teachers at any time. Due to the extracurricular innovation lab is open, students of different grades could learn and do research in it frequently, in this way the senior students could teach the junior students, they can learn, cooperate mutually and get common progress.

A set of food electronic production project of "combining major, front and back correlation, progressive difficulty and leave leeway" is established:

Guiding thought of project settings: The project settings follow four principles as below:

- The technical contents referred to the project combines with the main course in the major.
- The difficulty to the project is from easy to complex, step-by-step difficulty.
- Each project is correlated between front and back, featuring integrated effect.
- Leave leeway, enable further free development.

The project shall be selected on the basis of the whole teaching system and the outline requirements. Hierarchy and practicability shall be focused. Meanwhile the learning approaches of appearance-inside and gradual deepening shall be in accordance with. Not only the basic teaching points shall be included, but also students' initiative in solving problems shall be motivated. It shall be convenient for students to learn scientific and technological knowledge and grasp all kinds of practical skills.

In terms of contents, practicability and development shall be fully reflected. The project contents shall combine the long-term and phase. The project contents shall always contain the highlights that could motivate students' interest and present the learning task under complicated background. Through the project contents, students shall discover the correlation among different courses that are in the teaching system, the close relation between the project theme and real world. Thus students could have pertinence when they are learning and find it is useful.

It improves students' manipulative ability in Food electronic design and practice. When teachers select the project contents of practice, they shall jump out of the traditional thought and reflect innovative ideas. The tasks shall attract students, stimulate students' learning interest and desire; shall be divided into several levels; shall take all students into consideration, make sure they could get achievements after each time study, experience the delight and sense of achievement after the task is completed; shall reflect authenticity and reasonability, as well as create the real situation that is close to student life.

The selection of practical contents is generalized as below:

- The project shall possess certain application value and cover certain teaching contents.
- It could combine the theoretical knowledge in one course or several courses with the practical skills.
- Opportunities shall be provided for students to make plan and implement independently.
- Explicit and concrete achievement exhibition shall be offered.
- Students could overcome and dispose the difficulties and problems existed during project implementation.
- The project has certain difficulty and requests students to solve new problems by utilizing multi-disciplinary knowledge, skills.

Setting plan for practical project: Through the practical experience from four grades, aiming at the mainline of the course about "circuit-analog circuit-digital circuit-sensor-single-chip microcomputer", this task defined the practical contents about "rectification power-responder-time delay switch with voice or light-operated-single-chip microcomputer control system".

RESULTS AND DISCUSSION

Through adopting new mode to cultivate 9 classes related to Food electronics major in Agricultural University of Hebei, School of Information, in total above 260 students, symposium and questionnaire analysis, it results that the effects are significant and the academic atmosphere receive good reputation from all course teachers. The declaration, quantity and topic difficulty in the project of Challenge Cup that takes class 11 and 12 as subject are far beyond than that in previous sessions. The university conducts teaching inspection and visits class randomly, not only all students attend the courses of complex variables and integral transformation, they also contend for sitting in front row, which is rare in present classroom. In addition, the extracurricular production stimulates students' interest greatly, they spend thousands RMB to purchase components and parts, for conducting plenty of Food electronic production. The manipulative practical ability among freshmen is far beyond than that among senior students. They have completed the competition topic that were participated by senior students in National Undergraduate Food electronic Technology Contest, also they designed and produced new projects, preparing for the National Campus Innovation Contest. The results from questionnaire survey after develop Food electronic production is as follows: Table 1 are comparisons of students' comprehension degrees towards major, Table 1 and 2 are comparisons of interest degrees for Food electronic production.

Seeing from the Table 1, after adopt new mode to cultivate, students get substantially increase in comprehension procedure to the major, interest degree

Table 1: Comprehension degree towards major

	Degree before new mode cultivation (person)			Degree after new mode cultivation (person)		
Class	Comprehend	So so	Not clear	Comprehend	So so	Not clear
Food electronics 1101	3	12	16	25	4	1
Food electronics 1102	5	15	11	26	5	0
Food electronics 1201	6	11	16	28	0	2
Food electronics 1202	5	15	9	26	2	0
Food electronics 1301	7	9	15	24	3	0
Food electronics 1301	4	13	14	27	2	0
Internet of things 1201	5	12	13	26	3	0
Internet of things 1201	6	11	15	25	3	2
Internet of things 301	8	16	6	25	2	1

Table 2: Comparison of interest degree in food electronic production

	Interest degree before new mode (person)			Interest degree after new mode (person)		
Class	Very interest	So so	Not clear	Very interest	So so	Not clear
Food electronics 1101	18	4	9	20	10	0
Food electronics 1102	15	10	6	22	9	0
Food electronics 1201	16	7	8	25	4	3
Food electronics 1202	16	5	10	23	3	2
Food electronics 1301	13	12	6	24	6	1
Food electronics 1301	14	10	3	20	8	2
Internet of things 1201	12	12	9	19	10	6
Internet of things 1201	13	10	7	18	10	3
Internet of things 301	10	12	10	20	6	4

to Food electronic production, manipulative ability in Food electronic practice and expectation degree in specialized course. In the meantime, through develop practical guiding, students improve their future orientation. Consequently it makes students have explicit and clear plan in terms of which course shall be taken as elective course, which course shall be input more vigor according to their orientations during 4 years study.

CONCLUSION

Non-explicit learning objectives and insufficient learning initiatives are key reasons that impact cultivating quality of the students. The cultivation mode of "early intervention, practical guiding" has solved the issue that freshmen cannot see specialized course teachers during the first 3 semesters. Through extracurricular practical activities, student can know about the specialized contents, students' learning interest is motivated and the importance of recognizing the basic theoretical course by students is guided. The practice showed that problems of vague in recognizing major and insufficient in learning motivation during freshman period were solved, students' interest in extracurricular production was extremely stimulated and students' innovation ability, practical application ability were greatly improved.

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