# How to Improve the Teaching Effectiveness of the Second Classroom of Primary School Information Technology From the Perspective of "Double Reduction"

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**Abstract.** In the context of "double reduction", primary school information technology teachers should take "double reduction" as the main teaching direction. The importance of the current information technology second classroom was analyzed through literature research and field investigation, as well as the actual situation and existing problems of the primary school information technology second classroom under the background of the "double reduction" policy. A series of suggestions were proposed for the development of the delayed secondary classroom of primary school information technology, including strengthening policy support, promoting teacher team construction, and other methods to improve teaching effectiveness and truly reduce the academic burden of students, Making full use of information technology in the second classroom to promote the comprehensive development and healthy growth of students.

**Keywords:** double reduction, information technology, second classroom

## 1 Introduction

In traditional educational concepts, information technology is not an exam subject but a marginalized discipline within the disciplinary system. Students' learning motivation is not strong, and teachers' teaching is also greatly restricted[1]. However, in the context of "double reduction", starting from both on and off campus, we aim to help students reduce their burden, carry out delayed second classrooms, and enhance their network and computer knowledge skills, which is also required in the current information age. Optimizing and improving the teaching strategies of primary school information technology is particularly important for carrying out the second classroom, enhancing students' enthusiasm and enthusiasm for participation, allowing them to fully utilize their strengths in the second classroom of information technology, and improving their comprehensive abilities. At the same time, in the context of the new curriculum standards and the "double reduction," the content taught by teachers should not only be limited to

knowledge from books but also require students to develop comprehensively. Vigorously developing the second classroom of information technology is a good solution. The so-called second classroom of information technology refers to the process by which students can apply and practice their learning of other subjects in the second classroom of information technology.

Primary school students are still very weak in the ability to use symbols for reasoning, but relying on the development of information technology activities, information technology, and related subject content can be integrated, which not only provides students with specific learning content but also, to a certain extent, cultivates students' comprehensive practical abilities such as design, thinking, and hands-on; Meanwhile, since scores are not used as a criterion for evaluating students in the second classroom of information technology, students only need to fully imagine and open their minds when carrying out activities, which is potential cultivation of students' innovation and practical abilities. In addition, the second classroom of information technology delay can solve the problem of lagging textbook content by designing a series of training room activities that keep up with the development of the times. Sheng Ziyu Strategies for Developing Primary School Information Technology Societies Under the Background of "Double Reduction"[2].

At present, there has been some research and practice on how to improve teaching effectiveness from the perspective of "double reduction", and certain achievements have been made. In the context of "double reduction", Yang Qing proposed three practical strategies for improving homework in primary and secondary schools, with a basic orientation toward adhering to comprehensive education. Firstly, teachers should clarify the significance and explore a closed-loop of "planning implementation reflection" homework improvement; Secondly, the teaching and research group should strengthen teaching and research and explore the design and implementation of "standard+" assignments; Thirdly, schools should improve their mechanisms and strengthen the overall management of homework[3]. In response to classroom teaching, Zhou Xu and others proposed a burden reduction plan of "teaching as much as possible", combining the original intention of "educating students" and the need for "taking exams" in classroom teaching[4]. Due to the disciplinary characteristics of information technology, Jiang Mengfei combined the "double reduction" policy to analyze the current situation of information technology homework design and evaluation and proposed a strategy for optimizing information technology homework design and evaluation through hierarchical design, classification design, and step-by-step evaluation[5]. Zeng Qingmei analyzed the shortcomings in the current primary school information technology classroom and explored the teaching strategies for primary school information technology classrooms under the "double reduction" policy, reformed classroom teaching objectives, and clarified the classroom status of students; innovative classroom teaching methods; and building a composite teaching philosophy[6]. In order to monitoring the internet media opinion information quickly triggered by the implementation of the "double reduction" policy. Li Jiling et al. uses the web crawler to dynamically collect the internet media opinion big data related to the "double reduction" of main media and utilizes text analysis and data mining technologies to dynamically monitor the hot spots, topic

tendencies, and communication characteristics of media opinion[7].Yu Shuo et al. investigated the impact of the "double reduction" policy on parents, and the research results showed that: (1) education anxiety acted as a significant mediator between parents' understanding of the "double reduction" policy and their perception of education involution, with the full mediation of anxiety about school admission outperforming anxiety about learning attitudes and (2) the more parents understand about the "double reduction" policy, the higher their perceived education equity[8]. In addition to classroom teaching, the second classroom also plays an extremely important role in cultivating students' innovation abilities and improving their comprehensive quality. Currently, some schools have launched teaching activities in the information technology second classroom, but due to the implementation of the "double reduction" policy, there are still some problems that need to be solved.

## 2    Problems in the Development of the Second Classroom of Primary School Information Technology Under the Background of "Double Reduction"

At present, some universities focus on cultivating mentors for researching information technology courses, and the state also strongly supports the development of the second classroom of information technology. However, for most normal students, there are relatively few who choose to work as information technology teachers, and most primary school teachers are also unwilling to teach information technology courses, so there is no guidance from professional teachers, The second classroom is unable to carry out activities normally and evaluate group activities; Most parents think that children's access to computers and mobile phones is just playing games, and their understanding of information technology is still in the past. They know little about new technologies, artificial intelligence, programming, and other innovative technologies. Under the pressure of parents, some schools have to pay attention to extra lingual learning, suspend the second class of information technology, extend the class time, and leave school equipment idle, resulting in a waste of resources and a lack of information literacy.

In data mining practice, common map reduction based clustering algorithms include som clustering algorithm, FCM clustering algorithm, and kmea clustering algorithm $\eta$ S algorithm and hierarchical clustering algorithm. This section focuses on $\kappa$ Taking means as an example. K-means is one of the distance based clustering algorithms that uses distance as the sole evaluation metric for similarity shapes. Its goal is to find independent subset clusters composed of objects that are close to each other. The basic process of this algorithm is as follows:

(1)    Select training sample $Z = \left\{ z \quad , \quad , \ldots^{(1)} \; z^{(2)} \quad z^{(n)} \right\}$, where Z(i) $\in$ R(i $\in$ [1,n]).

(2)    The centroid point u(1),u(2),...u(k) is selected randomly, where u(k) $\in$ R(i $\in$

[1,k]).

(3)    For any sample z(i))(i ∈ [1,n]), according to the distance formula d(i) = $\min(\|z^{(i)} - {}^{(j)}\|)$ ∈ [   $_u$ 2 , j 1,k , map task calculates the classification of the sample,reduce

(4)    The task is calculated according to formula (1)

$$u_j = \frac{\sum_i^n 1\{d^{(i)} = j\}\alpha^{(i)}}{\sum_i^n 1\{d^{(i)} = f\}} \tag{1}$$

(5)    Iteration termination in the process of iteration, if the centroid does not change any more, it will terminate and output the centroid.

The time complexity of the K-means algorithm is O (MKT), where m is the size of the dataset, K is the number of clusters, and t is the number of iterations. Therefore, the overall efficiency of the algorithm can be improved by reducing the number of iterations or improving the efficiency of each iteration.

# 3    Strategies and Methods for Conducting the Second Classroom of Information Technology

The proposal of the "double reduction" policy provides students with sufficient time to participate in activities. In the rapid development stage of information technology, reasonable use of correct strategies and methods can effectively combine the first and second classrooms, promote and supplement each other, and meet the needs of different students. When teaching in the second classroom, teachers use appropriate methods to stimulate students' interest in exploration, enhance practical abilities, cultivate students' learning habits of daring to question, independent thinking, and not afraid of difficulties, which can be beneficial in the second classroom.

## 3.1    Encouraged by the Government, Schools Carry Out

The country attaches great importance to the development of the new generation of information technology industry, which is rapidly developing. The Ministry of Industry and Information Technology of China encourages and vigorously develops the new generation of the information technology industry. Qiao Yueshan, Director of the Ministry of Industry and Information Technology, pointed out that the new generation of the information technology industry is a strategic, fundamental, and leading industry in the national economy[9].

The government should encourage schools to provide after-school services for the second classroom of information technology, laying a solid foundation for cultivating a new generation of talent.

Universities should support and encourage the cultivation of information technology teachers, and do a good job in the cultivation of information technology teachers, to promote the rapid development of information technology. Primary schools in various regions should also regularly carry out teaching and research linkage, lectures from

renowned teachers, etc., to jointly build, select, and share high-quality resources to improve teaching quality. Teachers should be selected to participate in training room construction and organize various activities, offer information technology characteristic activities, learn from the excellent teaching models of other schools' second classrooms, promote the effective development of information technology second classrooms, and enable students to develop comprehensively in morality, intelligence, physical fitness, aesthetics, and labor.

## 3.2    Participate in Activities and Enhance Abilities

Establish robot training rooms and 3D printing training rooms. Teachers should encourage students to participate more in this type of operational club activity, improve their hands-on operation ability, enable them to explore the mysteries of robots, understand that information technology can promote their learning of other disciplines, and enhance their innovative thinking and practical abilities. Students have gradually become new masters of knowledge, and teachers have transformed from disseminators of knowledge to guides for students to acquire new knowledge and promoters for their growth and development. They have transformed from teachers to researchers, helping and supporting them, promoting the transformation and improvement of students' thinking abilities, and developing their imagination and creativity.

## 3.3    Teacher Guidance and Multi-Party Promotion

In the context of "double reduction" and the rapid development of information technology today, more and more universities advocate for the development of new technologies. Normal universities strengthen teacher research projects such as information technology research and cultivate professional information technology teachers. At the same time, primary schools actively encourage students to participate in practical activities such as robot training rooms. From teaching students knowledge to teaching students how to learn, teachers are more participants and researchers. Teachers' activities serve students, play the leading role of teachers, and fully reflect the subjectivity of students.

During the period of rapid physical and mental development of primary school students, actively carrying out the second classroom in schools is a good time to help students develop their strengths and develop hands-on skills. After professional training, guidance teachers can guide students to write a program themselves, help students learn, and be more targeted. Teachers mobilize their enthusiasm by organizing robots and 3D printing activities and cultivating students' scientific exploration awareness. For example, robot activity training rooms mainly use scratch and other program software to write corresponding programs for robots, complete the setting of robot operation instructions, and enable robots to act flexibly. Teachers impart rich theoretical knowledge to students, which can not only overcome their lack of hands-on practice in teaching, but also help students form good computer usage habits, strengthen the importance of information technology curriculum teaching, enhance students' team awareness and cooperation spirit, and improve their learning enthusiasm.

### 3.4     Teaching Exploration, Induction, and Summary

Teachers can carry out activities through exploratory teaching during the second classroom teaching. For example, in a 3D printing club, teachers need to create a context around the problem, propose a targeted question, guide students to construct a basic model in their brains, and use modeling software to construct it. This process does not limit students' time, fully reflecting students' autonomy.

During the construction process, teachers should encourage students to think independently. Throw a question to the students to trigger their thinking, adopt the learning method of "independence, inquiry and cooperation", combine the three-dimensional learning theory with the practical operation, give play to the students' subjectivity in teaching, let the students practice by themselves, emphasize students' independent learning and independent inquiry, and complete the creation of works through group cooperative learning and teachers' assistance. As a teacher, it is necessary to grasp the connection between teachers, students, and information technology, to stimulate their learning enthusiasm. At the same time, teachers must also become guides for students' learning and promoters for their development, to cultivate and enhance students' awareness of creating three-dimensional spaces.

Although the second classroom is a process of students' independent participation, if teachers can effectively stimulate students' interest in learning, they can achieve the expected teaching effect. The teaching tools used in different courses vary, but the strategies used to achieve good teaching outcomes are the same. Students only have the opportunity to enter an efficient collaborative communication process after conducting serious independent research and positive thinking. In other words, their collaborative communication is based on independent exploration and discussion, providing them with perspectives, exchanging ideas, and proposing targeted solutions. At the same time, it is also inseparable from the teacher's induction, summary, and improvement of knowledge points.

## 4     Summary

Under the background of "double reduction", the development of the second classroom of information technology can effectively stimulate students' interest in learning information technology, improve information literacy, promote the deep integration of information technology and education, and innovate development. Primary school information technology teachers need to recognize the importance of "double reduction", keep up with the times, continuously improve their professional level, attach importance to exploring scientific teaching concepts, further exert the subject position of students, mobilize their learning enthusiasm, improve their innovative spirit and practical ability through the teaching of the second classroom, thereby reducing the academic pressure on students, enabling them to achieve all-round growth, and effectively play the important role of information technology in life.

## Fund Projects

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