

Exploration and Application of AAR in Practical Teaching of Higher Vocational Education

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Abstract. This paper aims to explore effective ways to improve the quality of practical teaching in higher vocational education, the capabilities of practice and life-long development of students in China. Through extensive research, this paper analyzes problems in practical teaching of higher vocational education in China. On the basis of studying the process improvement methods commonly used by enterprises [1-3], this paper creatively introduces After Action Review (AAR) into practical teaching in domestic higher vocational colleges. Applying this method to the course of "Integrated practice of Network Services", as shown in Table 3, students can improve their shortcomings in practice. Teaching practice shows, AAR is conducive to cultivate the talents with strong practical ability and sustainable learning and development capabilities under the historical background of "combining learning with working, and integrating of production, education and research" as shown in Table 4.

Introduction

Higher vocational colleges are the cradle for cultivating technical and applied talents. Improving the quality of practical teaching is an important foothold and breakthrough for higher vocational colleges to further promote education and teaching reform in the new era. Domestic higher vocational colleges have introduced advanced practical teaching concepts abroad, such as German "Dual System", Canadian Competency Based Education (CBE) Model and Australian Technical And Further Education (TAFE) Institute [4]. But due to differences in teaching concepts and economic development, colleges can only explore methods and patterns that meet China's national conditions and student learning conditions on the basis of reference.

The following problems commonly exist in practical teaching of higher vocational education in China. First, the practical teaching effect is not good and students' practical ability has not achieved a qualitative leap [5]. Second, students lack teamwork ability leading to insufficient communication and collaboration among practice team members which is not conducive to follow-up career development [6]. Last but not the least, due to lack of summary, the knowledge and skills gained in practice are quickly lost after practice. Sustainable learning and development ability of students are poor.

On the basis of domestic and foreign research both in colleges and in enterprises, combining the learning conditions of students in higher vocational education in China, this paper creatively proposes the introduction of AAR into practical teaching. AAR is a kind of lightweight team conversation meeting which was first used for transferring experiences and improvement methods after a task by U.S. Army. In practical teaching, teachers and students can conduct AAR after every practical course to clearly know what the practice goal is, whether the practice goal is achieved, what happened during the course, why it causes a gap, what they learned from the course and how to do next time. Through a structured process, experience can be closed loop and applied rapidly as well as experience transfer and precipitation can be realized [7]. AAR can effectively solve the above problems in practical teaching of higher vocational education.

This paper is mainly divided into two parts: firstly, explores the feasibility of introducing AAR into practical teaching in higher vocational education; secondly, discusses how to apply AAR in the

practical teaching and the application effects. In the summary, this paper will give a conclusion and suitable scenarios of AAR.

The Exploration of Introducing AAR into Practical Teaching in Higher Vocational Education under the Background of College-Enterprise Cooperation

As is stated above, practical teaching in higher vocational education has a list of problems such as poor practical teaching effect, lacking of teamwork ability and sustainable learning and development ability among students. Introducing AAR into practical teaching means that after a task in practice, students in one team will have a formal or informal meeting to enable participants to discover what happened, why it happened, how to maintain it, and improve its shortcomings. To study the applicable and not applicable situations of AAR in the table 1, this paper obtains a conclusion whether AAR can be successfully implemented in higher vocational education.

Table 1. Applicable and not applicable situation of AAR

	Applicable	Not Applicable
Situations	I. A task, event, or activity has just been completed; II. The activity is routine or repeated; III. The activity has measurable goals, clear starting and ending points, and measurable results; IV. Can clearly identify the gaps between expectations and realities; V. Promote team growth through group learning, enriching the experience and knowledge of team members; VI. No need for deep analysis.	Long-term, complicated tasks like a project

Applying AAR for improvement can clearly identify the gaps between expectations and realities and can help teachers and students to improve the practical effect. Through self-summarization and improvement, students can enhance sustainable learning and development ability and establish the ideology of lifelong learning. Team-based AAR can promote team growth and teamwork ability of team members. Therefore, it is necessary to introduce AAR into practical teaching of higher vocational education.

In addition, in higher vocational colleges, practical courses and theory courses process alternately which means one practical course only completes a small task and lasts ninety minutes. Students basically take practical courses every week. The form of teamwork is widely used in practical courses. These characteristics are in line with the applicable situations of AAR; therefore, AAR can be implemented in practical teaching of higher vocational education.

The Application and Effects of AAR in Practical Teaching in Higher Vocational Education

AAR has five basic questions and structured process as shown in Table 2.

Table 2. The basic process of AAR

Before the Meeting	During the Meeting		After the Meeting
Planning and Preparation	AAR Meeting		Follow up and Share
Who What When Where How long	1. What we originally expected to happen?	2. What actually happened?	Take action Share experience
	4. What will we do next time?	3. Why is there a difference? What have we learned from it?	
4W and 1H	Structured Process		Two Closed-loop Actions

Take the practical course “Building Domain Name System (DNS) Server” for example, before AAR meeting, organizer (when first organizing AAR, teachers can act as organizers) should plan and prepare the meeting from 4W and 1H. 4W includes who, what, when and where. “**Who**” means the participants of AAR; usually, participants are team members and others who are interested in the tasks. In practical teaching, participants include students who just complete building DNS server. “**What**”

means the topics of AAR, in this case, the topic can be set as “AAR for Building DNS Servers with low efficiency and errors”. From the applicable situations of AAR, we know that the best time to conduct AAR is **when** a task has just been completed. “**Where**” means the location of AAR and the best place is a quiet place with a blackboard or whiteboard, so a classroom with a blackboard is recommended. 1H means **how long** the AAR meeting lasts, from fifteen minutes to one hour recommended.

After early preparation, AAR meeting can be performed. A guide asks the five questions one by one and the participants discuss one issue at a time. When first organizing AAR, teachers can act as guides; and when students can master this method, any team member can act as guide. Discussion of the first and second questions takes 25% of the whole time, the third and fourth questions takes 50% of the time and the fifth question takes the remaining 25% of the time.

The first question “What we originally expected to happen?” asks the purpose and goal of the tasks and help students clearly know about the goal of practice and help them to set reasonable goals in future study and work. **The second question** “What actually happened?” asks what tasks were actually completed. This question lets students see the gaps between expectations and realities. **The third question** “Why is there a difference?” helps students understand what causes these particular results and cultivates students' ability to analyze problems and focus on the most important issues. **The fourth question** “What have we learned from it?” makes students to learn to summary and improve; moreover, when students do the similar tasks, they will know what to persist and what to change. **The fifth question** “What will we do next time?” proposes improvement suggestions, implement responsible persons and completion deadline. During the AAR meeting, a record should be output as shown in Table 3.

Table 3. The output of AAR

AAR Name	AAR for Building DNS Servers with Low Efficiency and Errors			
AAR Time	June 2nd, 2017 13:00-14:00			
AAR Background	In the practical course of “Building DNS Server”, 53% of the students fail to complete practical tasks on time and the built DNS servers of 35% of the students cannot be used normally.			
Organizer	Xin ZHANG			
Particapants	Xin ZHANG, Zheng LIU, Si LI, Wu WANG and Liu MA			
Guide	Zheng LIU			
The Record of AAR				
Team Goals	Goals Achievement Situation	Analysis Gaps	Improvement Suggestions	Responsible
1. Complete building DNS Server on time; 2. The built DNS Server can be used normally; 3. Master the method of building DNS server and can build it independently.	1. 53% of the students are fail to complete building; 2. The built DNS servers of 35% of the students cannot be used normally; 3. 92% of the students cannot build DNS Server independently without Instruction Manual.	1. Theoretical knowledge is not solid and do not understand the principle of DNS server; 2. The practical environment is not ready and Windows Server 2008 Servers are not installed first; 3. The division of team members is not clear.	1. Before practical course, seriously study theoretical knowledge;	Everyone
			2. Prepare the practical environment in advance according to practical requirements;	Environmental Director: Si LI
			3. Clear division according to team members' wishes and abilities.	Team Leader: Liu MA

After AAR meeting, team members should take actions according to the improvement suggestions and share the experience each other.

Table 4 shows the benefits achieved after introducing AAR into practical teaching.

Table 4. The practical teaching situation before and After AAR and the benefits of AAR

Before introducing AAR	After introducing AAR	The benefits of AAR
The practice goals are too large or too small	The practical goals are reasonably set	The practical goals are easy for students to implement
The practice tasks are not completed in time	The practice tasks are completed on time	Quickly complete the practical content
Students passively accept practical tasks	Students take the initiative into practice	Enhance the students' initiative
Team members communicate less	Team members communicate effectively	The spirit of teamwork enhances
The good practical methods have not been summarized	The good practical methods have been accumulated	The experience has been transferred and precipitated
Insufficiency has not been improved	Insufficiency has been kept improved	The practical teaching effects are getting better

As can be seen, introducing AAR enhances the students' initiative and teamwork, makes students complete the practical content with high quality and high efficiency, improve the teaching effects and improve the sustainable learning and development ability of students.

Summary

This paper creatively introduces AAR method of enterprises into practical teaching in higher vocational education. AAR can help teachers improve practical teaching effects and help students enhance teamwork and practical technology. AAR should be used when a task is just completed and it can be regarded as a team activity as well as an individual activity. After an individual completes any job, he can do AAR to continuous improvement. The sustainable learning and development ability can be established and improved in this process.

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