

## The research and exploration of decentralized practical learning model

Tianyu Li

School of Computer Science and Technology, Changchun Institute of Technology, Jilin 130012, China;

986702937@QQ.com

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**Abstract.** Limited teaching hours can be a common problem in practical learning in colleges. This paper tries to analyze the reasons and the influence of this problem in the teaching of college courses. It puts forward the suggestions of using decentralized practical learning model and broadening time range, which can solve the problem of curriculum-hour-limitation. The research has improved the quality of practical learning in some aspects.

### Introduction

Practical learning is an effective way to consolidate and deepen the understanding to the theory. It's a momentous step to foster high-quality talents [1]. All of the practical learning projects include time schedule to arrange practical learning curriculum. But there are differences depending on subjects. Some subjects can't get good practical effect due to the curriculum-hour-limitation. The article discusses a decentralized practical learning model which aimed at improving the poor teaching quality due to the curriculum-hour-limitation and put forward a new method to solve it.

### The actuality and issue of practical learning

The practical learning of one course is divided into two types: The first is in-Curriculum experiment which is a base for the students to learn theoretical knowledge and helps them to understand the knowledge taught on the theoretical Curriculum. The second is Curriculum design, which helps you to design or solve problem by making use of the whole Curriculum knowledge [2]. The Curriculum design continues for one week without any other teaching activities.

Many practical learning researches focus on teaching methods and skills. To improve the quality of practical learning, the investment is increased, many advanced laboratories are built, and the percentage of practical learning is added. But some courses aren't ideal enough.

Of all the elements effecting practical learning qualities, the course hour is a key factor. According to the research, the poor practical learning quality due to Curriculum-hour-limitation is not unique. In recent years, the college pays more attention to practical learning. The percentage of practical learning curriculum hour of many courses will be increased gradually.

Usually, there're 30 – 40 students in every Curriculum; of course, some good professions have more of them. In practice-teaching, two guide teachers are needed at most. In such situation, it's no problem to do some simple experiments, but it's not so easy for the teachers to know whether all of their students practice well if the experiments and Curriculum designs are complicated. The teacher often helps students only when they have some questions. However, things go wrong once the students don't ask questions actively, or the teachers don't have enough time to check all of their practice. Students used to hand in their study results and reports at the final examination, under the way of centralized-weeks' practical learning. In this way, even if the teacher checks out some questions, the students can not get the feedback in time. Thus, the students' practical ability cannot be really improved.

Especially in some design courses, for example, architectural design, industry design, software design, and costume design, etc. During the teaching time, students can't penetrate into design theory, techniques, and methods, because they are still in the learning stage. In the meantime, from the perspective of study law, students always find it difficult to make a proper and correct project in a

short time, because they need much more time to understand and then digest what they've learned, so that they are supposed to do the research, to revise again and again, and to perfect it. The span of centralized-weeks' time is so narrow that the students even have no time to deeper think or correct. As a result, the centralized practical learning mode doesn't apply to these courses at all.

### Decentralized practical learning

After the research and analysis, other questions would be solved or mitigated if Curriculum hours' restriction could be dealt with. Actually, the real way to improve the quality of practical learning is to make it without relying on increasing the proportion of practical Curriculum hours largely. The decentralized practical model mentioned in this article aims to solve the problems of Curriculum hours' restriction without increasing the practical hours. Here are the specific ways to centralize the whole part of practice as same as theory in the whole Curriculum hours. As an illustration, suppose that there're 24 practice hours of a course, and the Curriculum can be divided into 6 weeks, 4 hours per week; or for 4 weeks, 6 hours per week. To differ from centralized practical learning, we can call it decentralized teaching pattern. Now, let's probe into it.

**A decentralized model of practical learning's features.** The innovation of this model is dispersing concentrated practical education hours, the greatest feature of this model is increasing time span. According to the methods above to arrange, then time span will be increased 3 times to 5 times. If there are three concentrated weeks, the decentralized arrangement of teaching practice is 9 times to 15 times and even throughout all the term. Chart 1 is a comparison diagram for two practical learning's methods to time span.

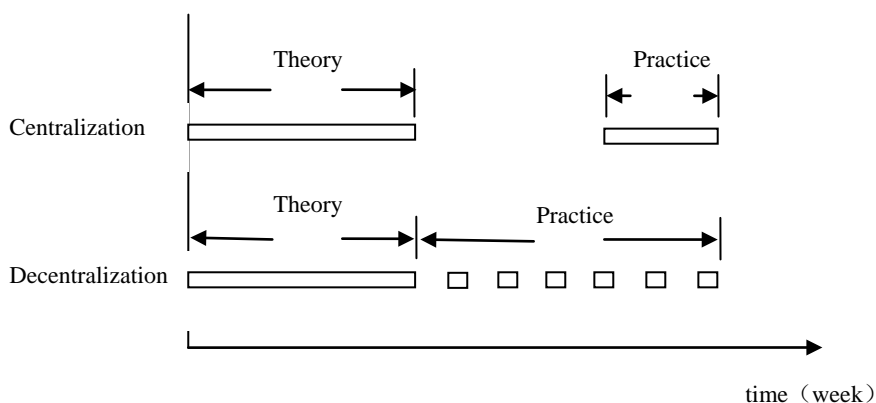


Chart 1. a comparison diagram for two practical learning's methods to time span

**A decentralized model of practical learning's advantages.** Using decentralized practical learning model can solve hour-limitation problems effectively; meanwhile, it finds the solution to other problems for adopting a decentralized model of practical learning. This model's advantages can be summed up in five points:

It can guarantee teacher's guiding time and there are some inevitable problems appearing in students' practice under a decentralized model of practical learning. While under a concentrated model of practical learning, it is hard for teachers to guide and check the whole students' practice situations in short time because of limited hour and time span. Adopting the method of time dispersion and increasing time span provide enough time for teachers and students to communicate. And teachers have enough time to check and find problems, correct students' mistakes and deviation and the accumulation and expansion of problems can be avoided.

Students have the time to correct mistakes. According to progressive study regular patterns, as the students' in-depth understanding of the problems and practices, a mass of problems will appear in the middle and later period of practice process. In a concentrated model of practical learning, if a big problem and mistake was found in the middle and later period and the former content was needed to be altered. Perhaps there is one day or two left so that not enough time to correct, then it will decrease

the quality of students presenting results. To adopt the method of time dispersion, in the middle and later period of practice process, but it will be left one week or two of the rest time, then there are enough time. Not only guarantee quality but also make students completely grasp knowledge and draw lessons.

Hours' arrangement is flexible. A concentrated model of practical learning's time is fixed relatively. A decentralized model is more flexible, weekly hours can base on course's feature and specific teaching situation to arrange. It not only can be arranged after the end of theory course but also can start after a few weeks later of theory course's beginning .Ever week's hours can be arranged continuously or it can be arranged separately. The way of dispersing first then concentrating can be adopted.

Practice subjects are more extensive. Practice contents and subjects are set according to the aim and time of practice .For the limitation of Curriculum hours, the subjects which have big workload and great difficulties can not be arranged .Using the way of decentralization can improve this situation, for the increase of time span, it can bring students some subjects which have much bigger workload and greater difficulties and get much closer to the actual.

Improve the way of examination. Centralized course designs always take the methods of delivering outcomes, reporting and making a reply in the end to carry out examination. With the methods of decentralization, teachers can make use of the time in Curriculum to make a reply in stages and also students can make use of the time after Curriculum to accomplish design results, which equals to homework. In this way, the scores of examination become more reasonable and exact.

**The disadvantages of decentralized practical learning pattern.**This kind of practice pattern breaks the continuity of practice while increasing the span of time at the same time, and the whole process of practice is discontinuous. It will make a difference to some subjects' contents which need to study, research and operate continuously.

**Applicability.** Decentralized practical learning pattern mainly applies to designed and comprehensive practice. But for operational and verified practice, it's not suitable. For example, production practice for machinery major or social practice which needs students to their company to practice doesn't apply to this pattern.

## **Results of research and exploration**

After researching on practical learning pattern for a period, this kind of decentralized practice pattern was firstly used in the course, software engineering, in 2009. Here are some specific practice situations:

The practical learning pattern on software engineering in the past usually took the following two methods: the first is in- Curriculum experiment, for example, 38 Curriculum hours in theory Curriculum and 10 Curriculum hours in experiment Curriculum are all concluded in the total Curriculum hours, they're 48 Curriculum hours; the other is taking the way of course design, after accomplishing the theory Curriculum, there would be another course design for two weeks arranged. But the teaching effects of the two days above were all not ideal.

Decentralized practical learning pattern has been taken. Theory teaching is used with 40 Curriculum hours and 28 Curriculum hours of practical learning is divided into seven weeks, four Curriculum hours a week .The same as normal in- Curriculum assignments, teaching theory course and submitting design results in stages will be arranged first and then it's practical learning .and the time in Curriculum can be used to make a reply in stages. The methods of group design, group confrontation and agile development and so on were taken in the process of practical learning. During segmented plea, students were required to introduce group design results to all classmates.

When new pattern is taken, the results' quality submitted improved clearly .Because every stage has gotten check and control, the design results whose quality is much worse will not appear. Some students also have many changes after practice. They had a strong interest in practice and also they can think deeply. When there is a discussion in the group and therefore many students can express their own opinions actively. Teachers and students communicate more, which clearly reflects on test

scores. Chart 2 shows students' scores analysis in the test of software engineering course and histogram of scores contrast.

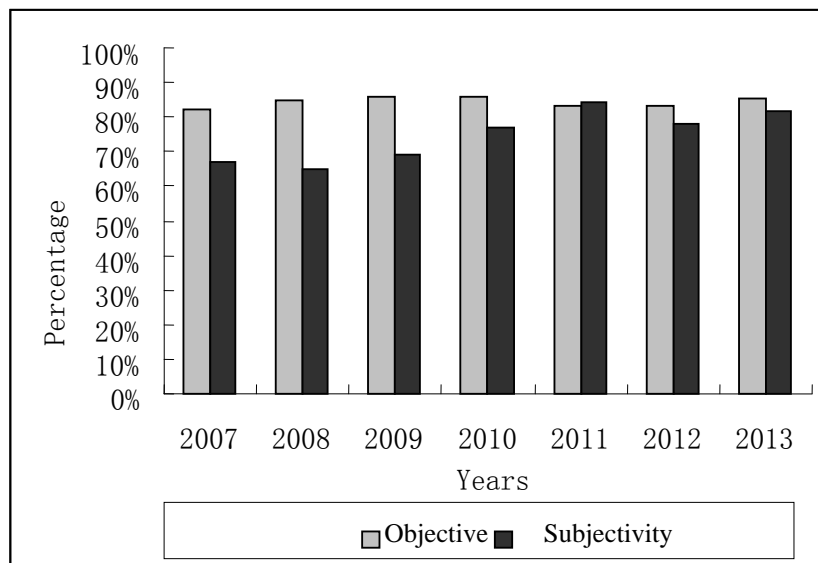


Chart2. The test grades of software engineering students2007-2013

From above we know, the objective grades hasn't changed a lot since 2009. The main reason is the comprehension and recitation conquer the large part of objective. The subjective grades improved obviously. It explained that the design ability and comprehensive analysis ability of students got well trained and exercised.

## Conclusion

After using the method on practical learning of software engineering, the method was also tried on software design curriculum and got some good effects on some of them. The teaching model which is discussed solved hour limitation of experimental course and achieves further innovation by using decentralized practical learning model. It proves rationality and practical applicability of decentralized practical learning model. It's a new discovery to improve the quality of practical learning model.

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