Investigation and Analysis of Internship Management of Students in Higher Vocational Colleges based on PDCA Theory

Ling Bai[a,*], Likui An[b]

College of Education, Jiangxi Normal University of Science and Technology, Nanchang Jiangxi, China

[a]504840792@qq.com, [b]249853078@qq.com

*Corresponding author

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Abstract: Internship is an important way to cultivate and improve students' practical ability and professional quality in higher vocational education.Based on the well-known PDCA theory in management, this study compiles survey tools, selects 300 students from five high vocational colleges in Jiangxi as samples to investigate the current situation of student' internship management in high vocational colleges.Through investigation and analysis, it is found that the planning and preparation work before the internship in higher vocational colleges is not in place, the inspection management during the internship is not standardized, and the improvement and optimization after the internship is almost vacant.In view of the existing problems, this paper puts forward some countermeasures to optimize the internship management of higher vocational colleges from the aspects of management objectives, management process, and management guarantee conditions, so as to improve the quality of technical and skilled personnel training in higher vocational colleges.

1. Introduction

Internship has become a key factor in the higher vocational education and is the indispensable way to improve the students' vocational quality and skills[1]. The success of the students' internship assumes today a core mission in the future professional career of students[2]. At the same time,it is also one of the key factors to promoting the sustainable development of the society and the economy[3]. In 2021, the Ministry of Education and eight other departments issued a notice on "the Regulations on the Internship Management of Students in Vocational Schools",aiming to standardize the internship management of vocational school students and improve the quality of internship management.Internship has brought great problems to the management of vocational colleges. How to choose an appropriate and efficient management to carry out internship management has become a problem that must be considered and worth studying.From the existing research results, internship management is a hot research topic. The research field mainly focuses on the mode, problems and countermeasures of internship management, and few literature conduct theoretical and empirical research from the perspective of management.

PDCA theory is a general model in management and is widely used in total quality management (TQM). It reveals the principle of continuous quality improvement, indicating that any successful management must go through "PLAN""DO""CHECK""ACTION"(PDCA) four stages, and the four stages cycle back and forth in a spiral.The PDCA theory has been widely used in business management, medical management, technology management and other fields. In recent years, there are more and more applications in college management, mainly in teaching quality management, employment management and so on.

This study attempts to take PDCA as the theoretical basis, selects five higher vocational colleges as the research objects, and adopts self-compiled questionnaires, aiming to find out the current situation of student internships in higher vocational colleges, and to detect the problems existing in the management of student internships in higher vocational colleges, and then analyze its causes and try to put forward corresponding improvement suggestions.

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2. Survey design of internship management of students in higher vocational colleges based on PDCA Theory

2.1. Objects of investigation

A sample of 300 students from five high vocational colleges in Jiangxi were selected.A total of 278 valid questionnaires were collected.The details of the valid samples are shown in Table 1.

Table 1 Basic information list of valid samples.

Demographic variables	Category	Number of people	Percentage (%)	Total
gender	male	165	59.1	278
	female	114	40.9	
birthplace	city	118	42.3	278
	rural	161	57.7	
profession	application of electronic technology	60	21.5	278
	accounting by electronic data processing	59	21.1	
	numerical control technique	52	18.6	
	tourism management	59	21.1	
	physical distribution management	49	17.6	

2.2. Tools and methods of investigation

This study mainly used self-made questionnaires to conduct questionnaire survey.Firstly, classify and sort out a large amount of information obtained from literature research and qualitative interviews, form a questionnaire survey project, and initially compile the "Questionnaire on the Current Situation of Student Internship Management in Higher Vocational Colleges", and then carry out test and revise the questionnaire. The final questionnaire consists of three dimensions, that is, the management before the internship (P stage), the management during the internship (D and C stages), and the management after the internship (A stage).The reliability and validity of the formal test questionnaire both has met the statistical requirements.

3. Survey results of internship management of students in higher vocational colleges based on PDCA Theory

3.1. Investigation results and analysis of the basic situation of students' internship management in higher vocational colleges

The survey content of the basic situation of student' internship management in higher vocational colleges mainly comes from the "the Regulations on the Internship Management of Students in Vocational Schools" newly issued by eight departments including the Ministry of Education, which aims to find out whether higher vocational colleges strictly manage student internships in accordance with national requirements.The specific content includes the selection method of the internship company, the signing of the tripartite internship agreement, the length of the internship, the degree of the counterpart of the internship major, and the writing of the internship plan. The specific survey results are shown in Table 2.

It can be seen that 95% of the students are arranged by the school, and the remaining 5% of the students find the internship companies by themselves.This practice does not violate the regulations of the Ministry of Education. "The Regulations on the Internship Management of Students in Vocational Schools" allow students to go to companies (enterprises) for internships on their own with the approval of vocational schools.However, vocational schools, internship companies and students are required to sign an internship agreement.According to the survey results, 97.1% of the students have signed the tripartite internship agreements, but they still need to be strengthened to ensure the full coverage of the signed agreement area, so as to avoid the risks caused by the students without any other legal, medical treatment and other guarantees during the internship.The arrangement of internship time in most higher vocational colleges is in line with the regulations and

can ensure the development of practical education and teaching activities.However, 67.4% of students have internship positions that do not fully match their majors, which is not conducive to the cultivation of students' professional skills.In the writing of internship plans, internship logs and internship summary reports, more than 90% of the students have done it, which shows that higher vocational colleges have requirements for this.Among them, the writing rate of the internship summary report after the internship is the highest,while relatively few students insisted on writing the internship log.

Table 2 The survey results of the basic situation of students' internship management in higher vocational colleges.

Item	Option	Frequency	Effective percentage	Cumulative percentage
selection method of the internship company	school arrangement	265	95.0	95.0
	by yourself	14	5.0	100.0
signing of the tripartite internship agreement	yes	271	97.1	97.1
	no	8	2.9	2.9
length of the internship	1-3 months	20	7.2	7.2
	4-6 months	17	6.1	13.3
	7-9 months	221	79.2	92.5
	10-12 months	17	6.1	98.6
	more than one year	4	1.4	100.0
degree of the counterpart of the internship major	not counterpart completely	5	1.8	1.8
	not, but related	50	17.9	19.7
	yes,but not exactly the same	133	47.7	67.4
	complete counterpart	91	32.6	100.0
writing of the internship plan	yes	258	92.5	92.5
	no	21	7.5	100.0
writing of the internship log	yes	26	9.3	9.3
	no	253	90.7	100.0
writing of internship summary or internship report	yes	270	96.8	96.8
	no	9	3.2	100.0

3.2. Descriptive statistics of students' internship management in higher vocational colleges

Table 3 lists the minimum value, maximum value, mean value and standard deviation of the sample on the three factors of the "Questionnaire on the Current Situation of Student Internship Management in Higher Vocational Colleges". From this it can be found that:

Table 3 Descriptive statistics of students' internship management in higher vocational colleges.

	N	Min	Max	M	SD
P stage	279	1	5	3.05	0.79
DC stage	279	1	5	3.45	0.83
A stage	279	1	5	3.81	0.83
Total questionnaire	279	1	5	3.40	0.77

First, on the whole, the stakeholders of internship management in higher vocational colleges are also the most important management objects, students, have a high evaluation of internship management of higher vocational colleges, and the average value of the total questionnaire is 3.4, which is higher than the middle level of 3.

Second, from the point of the average of all dimensions, the score after the internship management (A stage) is higher than the internship management (DC stage), the score before the internship management (P stage) is the lowest , which shows that in the whole process of student internship management, higher vocational colleges have done the best job of summarizing the students' practice after practice, while the planning and preparation work before the internship is relatively lacking.But,judging from the three items A1, A2, and A3 in A stage, the management after the internship of higher vocational colleges mainly focuses on the summary and communication

work, and does not involve improvement work.

3.3. Difference analysis of students' internship management in higher vocational colleges under different selection methods of the internship companies

Although "the Regulations on the Internship Management of Students in Vocational Schools" pointed out that " students can go to companies(enterprises) to carry out practical education and teaching activities for professional skills training by vocational schools or with the approval of vocational schools,according to the requirements of professional training objectives and the arrangement of talent training programs", school arrangement and self-seeking of two different ways of choosing internship companies will lead to differences in the management of student internships in higher vocational colleges, and the management status will also change accordingly.In order to clarify this issue, this study conducted independent sample t-tests on the three dimensions of student internship management in higher vocational colleges according to the different ways students choose internship companies. The results are shown in Table 4.

Table 4 Differences of students' internship management in higher vocational colleges under different selection methods of the internship companies.

Dimension	Selection method of the internship company	N	M	SD	t	Sig.(2-tailed)
P stage	school arrangement	265	3.10	0.77	4.47**	0.00
	by yourself	14	2.18	0.66		
DC stage	school arrangement	265	3.48	0.82	2.56*	0.01
	by yourself	14	2.91	0.73		
A stage	school arrangement	265	3.86	0.78	3.88*	0.02
	by yourself	14	3.00	1.17		

*P<0.05，**P<0.01

As can be seen from the table, the Sig.(2-tailed) is less than 0.05.This shows that there are significant differences in the management status of students in higher vocational colleges before, middle and after the internship under different selection methods of internship companies.Judging from the M of school arrangement and self-seeking, the M of school arrangement is higher than self-seeking in three dimensions.This is mainly due to the fact that the internship companies that students seek by themselves are not within the scope of the management of higher vocational colleges, and higher vocational colleges cannot manage them effectively. Naturally, the quality of student internships cannot be guaranteed.

3.4. Difference analysis of student’ internship management in different majors in higher vocational colleges

Different majors have different methods for students' internship management in higher vocational colleges.This study selects several major categories with large heterogeneity among the survey objects, and compares and analyzes the internship management status of higher vocational colleges, trying to understand the differences in the internship management of students in different majors.The results are shown in Table 5.

According to Table 5, the F of the five majors in the "P stage" is 27.39, and the Sig. is 0.06, or P> 0.05, indicating that there is no significant difference between the five majors in the management before the internship in higher vocational colleges.That is to say, before the internship, higher vocational colleges have made the same internship plan and internship mobilization for the students of these five majors.However, the Sig. in the "DC stage" is 0.00, or P <0.01, indicating extremely significant differences in the management of the five majors in higher vocational colleges.And the Sig. in the "A stage" is 0.03, or P<0.05.Combined with LSD, we can know that in the process of student internship, the internship management for majors with strong professional technology is significantly better than that of majors with low technical skills requirements.

Table 5 Differences of students' internship management in different majors in higher vocational colleges.

Dimension	Major	N	M	SD	Sig.	F	LSD
P stage	accounting by electronic data processing	59	3.64	0.54	0.06	27.39	n.s.
	application of electronic technology	60	2.79	0.70			
	numerical control technique	52	3.47	0.68			
	tourism management	59	2.61	0.69			
	physical distribution management	49	2.77	0.74			
DC stage	accounting by electronic data processing	59	4.08	0.52	0.00	42.43**	A>B,A>D,A>E,B>D,B>E,C>D,C>E
	application of electronic technology	60	3.52	0.66			
	numerical control technique	52	3.89	0.56			
	tourism management	59	2.74	0.76			
	physical distribution management	49	3.02	0.74			
A stage	accounting by electronic data processing	59	4.32	0.54	0.03	21.54*	A>B,A>D,A>E,B>D,C>B,C>D,C>E,E>D
	application of electronic technology	60	3.58	0.88			
	numerical control technique	52	4.22	0.79			
	tourism management	59	3.26	0.69			
	physical distribution management	49	3.73	0.67			

n.s.P>0.05, *P<0.05， **P<0.01

Notes: A is accounting by electronic data processing, B is application of electronic technology, C is numerical control technique,D is tourism management,E is physical distribution management.

3.5. Differences in satisfaction of students of different genders with internship management in higher vocational colleges

Table 6 shows that there are significant differences in student gender on internship management satisfaction in the "A stage"(Sig.=0.003 <0.01).In terms of M, males have higher evaluations and are more satisfied with the management after internship in higher vocational colleges.However, in the "P stage" and "DC stage" , there is no significant difference between males and females, indicating that male and female students have relatively consistent evaluations of the management of high vocational colleges before and during the internship.

Table 6 Differences in satisfaction of students of different genders with internship management in higher vocational colleges.

Dimension	Gender	N	M	SD	t	Sig.(2-tailed)
P stage	male	165	3.48	0.75	1.05	0.27
	female	114	3.36	1.03		
DC stage	male	165	3.90	0.86	1.42	0.16
	female	114	3.75	0.97		
A stage	male	165	4.10	0.86	3.04**	0.00
	female	114	3.76	0.95		

**P<0.01

3.6. Differences in students' satisfaction with internship management in higher vocational colleges from different birthplaces

It can be seen from Table 7 that there are significant differences in the satisfaction of students from different birthplaces in the three dimensions of internship management in higher vocational colleges.According to the M, students from cities are significantly less satisfied with the management of high vocational colleges before, during and after internships than students from rural areas. This shows from the side that urban students have higher requirements for internship

management in higher vocational colleges.

Table 7 Differences in students' satisfaction with internship management in higher vocational colleges from different birthplaces.

Dimension	Birthplace	N	M	SD	t	Sig.(2-tailed)
P stage	city	118	2.92	0.66	9.68**	0.00
	rural	161	3.81	0.83		
DC stage	city	118	3.32	0.85	9.29**	0.00
	rural	161	4.22	0.76		
A stage	city	118	3.34	0.69	12.08**	0.00
	rural	161	4.42	0.77		

***P<0.01*

4. Conclusion and Recommendations

4.1. Conclusions

Through the above investigation and analysis, it is found that there are questions about the internship management of students in higher vocational colleges:at present, the planning and preparation work before the internship is not in place, the inspection management during the internship is not standardized, and the improvement and optimization after the internship are almost vacant; higher vocational colleges have different management methods for students of different majors,and pay more attention to majors with strong professional skills, but less attention to majors with lower technical skills requirements.Students of different birthplace and different gender have quite different satisfaction with internship management in higher vocational colleges.

4.2. Recommendations

Based on the comprehensive investigation and analysis of the current situation of students' practice management in higher vocational colleges, we put forward the following countermeasures to optimize practice management in higher vocational colleges from the aspects of management objectives, management processes, and management guarantee conditions based on PDCA theory. That is to clarify the direction and establish a perfect internship management target system; emphasize the process and effectively manage the whole process of students' internship; improve the conditions, strengthen the guarantee of internship management in higher vocational colleges, and improve the satisfaction of different students with internship management, thereby improving the quality of technical and skilled personnel training in higher vocational colleges.

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