

Research on Improving the Interactivity of Online Education in Primary and Secondary Schools

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Abstract: During the new epidemic, the Ministry of Education called for the suspension of classes and the suspension of school, requiring students to take online classes at home. With the introduction of online teaching, students' learning status has become increasingly unstable. The online classroom platform provides a wealth of teaching resources to attract students' interest in learning, and it breaks the space limitations of traditional teaching. Nevertheless, the online teaching model has also encountered new challenges. In transforming the traditional classroom into an online classroom, the learning environment has changed, resulting in a lack of motivation for some students to learn independently. The online classroom platform, using Internet technology and modern multimedia teaching tools, can improve the online interactive links between teachers, students and parents and can effectively address the problem of student's independent learning. It is around the interactivity of online education in primary and secondary schools during the epidemic that this paper explores research.

Keywords: Online education, Interactive practice strategies, Primary and middle school students

1. Introduction

Since the Ministry of Education issued a circular on "stopping classes without teaching and learning", online teaching has become the primary way for schools to carry out their teaching activities. Online teaching has been hot, but the results have not been satisfactory at this particular time. Fatonia surveyed 2377 primary and secondary school teachers nationwide on the form of interaction, the effectiveness of interaction and the evaluation of their use of online education platforms, and the results showed that 66.8% of the teachers felt that current problems with online education were that the interaction was not Adequate [1]. Thus, teaching interaction is the biggest problem facing online education today. The lack of interactivity is the shortcoming of traditional online education. Given today's uncertainty, gaining insight into students' online learning experiences during the COVID-19 pandemic is crucial. To date, many studies have investigated this area, focusing on students' mental health, home learning, and self-regulation [2-4].

However, there has been relatively little research on the interactivity of online education, so this paper takes this to an in-depth level to promote online educational interaction in primary and secondary schools. This study refines the generalised interactivity of online education. From both

school and home perspectives, it describes the current state of interaction with peers, teachers and parents in online learning in primary and secondary schools, both in and out of the classroom.

2. Interaction between Students of Online Teaching

2.1. The Form of Interaction in Class

Online small-group collaborative learning can be task-driven to advance instruction. The teacher will present the task, and students will discuss it within their groups. The group leader first reports on what the group will share then names the group members to answer in turn and summarizes the group's shared questions. During the lesson, group work creates more opportunities for interaction. The interaction between students in the online classroom can better promote in-depth thinking, and many learning problems will be solved through group interaction.

During the New Guinea outbreak, Chinese primary and secondary school students often used Tencent Meetings as an online classroom platform. Tencent Meetings can be used for a variety of purposes. First, it can be an excellent tool for students to get to know each other. Students can get to know each other better by opening and watching each other's videos, not just by name and school number. Recognizing each other's faces and listening to students' stories helps build friendships among group members. Second, the platform allows everyone's voice to be heard. It facilitated team member participation [5]. Most importantly, using this platform also enhances student discussion, group work, and exam study. It also leads students to think more critically, interact at a higher level, and be more reflective in their assignments [6].

A child's best teacher is neither a parent nor a school teacher but a peer. The online learning process allows students to communicate with each other in real time on the online platform, allowing them to interact more frequently. Students help and complement each other's strengths, and their influence is sometimes more remarkable than that of teachers. Because students have a common bond, they can only gain so much from each other. By communicating and collaborating to improve their learning, students will not only learn, but they will also learn how to learn, interact and work with their peers.

Online platform discussions allow for a variety of forms of communication between students. Students can combine groups with different students simultaneously through group discussions because their time is sliced and diced. The group discussion here is a development based on individual self-learning. In the group discussion, students boldly express their ideas, observe their peers' learning methods during the discussion, and adjust their ideas for solving problems. Before the group discussion, all students in the class are first divided into groups of 4 or 3 students each. A good student is elected as the group leader in each group, who can play an organizational role in the discussion. The process of discussion exposes students' thinking and facilitates the tightening of teaching focus and difficulty. Each student begins a stimulating discussion organized by their respective group leader. Each student is expected to express his or her ideas boldly, even if some of them are poor, and to observe his or her classmates' learning methods and develop ideas to solve the problem during the discussion. After the group discussion, each group asked each representative to speak and share the discussion results. At the same time, the teacher made appropriate points. This way, students can develop more ideas through their efforts and working with classmates. Through group discussion, students' interest in learning is mobilized, their awareness and ability to participate in teaching is improved, and the leading role of students is effectively played. Students learn actively, quickly and happily, which dramatically improves classroom efficiency.

2.2. The Form of Interaction after Class

Students should pre-study in advance to familiarize themselves with the learning content. Online courses are limited in length, and teachers can only use the most concise language to explain essential

and challenging knowledge points. Without pre-reading, students can quickly fail to keep up with the teacher's pace, so they should pre-review the next day's course the night before, according to the class schedule. Students have a pre-class discussion about the pre-reading content, answer each other's questions, and finally pool the unsolved problems and ask the teacher in a unified way, which helps to improve the efficiency of listening to the next day. Pre-class pre-reading is done without teacher supervision, which makes students more relaxed and free, and also increases the frequency of interaction between students and is one of the ways to increase motivation for learning.

After-class interaction is an extension and continuation of classroom teaching, an enhancement and synthesis of classroom content, and an application and transfer of subject knowledge. It is necessary to combine in-class and out-of-class organically so that students can apply the knowledge and skills learned in the online classroom outside of class in order to make progress and development in various aspects, such as thinking, emotional attitude and values, and form an attitude of willingness to investigate, to achieve the goals of education and teaching fully. At the same time, after-school interaction is also a tool to facilitate knowledge exchange between students and their peers.

In post-class interaction, students receive feedback from the teacher after they have completed and submitted their homework alone. Students can check and fill in the gaps based on the teacher's feedback. For questionable knowledge points or topics they do not know, students can ask for advice from students with excellent academic performance through communication software such as WeChat and QQ and provide targeted advice to help each other solve problems in homework. Students can discuss the difficulties and key points of knowledge they do not understand in class through the social platform after class, which significantly strengthens the interactive communication between students and students, and one-to-one contact can be established after class interaction. In this way, students unknowingly consolidate their new knowledge in competition. Especially for students with a weak foundation and the opportunity to learn again, they can master their knowledge in time and gain the joy of success, and their motivation to learn naturally increases. In addition, students can ask each other about their recent life, study status and exciting things happening at home, which can also bring them closer to each other as they get to know each other. At the same time, the off-class interaction strengthens the information transfer between students, gives full play to the primary role of students, improves learning efficiency, enhances students' sense of cooperation, develops their ability to help each other and cooperate, and cultivates their personality quality, which meets the requirements of education socialization.

2.3. Advantages and Problems in Interaction between Students of Online Teaching

Students have discovered some of the advantages of online education. The most common advantage of online learning is the comfort of the educational environment. Students respond similarly to what they listen to at home, and they are not limited by geographic location; they can listen whenever and wherever they want, are not limited by time and space, and are grouped into a comfortable, educational environment topic. It allows students to organize their time with each other more wisely. Secondly, they can talk comfortably in a chat and ask the teacher questions more freely. They feel like they are taking a one-on-one class, the interaction seems to flow well, and they can ask questions more quickly than in an offline lecture.

Students' most common complaint about online education was that the network was unstable. Some of the frequently expressed points students made about the instability of the network included frequent delays, the instructor's voice being out of sync with the material, and their inability to attend classes without a wi-fi connection. A secondary concern was the educational environment's poor quality, inaccurate content communication, and inability to interact directly. A typical response was that teachers only talked to themselves and did not interact with students. Finally, students' attention span was reduced. Many students responded that it was difficult to focus on the classroom for long

periods. Consequences include dissatisfaction with changes in assignments, lower academic performance, lack of preparation for classroom design, and reduced classroom comprehension. Purwanto revealed some other challenges and barriers that students encounter in online learning [7]. The challenges related to students are limited communication and outreach among students, higher challenges, and longer screening times for students with special educational needs.

3. Interaction between Teachers and Students

3.1. The Form of Interaction in Class

As the technology that drives online education continues to evolve, special attention must be paid to students' needs and experiences in online courses [8]. Research has proven student-instructor interaction to be an essential component of online courses for students and instructors [9].

The interactive teacher-student online teaching and learning process is consistent with student learning. During online teaching and learning, students are active inquirers of learning, and the teacher's role is to create contexts appropriate for student learning rather than provide ready-made knowledge. According to American psychologist Ossubert, the process of students receiving knowledge is in which old and new knowledge interact. Students have a specific knowledge structure and the attribute of conforming and assimilating thinking to new knowledge. Under the purposeful guidance of teachers, students can master knowledge through inquiry-based learning.

Online education platforms have emerged in recent years, and teachers often use platforms such as zoom, nail, and Tencent Meetings for teaching. These sizeable online education platforms allow teachers to schedule pre-course prep for students, assign and receive assignments on time, and communicate with students in real-time through audio and chat boxes, among other diverse features. Students can choose to send emoticons to interact with the teacher during class, such as sending a thumbs up to show they understand what is being said or sending a hand up to show they have a question. These features expand the interaction between teachers and students, bring teachers and students closer together, and help teachers better understand how students learn online.

Online teaching activities are the process of teacher-student interaction, which is the fundamental way to implement quality education and cultivate innovative talents. Students are the main body of learning, and mobilizing students' enthusiasm, and initiative is the key to improving teaching quality. Teachers should adopt effective online interactive teaching methods around the key points and difficulties of the lecture content to achieve the teaching objectives.

Therefore, the following points should be achieved when building online interactive classroom teaching. First, teachers should provide students with opportunities for online interaction as much as possible. The teacher is the instructor of the teaching process, while the students are the subjects of the teaching process. Teachers should provide interactive opportunities for students to actively participate in the online classroom, fully mobilize students' enthusiasm, initiative and creativity, and make online classroom teaching dynamic. Second, teachers provide space for students to interact online. Students should be open and accessible in the online classroom. Teachers should focus on cultivating students' open-mindedness, teaching content without sticking to the textbook, and not quickly denying students' views and ideas. Finally, teachers design questions based on the textbook's content to continuously guide students to explore new knowledge. The questions stimulate students' desire to think and explore problems, encourage them to think differently and let them discover ways to solve problems through their exploration.

3.2. The Form of Interaction after Class

The post-class interaction of online teaching is an essential means to consolidate the effect of online classroom teaching. The network environment and distance limit online classroom teaching, and

certain conditions restrict the teaching interaction between teachers and students. Using post-class teaching sessions for communication and information feedback is an excellent opportunity to implement teacher-student interaction. Teachers can assign homework for students to go online or to the library for relevant information. This process can bring into play students' subjective initiative, deepen their understanding of knowledge, broaden their knowledge and increase their interest in learning. Students can communicate with teachers at any time if they have any questions. Teachers and students can communicate in an equal environment. For example, they can establish QQ groups after class, where students can freely express their views and opinions. Some students do not like to speak in class, but in the group, they can communicate with the teacher without any constraints. This kind of communication can solve students' learning problems and strengthen the understanding and friendship between teachers and students. On the one hand, it helps students maintain a good state of mind and emotion in the learning process and give full play to their prominent role. On the other hand, it also stimulates the internal motivation of teachers to teach and nurture others. Sincere and healthy emotions between teachers and students are the basis of online interaction between teachers and students and motivation for teachers and students to improve their quality together.

3.3. Advantages and Problems in Interaction between Students and Teachers of Online Teaching

Blaine showed that most students approved of online teaching methods and considered online teaching teacher-student interaction more effective [10]. A few students considered these forms of interaction to be very effective or of little use. A few students clearly expressed that these forms of interaction were ineffective. Thus, the widespread use of the Internet in education has changed the characteristics of previous teacher-student interactions as well as teaching and learning, causing traditional teacher-student interactions to change profoundly and exhibit different characteristics. It is easier for teachers and students to create a relaxed atmosphere and a relaxed classroom environment that is inclusive, equal and respectful.

Although online student-teacher interaction has been constantly advocated, there are many dilemmas in its development and use. First, students can quickly become the audience in online teaching. Second, teachers cannot quickly adjust the teaching pace in online teaching. In addition, teachers are unable to organize multi-directional interactions with students in the class. When interacting with individual students, the interaction can be ineffective, and the limitations of the Internet can hinder teaching progress. It can be seen that how to enhance teacher-student interaction and achieve high-quality classroom teaching in online teaching mode becomes a challenging research topic.

Teachers should increase online live teaching sessions and strengthen the management of students; test the teaching results by randomly releasing classroom quizzes or quiz activities, find and solve problems in time, and clear students' learning obstacles; make full use of the functions of various platforms, reasonably allocate the proportion of time between teaching knowledge and interactive discussions in online teaching, and appropriately increase the proportion of classroom questions; ask questions that are close to students' life The questions asked should be close to students' lives to improve students' learning enthusiasm; teaching knowledge and interactive discussion should be interspersed to avoid audiovisual fatigue and to create a lively classroom atmosphere with online interaction between teachers and students.

4. Interaction between Parents and Students

4.1. The Form of Interaction in Class

Online teaching has led to a change in the learning environment for students. Therefore parents should meet the learning needs of their students as much as possible. They should create a good learning environment for students by providing more books, resources, equipment, learning technology and learning tools and motivating students to learn.

During the epidemic, teachers have limitations in supervising and interacting with students due to teacher-student separation, which requires solid parental support. Students need to adjust to independent and online learning, especially in primary schools, where they are particularly vulnerable to distraction in the face of the lure of the internet without the discipline of the classroom and the face-to-face management of the teacher and where parental supervision is required. Parental supervision and motivation can directly impact students' learning outcomes and physical and mental health.

According to Arwen, Sunitha and Duocet, parents also feel the impact of learning at home, and they also have more burdens as they have to supervise their children at home for learning and other chores such as preparing food [11-13]. Parents, as essential companions to their students' learning at home, need to take the initiative to liaise with teachers, according to the school's arrangements, to understand the content and progress of teaching, to learn about their students' daily learning habits and personality traits at school, and to negotiate and develop learning plans with teachers and students, taking into account the students' actual circumstances. Students' expectations of practical benefits should also be taken into account. A combination of rewards and punishments will undoubtedly give a great impetus to students' motivation to learn and can go some way to alleviating the embarrassing situation of poor independent and online learning.

4.2. The Form of Interaction after Class

Parents are the people closest to their child's learning life during online teaching. However, because many parents are not professionally trained, are busy with work, and do not have much time for educational research, the wrong parenting methods can have negative consequences. As students are exposed to screens daily in the online classroom, many become irritable and bored with school after class. When most parents see this state of learning at home, they inevitably become angry and sometimes speak ill of their children, creating severe family problems. In order to deal with this situation, parents are first required to familiarise themselves with the content available on the platform so that they can keep abreast of what is happening with their students, such as homework assignments or important notices issued by the school, and to remind and monitor their students. Parents can keep track of their student's learning and prevent them from missing things after school. For example, when parents find that their child is not paying attention in class, they need to change how they talk to their child after school to make it easier for them to accept so that parents can communicate effectively with their child. For example, when parents find that their children are not paying attention in class, they need to change how they talk to their children after class to make them more receptive so that they can communicate effectively. Parents should let their children do some things at the right time and praise them for doing the right things.

Einstein said, "Interest is the best teacher." How parents work with their students requires attention to the following areas. Firstly, parents can help their children prepare to teach aids and make learning aids before the lesson. For example, if the child is learning some fruit words, parents can help them draw the fruit and say the words as they are being drawn. It is easier for the child to remember this because the child is actively and effectively learning and revising as he or she prepares these teaching

and learning aids. Secondly, most children are 'able to talk in class and therefore tell their parents that they 'know it, but when they leave class, they often 'do not know it is because the classroom Parents need to be understanding and create the conditions to encourage them to listen to the recordings more often, rather than criticising or blaming them. Finally, parents should learn from their children and let them become their teachers, which will also significantly increase their interest in learning and the seriousness of their studies. Children have a strong capacity for imitation and will often imitate their teachers' every word and deed, even to the extent of treating their parents as their students and becoming teachers themselves in class. Parents can take advantage of this by arranging to move an hour a day to study with their children.

4.3. The Impact of Online Teaching on Parent-child Interaction

Online teaching changes how parents spend time with their children and can significantly affect fostering parent-child relationships. Firstly, online platforms can optimise the interaction between students and families. Problems with using and managing electronic devices occur mainly at home, where most parents cannot rationalise their children's need to use them. Under the home-school cooperation model, classroom teachers, as a third party, can help parents adjust their mindset, guide them to see their children's needs and encourage them to play and enjoy with their children, forming a positive interaction between family members. Secondly, teachers can use the online platform to understand parents' difficulties in home education and resolve conflicts between parents and children. In the "cloud" class meetings, students discuss alternative ways of socialising online, such as phone calls and letter writing, to communicate and avoid staring at electronic screens for long hours. Teachers also help students plan their time wisely, set individual after-school learning plans and goals, and set up a system of rewards and punishments, inviting parents to monitor and provide weekly feedback to the class group. With the cooperation of home and school, students' time spent on electronic devices has been dramatically reduced.

Online teaching takes place at home, and the safeguarding, supervision and management of student learning are achieved mainly by parents being present, so whether parents are actively involved or passively involved can significantly impact the effectiveness of teaching and learning. Parents' proactivity also manifests itself in the active accompaniment of their children in family life outside of the course and in optimising family living arrangements, all of which can create a sound ecology for online teaching.

The role of parents in their children's online learning process is, first and foremost, that of learning managers and, secondly, that of participants, not the other way around. Outside of learning, parents should be more of a companion and less of an activity manager in family life. This reversal in the order of roles can lead to a series of contradictions and conflicts. From this perspective, the proactivity of parental involvement is also significantly influenced by teachers' teaching and communication behaviour.

5. Conclusions

For educators, the biggest obstacle to online teaching is the difficulty of grasping students' online learning status. Therefore, whether students have conscious independence is an essential condition for their ability to complete their learning tasks seriously at home, and both home and school should strengthen the cultivation and education of students' conscious habit formation. Qualified class teachers and teachers of all subjects are expected to guide and manage the management aspects of students' mobile phone use, offer appropriate advice to students, join parents in supervising and managing the use of mobile phones and guide students to access the correct Internet and the right kind of Internet.

Students also employ various strategies to overcome the challenges they face in their online learning process. For example, to address the home learning environment, students talked to their families, moved to quieter locations, studied late at night when all family members had gone to bed, and consulted with their classmates and teachers. To overcome challenges with learning resources, students use the Internet, join Facebook groups that share free resources, ask family members for help, use resources available at home, and consult with their teachers. The specific strategies used by each student may be influenced by different factors around them, such as available resources, student personality, family structure, relationships with peers and teachers, and ability.

To address the problem of student-led learning inertia during online teaching and learning, local schools can develop interactive teaching and learning to enhance teaching and learning: pre-course warm-up through platforms such as microlearning, designing teaching and learning using case studies, scenario design and heuristics; completing classroom management using flipped classrooms and group work management; digitising assessment methods, maintaining question and answer groups and implementing a shared resource base.

The teacher community should adapt to social developments, combining traditional educational perspectives with modern teaching and learning methods as subtly as possible. Teachers should get closer to their students, familiarise themselves with the media platforms and use them well. Teachers should use online resources to optimise design, select content, enhance interaction and adapt to local needs.

In order to enhance the performance of online interactive teaching, efforts need to be made in the following areas. First, we should strengthen the construction of Internet education and popularise education informatisation across the board. Quality online education resources can effectively benefit thousands of families. Second, strengthen the construction of teachers. The Internet education industry will develop at high speed. Local universities must focus on teacher training, encourage teachers to participate in more teaching competitions and academic conferences, get in touch with the frontiers of the industry, learn new technologies and innovate educational methods. Third, promote legislation on Internet education. With the popularity of Internet education, the issue of Internet education legislation is imminent. It is necessary to legislate both to protect the educational information security of teachers and students in universities and to protect the intellectual property rights of educators' Internet teaching resources.

This paper reviews and collates how students interact with their peers, teachers and parents during online teaching and learning and the strengths, weaknesses and problems in these interactions. It provides evidence for future research on the practice of online interaction with primary and secondary school students. The limitation of this paper is that it only discusses the development of online interactivity without specific examples. In future research, a class in a secondary school could be used as an experiment to record the number of interactions and post-class feedback from students in online classes.

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