

# Research on the Integration of Information Technology and Primary Teaching in the Digital Age

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**Abstract.** In the 21st century, people are surrounded by a wide range of information technologies. E-payments, mobile, AR, VR, and other real-world technologies have brought great convenience to our lives. When the new crown epidemic started to spread, people realized that online teaching and learning started to play an important role. The integration of information technology and education turned into a mainstream research topic. Then for the primary class students, their physio-psychological characteristics make the integration of IT and teaching challenging. How can they use information technology to make learning more effective in this information age? This paper will discuss the positive and negative effects of the integration of information technology and teaching on both students and teachers. It will also give suggestions on how to make the integration of IT and teaching more effective from four perspectives: China, schools, teachers and students themselves so that the negative effects can be mitigated.

**Keywords:** Information technology; teaching and learning; primary school; online classes; Covid-19.

## 1. Introduction

In the context of the information age, all kinds of media are constantly appearing. For modern primary school students, most of them are overly dependent on the guidance of their teachers. There is a lack of independent thinking habits and self-awareness [1]. Moreover, often, when the content is difficult or new knowledge is not easy to accept, pupils' engagement and interest in the classroom are often lost due to the uninteresting nature of the lesson, so this requires a high level of interest in the classroom [2]. Most primary school students are less self-directed and less engaged in the classroom, and the use of information technology such as audio and video in the classroom is more conducive to enhancing students' interest in learning and teaching quality than a single mode of teaching [3]. At the same time, as primary schools contain a large number of students of different ages, it is necessary to establish age-specific instructional guidance [4]. Information technology plays a great role in improving communication, increasing efficiency and so on [5]. At the same time, IT can help facilitate group activities, increase classroom interaction and enhance student activation [6]. For teachers, by enhancing the integration of IT and teaching, teaching efficiency and quality can be improved. It is important to bring the advantages of IT into full play and to seek a variety of teaching formats [7]. This paper will use the literature review method to analyze the research on the integration of information technology and primary school teaching in the digital age, and the author hopes to give some reference to relevant parts or educators.

## 2. The Positive Effect

### 2.1. For Teachers

Information technology can help teachers to better generate more communication with their students [8]. As a new approach to teaching and learning, IT can turn the classroom into a student-oriented communication platform. This can help facilitate interaction between teachers and students. It also helps teachers to better hear the needs of their students, which can lead to better curriculum development, improved classroom design and more effective classrooms. Some online feedback systems which can be downloaded on the phone cannot only reflect the students' comments about the classes on time but also can receive the parents' advertisements.

Information technology can help teachers make changes to the way classroom tests are administered [9]. Compared to traditional paper-based classroom tests, teachers can use a range of applications and programs such as computers to set questions and generate papers on the knowledge and content covered in class more easily. Furthermore, the content can be more personalized for different levels of students. At the same time, students' test results can be quickly integrated with information technology such as these learning information systems, helping teachers to understand how well students have mastered the classroom content and thus make timely adjustments to teaching strategies.

Information technology can help teachers to improve teaching and learning [10]. Especially for science studies, when there are experiments in the curriculum, IT can show the experimental process more vividly through videos, animations, AR and VR. This new way of teaching can help teachers to improve the quality of teaching and help students to understand the content of the course better than the traditional way of showing experimental clips through text and textbooks.

Information technology also provides ideas for integrated learning [11]. Teachers of different subjects can use information interaction to integrate content from different subjects, helping teachers to value the connections between subjects while bringing theory and practice together and making the teacher team more harmonious and supportive.

## 2.2. For Learners

Internet technologies can help learners to better integrate learning content and help to improve students' learning efficiency [12]. This is especially true for primary school students who lack the ability to learn independently and integrate knowledge. When they can make use of the resources and features of an iPad, for example, to learn, it can greatly help them to improve their learning efficiency. The diverse nature of information technology can help students to think more creatively [13]. For primary school students, who do not easily concentrate for long periods of time, the combination of information technology and traditional teaching methods such as multimedia can help students to mobilize creative and divergent thinking. It can simultaneously engage students' creative abilities, improve their quality and change their often-rigid thinking patterns. At the same time, information technology can provide students with more resources [14]. For instance, during Covid-19, online classes provide rich resources to make sure the students can keep studying and not be affected by the pandemic. Teachers can provide the slides online to make sure students can have the possibility to make notes, which can make them more focused on classes instead of being distracted by making notes. For students, electronic devices can help them to learn effectively. For example, the teacher's PowerPoint can be used to preview the lesson beforehand. Some pre-recording and slides can give students a great understanding of the new contents of the class which can make them more efficient during the classes. The previous model of traditional learning would have been limited in terms of the resources provided. Therefore, IT can provide students with support beyond the text compared to traditional paper-based learning.

Student engagement and motivation to learn can be positively influenced by complete multimedia features and appropriate teaching methods [15]. Multimedia features, for example, information technology such as videos can explain course content more effectively than traditional teaching methods. In the past, the classes can be just explained by teachers' speaking, it is hard for students to imagine some abstract concepts. But now, teachers can connect information technologies with traditional speeches to make the classes be more attractive and increase class efficiency. For example, in chemistry classes, some experiments are not easy for students to carry out in the laboratory due to the high level of danger, so some videos of past experiments can be used to give the students a visual observation and ensure their personal safety. At the same time, students can be motivated by some animations and other designs to be more involved in learning. Some interesting classes design can attract the attention of students which can increase their class efficiency.

What is more, the new teaching methods will make the students be prior during the classes [10]. This will help the pupils to take the initiative in their learning, for example, they can decide their own

schedule of activities, they can pace their learning according to their own circumstances, and they can be more diagnostic to help them think about their own shortcomings. At the same time, some collaborative learning can help primary school students develop a sense of teamwork and support each other.

### **3. The Negative Effect**

#### **3.1. For Teachers**

The integration of IT and teaching may make some teachers over-reliant on IT [16]. Some teachers make poor choices of multimedia such as some videos in the classroom, for example, the videos are too long. It will lead to class time being wasted and teaching priorities and difficulties being ignored, resulting in a lowering of the effectiveness of classroom teaching. At the same time, for some subjects based on experiments, information technology can improve the quality of teaching to a certain extent, but it does not mean that any experiment can be replaced by information technology. When students are confined to the classroom, they lack the opportunity for hands-on experimentation. At the same time, they only have the opportunity to receive information visually, while their other senses cannot perceive the changes in everything. So, an excessive glance at information technology may affect the cultivation of students' experimental skills.

The immaturity of some information technologies may reduce the efficiency and quality of teaching to a certain extent [17]. For example, when teachers intersperse slides with videos or pictures to help students understand the content more visually, they may not be able to open them because of immature equipment, which may lead to inefficiency in the classroom and failure to achieve the corresponding teaching objectives. Alternatively, when teachers keep their classroom materials in folders or USB drives, it can cause them great distress if they lose them. They need to spend a lot of time preparing all the lesson content again, making them lose their enthusiasm for their work.

#### **3.2. For Students**

Information technology may cause students to develop bad learning habits [18]. For students, because they lack judgment, and in some formal writing, they may use some internet terminology due to the influence of information technology, resulting in weakened academic writing skills.

Information technology may affect students' mental health. Most IT will require students to have electronic devices, and for some poor families, it is difficult to provide their children with additional electronic devices [19]. Therefore, some students may have low self-esteem or be teased by their peers because they do not have these electronic devices, which may undermine their confidence in learning or even cause psychological problems.

### **4. Suggestions**

#### **4.1. For Countries**

For the countries, new teaching models that integrate information technology and teaching should be promoted vigorously. In terms of the policies promoted in China over the past decade regarding education, the country has gradually raised the requirements for teachers' information literacy [20]. This means that teachers need to make more extensive use of modern educational technology while improving teaching methods and emphasizing the effective integration of IT with subject knowledge. The country could refine its policies related to IT teaching more, for example, by setting different policies on teaching requirements for teachers according to the different age groups of students, so as to effectively improve teachers' information literacy.

## 4.2. For Schools

For schools, they need to actively support IT teaching and learning in terms of hardware facilities [21]. Teachers need to be provided with higher-end equipment that can enhance data collection and data processing on a larger scale. These can help teachers to achieve their teaching tasks and goals more efficiently. For example, what would take 300 teachers two days to complete may now be completed in half a day by a small team of five. This would greatly increase teachers' productivity and allow them to focus more on classroom set-up and so on, thus improving the quality of teaching.

## 4.3. For Teachers

During the teachers' teaching period, the school can assign a teaching assistant to the teachers [22]. This would not only improve the quality of teaching by monitoring each other but would also reduce the teachers' over-reliance on information technology as they learn from each other. At the same time, the teaching assistant can support the teachers in managing the class. In everyday learning, schools can specify the minimum number of laboratory or outdoor practical lessons, etc. that teachers need to teach. This will ensure that teachers take responsibility for their teaching and that the quality of teaching is improved [23].

## 4.4. For Students

Students' over-indulgence in the Internet due to information technology can be improved by both school and parental efforts [24]. For example, at school, teachers can limit the time spent on IT and increase the length of extracurricular activities; at home, parents can help them develop a healthy and correct concept of online learning through more communication and guidance. At the same time, in daily life, parents can bring children closer to nature.

At the same time, schools need to strengthen the safety and protection of online learning platforms and society needs to strengthen the rule of law to establish a positive culture [25]. For primary school children in particular, their lack of discernment means that they need a healthier online learning environment.

## 5. Conclusion

This study explored the integration of information technology and primary teaching in the digital age by collecting a large amount of secondary data through a literature review and thematic analysis. The study found that the existing literature mainly described the advantages and disadvantages of integrating information technology and showed the benefits and shortcomings of integrating IT with teaching and learning in primary schools. For teachers, using the integration of information technology and teaching cannot only bring them closer to their students and get along better with them. More importantly, it can help teachers to improve classroom efficiency as well as classroom quality. At the same time, the convenience of modern technology also allows teachers of different subjects to integrate knowledge from different subjects and improve their teaching skills. For students, the combination of IT and teaching makes learning more convenient. They can study in advance and review after class through the resources uploaded by teachers on the learning platform, which greatly improves their learning efficiency. Some IT extensions also enable them to better understand classroom content, thus improving classroom efficiency. However, the combination of IT and teaching has to some extent also brought some negative effects on teachers and students to varying degrees. It can lead to teachers becoming too reliant on electronic technology and reducing their ability to teach, or it can cause problems for teachers if the information technology is not mature enough. Students' over-reliance on electronic devices may lead them to become addicted to the Internet, especially for primary school students, who lack self-control and for whom information technology may be harmful. Therefore, in this study, different recommendations are given at four levels: countries, schools, teachers and students. This will help them to have strategies to deal with the negative effects.

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