The Research on the Influencing Factors of Online Learning Effect in Basic Education Field Under the Context of COVID-19

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Abstract. The Ministry of Education released the policy of "continuing with learning regardless of class suspension" in January 2020 under the context of COVID-19 that prevailed all over the world. As a result, all primary and middle school students nationwide started their new learning mode of online learning at home. Online teaching of China's basic education field has entered a fast development track, triggering hot discussion about online education. To explore the influencing factors of online learning effect in the basic education field, content analysis method was used in this paper to sort and analyze the papers on empirical study of online teaching during the outbreak of COVID-19, review the influencing factors of online learning for primary and middle school students, and found that people can pay attention to factors such as social presence, social support, and teaching Competency, and three ways to improve the post-epidemic era online teaching quality: Enhance perceived usefulness by trinity, Highlight active exchange to foster presence and Multi-party collaboration for mental support.

Keywords: Online Learning · COVID-19 · Basic Education

1 Introduction

COVID-19 started to prevail all over the world since January 2020, which poses certain threats on people's safety, health, life and even stability and development of the whole society. Offline collective classing teaching would exert adverse influence on pandemic prevention and control when the pandemic is not contained effectively within an extensive scope. According to the statistics of UNESCO, 22 countries had declared or implemented the measure of suspending learning at school on March 4, 2020, including 13 which had suspended class teaching within the whole country. To address the situation above, The Ministry of Education released the policy of "continuing with learning regardless of class suspension". As a result, all primary and middle school students nationwide started learning online at home, making China's online teaching mode that was originally applicable to higher education cover the whole education field gradually. Online teaching of China's basic education field, which started late with a slow development speed, has entered a fast development track, triggering hot discussion about online education.

Challenge and opportunity co-exist. According to the previous studies, the online and offline blended teaching mode could better enhance learning effect, in comparison to traditional classroom teaching [1]. At the same time, it is also unavoidable that pandemic will break out within a certain region at all times in the post-pandemic era. Therefore, it is imperative to review the role of online teaching in basic education field, and associate online and offline teaching efficiently. The outbreak of the pandemic has changed the traditional teaching mode substantially and proves that pure face-to-face offline teaching is actually impracticable. It also reveals that the modes that become prevalent gradually, such as online learning and blended teaching, have become the irresistible trend.

At the early stage of pandemic outbreak, many researchers found the learning effect of new teaching mode and learning environment was far from satisfaction. Not a few teachers claimed that students needed making up the lessons after online teaching became possible. To address the situation above, many scholars carried out empirical research of different kinds in order to explore the influencing factors that affect online learning effect of primary and middle school students. By taking CNKI data as the research objects, the papers on empirical study of online teaching during the outbreak of COVID-19 was sorted and analyzed, the concept of online learning effect was defined, the influencing factors of online learning for primary and middle school students was reviewed. And specific suggestions on improving online teaching quality were proposed in this paper, in order to further enhance online teaching quality in post-pandemic era.

2   Analysis on the Influencing Factors of Online Learning Effect

Learning effect means the results that students could grasp and acquire by applying the knowledge they learn. The evaluation on learning effect mainly lies in process and results. Online learning refers to the process in which learners personalize their learning and achieve results on an online virtual platform. However, due to different levels of psychological development, factors affecting the effectiveness of online learning vary at different ages. On the basis of online learning environment, teaching media and teaching mode, the influencing factors of learning effect were classified into the following several categories in this paper:

2.1   Social Presence

Social presence is a key concept in media studies. It was applied to distance learning at the end of the 20th century along with the development of electronic technology. It means social feeling under which, one person can perceive or experience the existence of others in the society during learning after triggering special mental phenomena so as to boost learning experience [2]. According to relevant studies, it plays a key role in boosting and maintaining successful and significant learning experience [3].

One key point for fostering social presence is to make learners believe other people in the society are physically "true" persons during learning process. In the online teaching process for primary and middle school students, the cultivation of social presence mainly lines in the presence of teachers and interaction with partners.

2.1.1 Presence of Teachers

The presence of teachers means reflecting teachers in videos or live streaming class as a factor and the most commonly used way of presence is teacher image + Slide [4]. The presence of teacher can be reflected by the rate of appearance, mode of presence and nonverbal intimate behaviors.

A number of studies show that teachers' rate of appearance exerts positive influence on students' concentration and knowledge comprehension ability significantly. Researchers have also started to focus on the influence of appearance time and length on learners. Most researchers believe that indirect presence of teachers could bring better learning effect for learners than their direct presence. For instance, by recruiting volunteers to watch micro-lecture and make test for them via eye tracking technique, Liu Xiaomin found that volunteers presented with teacher's image indirectly is superior to those with teachers' image all the time in test scores [5]. Based on time allocation of subjects on slide and teacher, Wei Xueting et al. found that students can pay more attention to learning material when teacher's image appears in explaining or expanding related knowledge [6].

Different researchers have different perspectives in terms of presentation of teachers. According to Han Xiaoli et al., presentation mode of teachers can be divided into 3 types, including teacher embedded mode, classroom recordings and teacher integrated mode, which are thought to have had impact on students' cognitive load with little difference [7]. Instead, the proportion and location will make impact on students' attention. When the image is presented in the top-right hand corner with a small picture, students' attention can be distracted as less as possible [8].

According to the conclusion by the American psychologist Mehrabian through numerous experiments: The impact of information is comprised of 7% speech, 38% voice and 55% facial expression. In other words, 90% of information was delivered by non-verbal behavior in information exchange. In traditional teaching, students' learning motivation can be strengthened by variable tone, exchanged eyesight, effective body language and facial expression of teachers. For online teaching, teachers can affect students' learning engagement and further learning effect by promoting their attachment to teachers via non-verbal intimate behaviors [9]. So, teachers need appearing on live streaming with smile and variable tone, so as to help students put their mind into online class better.

2.1.2 Peer Interaction

In online learning, less attention is paid to students in self-regulated learning [10], so students are likely to feel "lonely". However, effective peer interaction can promote the sense of presence and the level of self-regulated learning [10]. As showed by most of surveys and researches, our online teaching at primary and middle school is still in low-level development with more one-side information transmission of teachers and less peer exchange.

2.2 Social Support

In the early 1970s, psychiatrists studied social support from angle of science, which was followed by sociologists, epidemiologists and psychologists from their own theoretical position [11]. Many scholars also studied social support for children and teenagers, whose physical and mental development is influenced greatly by their social support system, including people they meet and their association activities [12]. Social support system of primary and middle school students is provided by their teachers, parents and online platform in online learning.

2.2.1 Teacher Support

Many researches have showed that teacher support has positive impact on students' scores, which is mainly reflected in autonomy support, cognitive support and emotional support. To be specific, in online education, autonomy and cognitive support could have a direct effect on students' self-regulation, sense of efficacy and further influence their learning engagement and academic performance [14].

Teacher's emotional support will influence students' emotion for the most of time. For example, students will feel tired of learning in online class due to lack of emotional support from teachers, which is caused by spatial separation. Based on this, some researchers conducted research on online remote learning. In test group, classroom evaluation system prepared by Robert C. Pianta was used to provide emotional support and was gradually modified based on classroom situation. In control group, subjects were provided online videos with inadequate emotional support from teachers. Research findings showed that attention to students' views and favorable learning atmosphere can alleviate learning tiredness [15].

2.2.2 Parents Support

Online education has transferred the main learning scenario to home, which will influence students' learning effect by substituting school as main learning environment. Parents' support mainly includes material and mental support. Material support includes network equipment, school supplies and other materials provided by parents. According to related research, online learning conditions including network equipment and learning site can be satisfied in most regions. However, according to relevant studies, children in urban areas can enjoy Internet facilities and school supplies more easily than children in non-urban areas because of parental reasons [24], which proves there is still a long distance to go in educational equity.

In addition, mental environment also produces great impact on students in many aspects. For example, parents with high cognition about online teaching will accompany their kids more, so as to improve their engagement in online learning [28]. According to Zhao Li and others, tiredness of learning could be alleviated to some degree if parents pay more attention to their kids [17], which is credited to parents' accompanying. Some scholars also made classification on parents based on family relationship and educational mode. It's suggested that excellent learning environment can be created by harmonious parental relationship and parenthood and learning effect proves best with relatively free learning supervision and more homework tutoring [16]. Notably, using SPSS.17, a tool

used by Li Mingyong et al. in a survey study of a district, they found that a one-way ANOVA with the number of children in different families as the independent variable and students' online learning adaptability as the dependent variable revealed that the learning adaptability of students with one child was 24.39, with one sibling 24.48, and with two or more 23.97.That is, students with "one child" and "one sibling" scored significantly higher than students with "two or more siblings" on the online learning style adaptation dimension [18]. According to Fang Wenting and others, family environment with much noise is regarded as one of factors influencing students' online learning effect [19]. Therefore, it could be concluded that students from families with many children is more vulnerable to distractions than those from one-child family. So, parents need intervening this situation.

2.2.3 Network Support

As online teaching continues, teachers' dissatisfaction to system crushes, lag and non-response of the platform in early stage of pandemic is disappearing gradually and easy sensation and controllability of the platform is perceived now. According to research on satisfaction about online teaching of primary and middle school teachers by Zeng Lianglan and others, satisfaction and perceived interest both have a positive correlation with willingness of teachers' online teaching [20]. Based on the technology acceptance model, Chao Wang conducted an online survey on primary and secondary school students using SPSS.20 and found that the standardized path coefficient β value of "perceived usefulness → willingness to participate in online learning" was 0.639, compared with the path coefficient value of "perceived ease of use → willingness to participate in online learning" ($\beta = 0.193$), it is clear that perceived usability is the biggest internal factor influencing students' online learning [21].

2.3 Teaching Competency

Many scholars started survey and study the latest dynamics of online teaching since 2020 when the pandemic broke out. The results show that teachers have high willingness of online teaching but the common problem that influences online teaching is insufficient online teaching competency. Medley et al. (1980) divide "teaching competency" into three kinds: Any specific knowledge, ability or attitude or any collection or combination of them. It can be concluded from the present situation that, under the present online and offline blended teaching mode, teachers could be capable of finishing online and offline teaching by ensuring teaching efficiency, i.e., "online and offline blended teaching competency" [22]. The requirements above pose higher challenge for teachers, who are required to connect the two teaching modes efficiency, besides improving offline and offline teaching ability. Teachers could enhance their theoretical attainment and practical ability through further research and study [23].

It is worth mentioning that training on teachers' information-based teaching is an urgent problem that needs resolving at present. After analyzing 420,000 questionnaires, Hu Yiling et al. discovered that schools do not lay due emphasis on teachers' information-based teaching skills [24].

At the same time, information sharing of online teaching plays a vital role in narrowing the "digital gap" between urban and rural area. However, unfair education has deteriorated further due to the distinct difference of information literacy between urban and rural teachers and poor online teaching competency of teachers in nonmetropolitan areas [24]. Therefore, to offer targeted training for urban and rural teachers differently and enhance their teaching competency is a required measure for enhancing students' learning effect.

3 Strategies of Enhancing Online Learning Effect

3.1 Enhance Perceived Usefulness by Trinity

Perceived usefulness means information technology user's perceiving on if one kind of specific new information technology could improve its working efficiency and if it is willing to use such technology continuously [25]. A great number of studies have pointed out that, teachers' perceived usefulness on teaching platform during online learning could influence their teaching satisfaction, which further exerts significant influence on the willingness of online teaching behavior [20]. At the same time, according to the results of questionnaire on the satisfaction of primary and middle school students on teaching software as conducted by many researchers, DingTalk software ranks first in terms of teaching effect during the outbreak of COVID-19 [26]. Therefore, it is imperative to optimize online teaching software, intensify training on online teaching skills for teachers and enhance user experience of both teachers and students. The survey and research on the parents of primary and middle school students also show that parents of primary school students vary significantly in the recognition of online teaching, which can be reflected in many different aspects, such as the value of online teaching, course, collaboration of family and school [27]. Therefore, efforts of family, school and students are required at the same time to enhance the perceived usefulness of online teaching software and even the entire online teaching.

3.2 Highlight Active Exchange to Foster Presence

Under the context of online learning at home, activities between teachers and students and between students are separated both in time and space, which leads to the lack of true emotional exchange and interaction. As a result, students are more easily to become tired of learning and suffer from affective disorder problems [29]. Therefore, it is of great importance to establish favorable relationship between teachers and students and peer relationship. Teachers must be always innovative, keep improving their capacity of online teaching, design teaching links meticulously and try more communication teaching software to ensure their efficient interaction with students. Teachers could also encourage students to establish learning group after class to offer mutual assistance or a discussion area for posting and discussion. Some researches indicate that students from only child families and students with a favorable family atmosphere could get adapted to online teaching better [18], which is probably because of a relative quiet learning environment that these families could provide. The above reminds parents of multiple-child family could pay attention to the learning environment of different children and ensure their learning quality.

3.3 Multi-party Collaboration for Mental Support

As indicated by the analysis above, supports from teachers, parents and network platform are critical to primary school students, who have insufficient independent supporting capacity and are easily apt to influence of external environment significantly. Under the context above, different parties shall work together to establish an omnidirectional system led by teachers, involving parents and supported by platform so as to support students from many different aspects, such as independence, emotion and perception. For instance, teachers could emphasize the significance of online teaching to both students and their parents before class begins; list all learning assignments before each class, and help students recognize their learning tasks clearly; in course of live streaming teaching, teachers should always notice students' behaviors, answer their questions and offer them mental support. Platforms should also provide data support so as to ensure teachers and parents could acquire data related to students' learning behaviors whenever possible and supervise their learning behaviors.

4   Conclusion

In January 2020, the Ministry of Education released the policy of "continuing with learning regardless of class suspension" under the context of COVID-19 that prevailed all over the world. As a result, all the primary and middle school students nationwide started their new learning mode of online learning at home. Online teaching of China's basic education field has entered a fast development track, triggering hot discussion about online education. On the basis of the above, the online learning effect was elaborated in this paper. According to the analysis on cnki database, social presence, social support and teaching competency are the main factors that influence online learning effect of primary and middle school students. Therefore, parents, schools, relevant education authorities and network platforms shall work together to enhance the perceived usefulness of teaching entity, foster presence and provide mental support for students. The research was carried out based on COVID-19 and the research materials were sourced from CNKI database, mainly including Chinese literature, which means certain limitation of this paper. In the future, the author can pay more attention to online teaching of different countries under the influence of COVID-19 and compare the difference of influencing factors of online teaching under the conditions of different countries.

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