

A Study on the Cultivation of Vocational Ability for Practical Undergraduate Students-Taking Automation as an Example

Wang Kuantian

Emilio Aguinaldo College, Manila, Philippines
kuantian.wang.mnl[at]eac.edu.ph

Abstract: Vocational ability is an important indicator for measuring the quality of applied undergraduate education. Applied undergraduate education is a place to cultivate high-quality workers and skilled talents who meet the needs of enterprises in production and service. The country attaches great importance to the cultivation of applied undergraduate professional abilities. The government has provided a lot of policy support for applied undergraduate colleges. In recent years, the development of applied undergraduate colleges has been very rapid. We recruit many students every year. Vocational ability plays an important role in the employment, transfer, and reemployment process of applied undergraduate students. Cultivating the professional abilities of applied undergraduate students to become high-quality technical talents after graduation is an important research topic faced by applied undergraduate educators. This article takes the automation major of application-oriented undergraduate programs as an example to elaborate on the talent cultivation goals and professional ability requirements of application-oriented undergraduate programs. Based on actual investigations, it analyzes the current situation and existing problems of vocational ability cultivation in application-oriented undergraduate programs, and focuses on exploring strategies for vocational ability cultivation.

Keywords: Applied undergraduate program; Automation major; Vocational Ability Development

1. Background of the Study

Science and technology are developing rapidly nowadays, and many new technologies are being applied to enterprise production and social life. The emergence of new technologies has improved the production efficiency and technological level of enterprises. At the same time, enterprises have increasingly high requirements for technical talents. Enterprises have higher requirements for talent in terms of professional knowledge, technology, and operational capabilities. These abilities combine to form professional abilities. The research on vocational abilities in China has a history of decades, and our understanding of vocational abilities is constantly updated and changing with the development of society. From the initial single skill to the overall ability of multiple skills, to now mastering interdisciplinary comprehensive professional abilities. The Ministry of Education attaches great importance to the professional abilities of applied undergraduate students. We have established the goal of cultivating applied undergraduate professional abilities. The Ministry of Education pointed out that the cultivation of applied undergraduate vocational abilities should meet the requirements of enterprises and the needs of national modernization construction. Not only should we attach importance to the cultivation of vocational abilities for application-oriented undergraduate students, but we should also pay attention to the cultivation of students' morality, intelligence, physical fitness, aesthetics, and other aspects, in order to cultivate comprehensive high skilled talents for the national modernization construction. The Ministry of Education has pointed out the direction for cultivating applied undergraduate vocational abilities. However, many applied undergraduate colleges have an incorrect understanding of the requirements of the Ministry of

Education. Many universities still equate applied undergraduate programs with regular undergraduate programs. Causing applied undergraduate graduates to fail to meet the requirements of the enterprise. Through investigation, it was found that in recent years, the development of applied undergraduate programs has been very fast, with a rapid increase in enrollment. However, due to the large number of enrollment, the number of laboratories, experimental equipment, and teachers in the school cannot meet the teaching requirements, resulting in a low quality of vocational ability training for applied undergraduate programs. This article takes students majoring in automation in application-oriented undergraduate colleges as the research object, studies the cultivation of professional abilities of application-oriented undergraduate students, analyzes the problems in the cultivation of professional abilities of application-oriented undergraduate students, proposes solutions and corresponding plans, provides feasible opinions and experience references for the cultivation of professional abilities of application-oriented undergraduate students, and cultivates more talents for the development of modern society.

2. Theoretical Framework

China's research on applied undergraduate vocational abilities is relatively late compared to other developed countries. The research on professional competence in China began in the 1960s. Although the research on vocational abilities in China started relatively late, the speed of research in China has been very fast in recent years. China has borrowed and referred to the successful experience of other developed countries in researching vocational abilities, and has initially formed a theoretical system for vocational ability

cultivation that is in line with China's education. This provides valuable theoretical basis for researchers in China.

In foreign educational concepts, especially in the United States, applied undergraduate vocational ability cultivation is highly valued. The United States has formed a mature theoretical system in the cultivation of applied undergraduate professional abilities. Larnie Gale and Gaston pol emphasize that applied undergraduate graduates should have strong vocational learning abilities and apply these vocational learning abilities to their work, creating value for businesses and society.

Research/Conceptual

Based on the theoretical framework mentioned above; This article proposes the following research paradigm to describe the research process:

Input:

View information;

Applied undergraduate colleges do not attach enough importance to the cultivation of students' functional abilities; The students in application-oriented undergraduate colleges have weak practical skills in operation;

Process:

Describe the situation of the interviewees;

Analyze the cultivation of vocational abilities for application-oriented undergraduate students;

Conduct statistical analysis on the survey results.

Output:

Provide suggestions for response measures based on the survey results.

Statement of the Problem

The purpose of this study is to improve the training methods of applied undergraduate colleges, enhance the professional abilities of applied undergraduate students, and enhance their professional competitiveness.

This article mainly addresses the following issues:

- 1) Is the talent training plan of applied undergraduate colleges reasonable;
- 2) Whether the teaching equipment of applied undergraduate colleges is sufficient;
- 3) Does the professional ability of graduates from applied undergraduate colleges meet the requirements of the enterprise;
- 4) What should we do next when facing all the problems faced by application-oriented undergraduate colleges?

Hypothesis

The survey and interview were random, and there was no significant difference in the results between the surveys and interviews.

Significance of the Study

The research in this article has strong theoretical and practical guiding significance in improving the vocational ability of

applied undergraduate programs. This article takes students majoring in automation as an example to explore ways to improve the vocational ability cultivation mode of applied undergraduate students. The purpose of this article is to summarize the problems in the cultivation of applied undergraduate professional abilities through investigation and research, and propose suggestions to improve the cultivation of applied undergraduate professional abilities, ultimately creating favorable conditions for cultivating applied undergraduate talents that meet the requirements of enterprises.

1) Theoretical significance analysis

This article mainly studies the training mode of applied undergraduate vocational abilities. This study has a promoting effect on improving the theoretical system of applied undergraduate education. Through the research in this article, we can deeply understand the ideas of applied undergraduate education. It can also enrich the meaning of applied undergraduate professional abilities. Provide evaluation criteria for the professional abilities and training standards of applied undergraduate students. It also provides valuable theoretical references for teachers' teaching activities in the classroom. Through the research in this article, we can grasp the current status of applied undergraduate vocational ability cultivation in China, and provide valuable theoretical basis for exploring new models of applied undergraduate vocational ability cultivation in the future.

2) Practical significance

(a) Through the research on the cultivation of applied undergraduate professional abilities in this article, the methods and approaches for cultivating applied undergraduate professional abilities are summarized.

Through the research in this article, the problems in the process of cultivating vocational abilities for applied undergraduate students are summarized, and the existing problems are analyzed to identify the root causes of these problems. Finally, develop a solution to the problem. The research results of this article have practical guiding significance in creating conditions for the goals of applied undergraduate education.

(b) Through the research on the cultivation of applied undergraduate professional abilities in this article, feasible improvement suggestions can be provided for the improvement of professional abilities of automation students.

At present, many applied undergraduate colleges and universities do not meet the requirements of enterprises in cultivating students. The employment situation for students remains severe. Many graduating students are unable to adapt to the requirements of corporate job positions. This has led to many companies being unable to find suitable employees and graduates from schools being unable to find suitable jobs. Some students, even if they find a job, resign after not working long hours due to not adapting to the job requirements of the enterprise. Some students even engage in

jobs unrelated to their majors. Through this study, it was found that the reason for this phenomenon is that the vocational abilities cultivated by applied undergraduate colleges do not meet the requirements of the enterprise. Therefore, through this research, we summarize the problems and propose feasible suggestions for improving professional ability cultivation, in order to cultivate more talents that meet the requirements of the enterprise for the automation industry.

Scope and Delimitation of the Study

This study will cover the Beihai Campus of Guilin University of Electronic Science and Technology in Guangxi Zhuang Autonomous Region, China.

Definition of Terms

Professional ability

Professional ability refers to the comprehensive and stable psychological characteristics that individuals must possess when participating in a certain profession. Professional ability is a special ability that differs from general abilities. Practitioners can adapt to changes in professional activities by using their professional abilities, integrating their knowledge, skills, creative abilities, and other aspects to form special abilities. There are many elements that constitute professional abilities, which are formed by the fusion of multiple abilities.

Automation major

The automation major involves many fields. There are many job positions for students majoring in automation after graduation. This major cultivates students to master the design, repair, maintenance, and operation of electronic equipment, electrical equipment, and automated production lines. Graduates majoring in automation are skilled professionals who can proficiently master the basic methods and skills of using automation equipment for processing process design and processing technology.

3. Methodology

Research Design

In this study, descriptive quantitative research methods were used. Use the questionnaire method to obtain useful data, and send the questionnaire to the respondent's mailbox through QQmail. This data collection method relies on the Internet, as long as the investigator is proficient in using the Internet. At the same time, telephone surveys are used as an alternative solution for collecting effective data.

Research Locale

The research location is Beihai Campus of Guilin University of Electronic Science and Technology in Guangxi, China.

Sample and Sampling Design

In this study, random sampling techniques will be used, and respondents will be determined to have internet connectivity and be able to answer relevant questions in the survey questionnaire through QQ email.

Research Instrument

The research tool used in this study is a survey questionnaire, which collects data.

Validation of Data

This research tool has been validated by at least two well-known experts in the field.

Reliability of Data

This study used a questionnaire survey method to conduct a survey on 85 students, investigating the demand of employers for students' professional abilities, investigating the cognitive situation of vocational school students' professional ability cultivation, investigating the actual cultivation of students' professional abilities by schools, and statistically analyzing the results.

Data Gathering Procedure

The collection of these data will be sent to a business leader, teacher, and student through QQ email. They can use their free practice to answer survey questions through email, and then reply through online email. Then collect and analyze the collected data in Microsoft Excel.

Statistical Treatment of Data

The following tools will be used in this article:

Frequency and percentage: These will be used to calculate the proportion of various types of data in the survey questionnaire;

4. Summary of Findings

1) Weak foundation and insufficient emphasis on vocational ability cultivation

The cultivation of students' professional abilities is accumulated through continuous learning and practice, and their professional abilities are influenced by many factors. However, in fact, on the one hand, some higher education institutions do not have a sufficient understanding of the vocational abilities of applied undergraduate programs, and cannot correctly understand the fundamental differences in vocational abilities between ordinary undergraduate programs. As a result, many training programs for applied undergraduate programs are almost identical to those for ordinary undergraduate programs. This makes the professional abilities of practical undergraduate graduates unable to meet the requirements of enterprises, leading to the phenomenon of applied undergraduate students becoming unemployed upon graduation. On the other hand, in recent years, applied education has not attached enough importance to the cultivation of students' professional abilities, and has mainly focused on enrollment and employment management. Insufficient attention is paid to whether students can adapt to their job positions and future career development after graduation, and insufficient emphasis is placed on cultivating professional abilities. Because the school's training objectives are not clear, which has seriously affected the training quality and students' learning motivation. In the survey of 85 students of applied undergraduate majors in an university, the survey

found that only 55.3% of the students have a clear understanding of applied undergraduate majors compared with ordinary undergraduate majors and like their automation majors. Some students studying automation are not studying to improve their professional abilities, but just to graduate normally; Some students even believe that they have not improved their professional abilities at all.

2) Insufficient practical teaching and weak professional abilities of students

The development of new technologies is very fast now, and many new technologies are produced every year. In the context of rapid economic development, various new technologies are developed and applied to every field and every job position. The speed of knowledge updating is very fast. If you want to meet the requirements of the job position, you must strengthen learning, persist in learning, and learn new knowledge. However, through investigation and analysis, it can be seen that many application-oriented undergraduate colleges have outdated talent training plans that do not meet the needs of enterprises and have seriously deviated from their requirements. The training programs of many applied undergraduate colleges have not been updated for many years. Many application-oriented undergraduate colleges focus on theoretical teaching, with little practice in practical teaching, resulting in students not having more opportunities to engage in practical operations and weak hands-on abilities. Through investigation and analysis, it was found that the main reasons for this are as follows.

The school does not have enough space for practical teaching and there are not enough laboratories. The experimental equipment in the school laboratory is limited and outdated, many of which are obsolete equipment by enterprises and do not meet the requirements of practical teaching. In order to better understand the actual situation, this article conducted a survey on automation students in an applied undergraduate university. There are a total of 6 classes in the automation major of this university, with 203 students. Through investigation, it was found that the practice venues of this major are mainly distributed in two teaching buildings. This major has one electrical and electronic laboratory, one microcontroller laboratory, one PLC laboratory, one power electronics laboratory, one electronic training laboratory, and one power drag laboratory. Some laboratory classes cannot meet the requirement of one person with one experimental equipment, and several students share the same experimental equipment, resulting in limited practical operation time for students in experimental classes and a lack of improvement in their practical operation abilities. Even some courses do not have experimental equipment, and teachers use textbooks for theoretical teaching instead of practical teaching. In the survey, 62.3% of students believe that the school's experimental equipment cannot meet the needs of practical teaching, and it is recommended that the school strengthen laboratory construction.

Table 1: Students' opinions on whether the school's professional equipment can meet the practical needs

A. Can meet	9	10.6%
B. Basically satisfied	23	27.1%
C. Unable to meet	46	54.1%
D. Not at all	7	8.2%
Effective questionnaire	85	100%

3) The outdated teaching methods of teachers affect the cultivation of students' professional abilities

Science and technology are constantly advancing, and knowledge is also updated with technological updates. Higher education institutions are places for cultivating highly skilled talents in society. University teachers must constantly learn, update their knowledge, and optimize their teaching methods and methods. Only in this way can we cultivate excellent students and meet the requirements of society. However, due to the rapid increase in the number of students admitted by the school in recent years, the teaching tasks of teachers are very heavy, and the emphasis on cultivating students' professional abilities is not enough. On the one hand, due to limited school funding, there is no arrangement for teachers to participate in training and update new knowledge. On the other hand, teachers have a lot of class tasks and do not have time to participate in training. On the third hand, due to the rapid growth of students in recent years, many new teachers have been recruited, and they lack experience. Due to the above reasons, some schools' teachers' teaching methods and methods are outdated, and students' professional abilities cannot be improved. According to the survey, 69.4% of students believe that the teacher's teaching methods are outdated and cannot meet the requirements of the enterprise. The survey results are shown in Table 2.

Table 2: Whether students think the vocational ability training method is reasonable

A. Very reasonable	5	5.9%
B. reasonable	21	24.7%
C. unreasonable	54	63.5%
D. Totally unreasonable	5	5.9%
Valid questionnaire	85	100%

4) The outdated assessment and evaluation system limits the improvement of students' professional abilities

Course assessment is an essential part of every course and an important method for evaluating students' mastery of course knowledge. Course assessment will promote students' motivation and improve teachers' teaching effectiveness. However, the unreasonable setting of course assessment methods has no promoting effect on students, and on the contrary, it will affect the effectiveness of students. Through investigation, it was found that many application-oriented undergraduate colleges have outdated curriculum assessment systems. Many schools use theoretical assessment as the main assessment method. Due to the examination of theory, the teacher spent a lot of time explaining the theory, and the students also spent a lot of time learning theoretical knowledge. Finally, the students' ability to operate time was not improved. The cultivation direction of applied

undergraduate education should be the cultivation of practical operation ability. This assessment method is seriously inconsistent with the training objectives.

5. Recommendations

This article found through on-site investigation that there are still many problems in cultivating students' professional abilities in applied undergraduate colleges. Applied undergraduate education is an important place for the country to cultivate applied talents, and it is a talent guarantee for the country to achieve modernization development. It is necessary to attach importance to the cultivation of applied talents. In response to the issues raised in the investigation, relevant experts from applied undergraduate universities were requested for assistance. This article combines the relevant opinions of experts and proposes the following suggestions for relevant application-oriented undergraduate colleges and universities to refer to.

1) Develop a reasonable professional training plan

The professional training plan determines the professional training objectives, and all teaching content and links are carried out around the training plan. The training plan plays a very important role in the training system of professional applied talents. Therefore, application-oriented undergraduate colleges must develop reasonable training plans. The goal of applied undergraduate colleges is to cultivate applied talents that meet the needs of enterprises. Therefore, before formulating training plans for applied undergraduate colleges, it is necessary to investigate the needs of enterprises for applied undergraduate talents. The person in charge of the first major leads the professional teacher to conduct on-site inspections in the enterprise to understand what talents the enterprise needs and what technologies students need to master. The person in charge of the second major led the professional teacher to conduct research and inspection in other applied undergraduate colleges. Understand and learn from the training programs of other excellent universities, and learn from their professional construction experience. The third regular follow-up visit is to assess the employment satisfaction of graduates and understand their development in the enterprise. After repeated investigation and research, based on one's own actual situation, develop a practical and distinctive training plan.

2) Emphasize the cultivation of students' professional abilities and construct a "combination of engineering and learning" teaching system

After the development of the training plan, the direction and goals of professional training were determined. The direction and goals of professional training need to be achieved through the development of a teaching system. The teaching system determines the setting of professional courses and the teaching methods and methods of teachers. A good teaching system can stimulate students' enthusiasm and interest in learning. Through investigation and research, as well as expert suggestions, the applied undergraduate professional courses are divided into three major modules:

The first public basic course. The setting of public basic courses needs to be strictly in accordance with the requirements of the Ministry of Education, mainly including courses such as higher mathematics, college English, physical education, Marxism, and Mao Zedong Thought. This part of the course mainly aims to cultivate students' cultural foundation.

Second major courses. The main purpose of setting up professional courses is to cultivate the professional abilities and qualities of applied undergraduate students. So the setting of professional courses should be considered comprehensively in accordance with factors such as the needs of enterprises and the market. The setting of professional courses varies depending on the training objectives. For automation majors, the following suggestions are made for professional courses:

Enterprise course: In order to improve the professional abilities of applied undergraduate students, schools should engage in deep cooperation with enterprises. On the one hand, invite enterprises to school for classes and teach students the skills that enterprises need. This section of professional courses should be jointly discussed with the enterprise. These courses become order courses, and order courses are jointly developed by the school and the enterprise to determine the course content. On the other hand, sending students to enterprises for internships allows them to experience the requirements of enterprise work in advance.

Competition course: There are two main ways to enhance the professional and technical abilities of applied undergraduate students: one is to participate in internships in enterprises; Another is through participating in professional competitions. Participating in professional competitions can consolidate and enhance students' professional skills. Students with competition experience are more likely to find employment after graduation. Therefore, competition courses should be established to enhance students' competition skills and also enhance their employment skills.

Module courses: Module courses are designed to expand majors and prepare students for cross disciplinary employment after graduation.

The third practical course. The main purpose of this type of curriculum is to enhance students' hands-on operation ability. Different majors have different requirements for students' skills and operations, so courses should be set according to the characteristics and needs of the major.

3) Improve the hardware construction of practical teaching and increase the proportion of practical teaching

On campus training base: The on campus training base mainly includes the construction of in class laboratories and on campus training rooms. The construction of in class laboratories mainly refers to the laboratories used for experiments in each course. In order to help students better understand the theoretical knowledge of the course,

experimental courses should be offered for each course. If conditions permit, all courses should be arranged in the laboratory for teaching. After the teacher has explained the theory, practical operations can be carried out in the laboratory. Deepen theoretical understanding through practical operations. Experimental operations are a basic requirement for applied undergraduate programs, so it is necessary to ensure that each course is a corresponding laboratory and that experimental equipment meets teaching requirements.

Off campus training base: In order to enhance students' professional abilities, it is not only necessary to cultivate them within the school, but also to send them to enterprises for training. Familiarize students with the technical requirements of enterprises. The learning objectives of students will be more clear.

Based on the actual needs of students in different majors for practical teaching, we will choose units with good working environments to cooperate with the school, establish off campus training bases, and provide a platform for students' practical teaching. In the process of building off campus training bases, it is necessary to comprehensively consider various factors to ensure that the practical teaching effect meets the requirements. Establish a long-term operational development mechanism, clarify the main teaching content of practical training projects, reasonably expand cooperation areas, and provide guarantees for the cultivation of students' comprehensive professional abilities. The school also needs to provide necessary financial support for the operation of the platform.

4) Optimize assessment methods

Breaking the traditional assessment and evaluation method of "one test paper, two hours, 60 minutes", fully utilizing the educational, guiding, and guiding role of assessment and evaluation in teaching and talent cultivation, reflecting the pertinence, timeliness, and creativity of teaching; Establish an assessment and evaluation system that emphasizes both job abilities, knowledge, and skills; According to the nature and characteristics of different courses, a diversified assessment and evaluation plan is adopted, including project assessment, experimental design, course design, practical creation, hands-on operation, simulation projects, and vocational skill identification. For example, the "Electronic Circuit CAD" course decomposes engineering projects and subject competition circuits into several projects and integrates them into course teaching from simple to deep, Each project is a complete engineering project in teaching: schematic drawing-PCB layout and wiring-circuit board production-circuit board debugging. Each project has four parts that are assessed and summarized to obtain the assessment results of the project. Finally, the comprehensive

assessment results are calculated proportionally for each project.

References

- [1] Ministry of education Opinions on comprehensively promoting quality education and deepening the teaching reform of secondary vocational education [Z].2000-3-21
- [2] Ministry of education Opinions on adjusting the layout and structure of secondary vocational schools Jiao Zhi Cheng [Z] No.3.1999-9-9
- [3] S. rasek, G. vidinu Global outlook for the development of educational content from now to 2000 [M] Beijing: Department of Education Science Press, 1996, 2: 214
- [4] Shi Weiping Comparative vocational and technical education [M] East China: East China Normal University Press, 2001 (3): 294-301
- [5] Jiang Dayuan New research on Vocational Pedagogy [M] Beijing: Educational Science Press, 2007
- [6] Huang Guoqing, Cao Yanyan Discussion on the connotation of students' professional ability in Higher Vocational Education [n] Journal of Jiangxi Agricultural University 2002 (12) : 132-133.
- [7] Cheng Fangping Report on China's education [ml. Beijing: China Social Sciences Press, 2002 (5): 145-146
- [8] Shao Ni Investigation and Countermeasures of secondary vocational students' employment status-- Taking mechatronics technology as an example [D] Master of Science Three papers School of Educational Sciences, Ludong University, April 2015
- [9] Liu Chunsheng Edited by Xu Changfa Vocational Education [M] Educational Science Press, 2002: 149-151
- [10] Hartig J, Klieme E. Kompetenz and Kompetenzdiagnostik. In: Schweizer, K. (Hg.): Leistung und Leistungsdignostik. Berlin: Springer, 2006 : 127-143.
- [11] Gu Mingyuan, Liang Zhongyi World education Encyclopedia-Vocational Education [M] Changchun: Jilin Education Press, 2000
- [12] Zhang Mingfang, Jing Xiangdang Characteristics and Enlightenment of Foreign Higher Vocational Education Examination [J] China Metallurgical Education, 2004 (3) : 51.
- [13] Li Defang, Kuo Hyun Yuan Teng On the investigation of vocational ability development universities in Japan [J] Vocational and technical education.2002.65-67.
- [14] Bai Wei Impression and Reflection on American Higher Vocational Education [J] Journal of Liaoning Vocational College of business, 2001 (1)
- [15] Wang Yanlin British Vocational Education and new professionalism [J] Foreign education research, 2000 (2): 23-24