

The Evolution of Online and Hybrid Teaching Policies After the Pandemic and Their Impact on Educational Equity

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Abstract. Since the outbreak of the COVID-19 pandemic in 2019, educational systems around the world have rapidly shifted to online teaching. This transformation has accelerated the application of digital technology in education and led to significant changes in educational policies. After the outbreak, online teaching has been as a regular part of the education practice is adopted. As a result, questions about equity in education have become increasingly important. This review examines the new champions league since the outbreak of online teaching and the development of hybrid teaching policy, and to explore the impact of these policies on education equity. The review focused on research published since 2019 and identified three main types of policy responses: policies related to digital access, curriculum and assessment adjustments. The findings suggest that these policies helped maintain continuity of education during and after the pandemic. However, differences still exist between urban and rural areas, families of different socioeconomic backgrounds, and students with disabilities, ethnic minority backgrounds or language barriers. The commentary notes that short-term policy responses are not sufficient to address long-term education problems. Future educational policies need to provide ongoing support and consider the diverse needs of different student populations in blended learning environments.

1 Introduction

2019 new coronavirus pneumonia (COVID - 19) since the outbreak, global education system within a short period of time online and hybrid teaching mode transformation, promote the digital process of the education. Relevant studies have pointed out that the epidemic has accelerated the application of digital technology in higher education, and the digitization of education has gradually evolved from auxiliary means to institutional arrangements [1]. After the epidemic, with the gradual recovery of offline teaching, online and blended teaching continue to exist as a normalized teaching mode and become an important direction for the long-term development of the education system [2].

With the transformation of teaching models, educational policies in various countries have undergone significant adjustments. Tilak and Kumar noted that the pandemic prompted

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structural changes in global higher education policies in terms of curriculum organization, teaching support, and resource allocation, which gradually evolved into policy issues related to educational governance and public resource allocation [3].

In this review, it is necessary to clear the key concepts used in this study. "Online teaching", defined as a teaching model that relies entirely on digital media and online platforms, has been widely used as an emergency measure amid school closures during the COVID-19 pandemic. In contrast, "blended" or "blended teaching" refers to a more institutionalized teaching model that combines online and offline elements and has become the norm in the wake of the pandemic. This distinction will help short-term emergency measures and long-term education and policy arrangements, and to examine the policy evolution and its influence on education fair provides a clearer analysis framework.

However, with the implementation of online and blended teaching policies, concerns about educational equity have attracted wide attention from both academia and the public. Existing research shows that although digital teaching can improve the flexibility of learning and access to education, it may also lead to inequalities in education due to differences in equipment access, network conditions, family support and individual ability. Significant differences exist between urban and rural areas, groups of different socioeconomic status, students with disabilities, students from ethnic minorities, and linguistically disadvantaged groups in terms of participation and learning outcomes. Therefore, online and blended teaching policies are closely related to teaching efficiency and have a profound impact on the equitable distribution of educational opportunities.

Although research increasingly, the existing research mainly focused on the specific teaching practice or study effect, and since the outbreak of systematic review of online and blended teaching policy remains limited, especially from the perspective of education fairness. In view of this gap, a literature review was conducted to answer three main research questions. First, what types of online and blended teaching policies have been rolled out since the COVID-19 outbreak, and how have these policies evolved over time? Second, how do these policies affect educational equity, especially with respect to urban-rural differences, family socioeconomic status, and disadvantaged student groups such as students with disabilities and ethnic minorities? Third, what are the key limitations and challenges that current policies can identify in the post-pandemic context? By addressing these issues, this paper aims to provide a clearer understanding of the development of online and blended teaching policies and their impact on educational equity.

2 The main types and evolution of policies related to online and blended teaching since the outbreak of the epidemic

New crown since the outbreak, online and teaching policy rapid advance in the national education system, its contents and key as the epidemic situation changes constantly adjust. Related studies have shown that the policies in the early stage of the epidemic are mainly based on emergency response, and gradually evolve in the direction of institutionalization and long-term in the post-epidemic stage [3]. In general, the online and blended teaching policies since the epidemic mainly focus on three aspects: digital intervention, teaching support, and curriculum and assessment adjustment.

2.1 Digital intervention policy

Digital intervention policies are the earliest and most extensive measures introduced by countries during the pandemic. The core goal is to ensure the basic conditions for students to participate in online learning. A large number of studies have pointed out that the government

alleviates the technology access problems caused by the shift to online teaching through the distribution of learning equipment, the provision of network access support and targeted subsidies for low-income families and remote areas [4]. To some extent, these policies enhance the possibility of students participating in online teaching, and also reflect the key position of digital infrastructure in modern education system.

In different countries and regions in the specific implementation level, equipment and network handouts cover exist significant differences on the scope and duration. Part of the policy focus on short-term emergency, emphasizing the rapid deployment and temporary support, and then the outbreak stage, part of the education system began to broadband access and digital equipment as a long-term public education resources, try to support in conventional financial arrangement [3]. Relevant studies also pointed out that the policy effect of one-time equipment distribution may gradually weaken if there is no follow-up maintenance and update mechanism [5].

2.2 Teaching support policies

With the continuous advancement of online teaching, the policy focus has gradually shifted from "whether to attend classes" to "how to give good classes", and teaching support policies have become an important issue. Teacher training is one of the core contents of such policies. A number of studies have shown that the epidemic has exposed significant differences in teachers' digital teaching capabilities, prompting countries to strengthen systematic training on online teaching tools, curriculum design and classroom management capabilities [6]. Some policies also focus on the workload of teachers and try to alleviate the extra pressure caused by online teaching by adjusting teaching requirements or providing technical support.

Meanwhile, the deployment of digital teaching platforms has become an important part of policy practice. Studies have shown that unified or official certification platforms can help improve the efficiency of teaching organizations and provide an institutional basis for curriculum management and learning data collection [7]. On this basis, some policies have begun to emphasize collaborative mechanisms between schools and families to enhance family participation in students' online learning through parent communication platforms or learning support guides [8].

2.3 Curriculum and assessment adjustment policies

Adjustment of curriculum and assessment is an important part of online and blended learning policies, which focuses on adapting to the changes in learning environment caused by changes in teaching methods. Related studies have pointed out that many education systems made flexible adjustments to the curriculum structure during the pandemic, such as reducing teaching content and reorganizing course modules to adapt to the pace of online teaching [9]. In terms of assessment, the frequency of online examinations and formative assessment has increased significantly, and teachers are more inclined to evaluate students' learning through continuous assignments, project tasks and classroom participation [7].

In addition, some policies have also rearranged the study time and the amount of homework to address the issue of students' fatigue from online learning and the increase in their study burden. Although these adjustments have enhanced the feasibility of teaching in the short term, their long-term effects still need further study, especially in terms of the impact on fairness and learning quality.

3 The impact of online and hybrid teaching policies on educational equity since the outbreak of the pandemic

Online and blended teaching policies introduced during the pandemic are primarily aimed at maintaining educational continuity and improving access to learning. However, the existing research shows that the effect of these policies varies in different social groups. Indeed, measures such as digital access support, instructional assistance and support do not eliminate the initial inequities, and their impact often depends on local conditions and social circumstances. This section therefore explores how different types of policy measures affect educational equity, with particular attention to the urban-rural divide, the socioeconomic status of the household, and the situation of disadvantaged student groups.

3.1 Urban-rural and regional differences

During the pandemic, many countries introduced digital intervention policies, such as device distribution and network subsidy programs, to close the gap in access to online learning between regions [3]. At the policy level, these measures are intended to provide students in rural and remote areas the basic technical conditions needed to participate in online learning. However, existing research shows that the actual effects of these policies vary across regions.

Urban areas typically benefit more from digital access policies because their network infrastructure is more stable and local support systems are stronger. In rural and remote areas, by contrast, students are still faced with the network connection is not stable, equipment limited supply and insufficient technical assistance related problem. As a result, students in these areas are more likely to experience disruptions to online learning even when device allocation policies are formally implemented [4]. These gaps in implementation weaken the intended equilibrium effects of digital intervention policies.

There are also policy differences in terms of teacher support. While many education systems have introduced training programs to help teachers adapt to online instruction, access to these opportunities varies by region. City schools are more likely to benefit from the organized training programs and technical support, while the rural schoolteachers tend to rely on self-study and informal resources. Tate and Warschauer show that when digital education policies are implemented uniformly without regard to regional capacities, their effects are closely related to local conditions. This process leads to regional differences in the quality of instruction, which in turn affects the learning experience of students [10].

3.2 Differences in the socioeconomic status of families

During the pandemic, the policies regarding online and blended teaching mainly aimed to ensure that students could obtain digital devices and learning platforms. Although these measures helped many students to keep contact with the school, but research shows that only focus on the admission policy is not enough to reduce family socioeconomic status (SES) related inequalities. Differences in family resources still affect students' online learning experiences in practice. Bacher-hicks et al. find that households with higher SES are better able to cope with changes in the format of instruction [11]. These families were able to invest more in additional equipment, create suitable study Spaces in their homes, and provide learning support during the online sessions. Therefore, they are often able to mitigate the negative impact brought about by school closures.

In contrast, low-income households are generally disadvantaged in terms of the number of devices, learning space, and digital skills of parents. Even with device allocation policies in place, some families still have multiple children sharing a single device, and limited home space limits students' ability to concentrate on academic tasks. Studies have also shown that parents' familiarity with digital platforms influences student engagement and task completion during online learning, which further influences the effect of policy interventions [10].

Differences in support for complementary education further limit the equity effects of e-learning policies. Higher-income families can compensate for reduced school support through private tutoring or additional online learning resources. In contrast, economic and time constraints make it difficult for low-income families to provide similar support. These differences contributed to inequalities in learning losses during the pandemic and continue to impact academic recovery once students resume face-to-face instruction [11]. Edden et al. argues that policies focused primarily on access devices ignore the importance of learning, support mechanisms and parents' digital capabilities in addressing educational inequalities related to socioeconomic status [5].

3.3 People with disabilities, ethnic minorities and language-disadvantaged groups

During the epidemic, to ensure the continuity of learning, online and blended learning policies were introduced, but to a large extent, these policies did not consider the needs of disadvantaged student groups. Existing research pointed out that in the inclusive design and disabled students, minority students and language barriers there is a gap in terms of support. The lack of adequate research has shown that many online learning platform accessibility features, such as compatibility with a screen reader, subtitles options and flexible learning format. These restrictions create practical barriers for students with disabilities and reduce their ability to benefit from online learning policies [10]. In this case, policy emphasis on rapid digital deployment often outweighs considerations for accessibility and inclusive design.

Online teaching policies have also exposed deficiencies in language support and cultural response for ethnic minority and language-disadvantaged students. In virtual classrooms, it is difficult for teachers to timely and accurately identify students' learning difficulties, and targeted language support resources are often scarce [4]. The lack of further fit between digital learning materials and cultural background affects students' learning engagement and enthusiasm.

In addition, some schools reduced or suspended offline support services for students with disabilities during the pandemic. Although certain policies attempted to replace these services with remote support, coverage and professional capacity remained limited [5]. Existing studies suggest that when inclusive design and targeted support are not integrated into the core framework of online and blended teaching policies, the diverse needs of disadvantaged students are likely to be overlooked in practice.

4 Challenges and policy gaps in the normalization of blended teaching after the pandemic

With the gradual alleviation of the epidemic, online and hybrid teaching has shifted from emergency measures to routine practice, and its policy effect and system sustainability have gradually attracted the attention of academic circles. Existing research generally believes that a number of policies introduced during the epidemic have alleviated the problem of teaching interruption in the short term, but there are still obvious deficiencies in long-term equity and institutional design [3]. These weaknesses are mainly manifested in the tension between the short-term emergency and long-term reform, the quadratic inequality of potential risks, and persistent structural challenges the teaching mode.

4.1 The tension between short-term emergency policies and long-term institutional reforms

In the early stage of the pandemic, online and hybrid teaching policies were mainly oriented to rapid deployment and temporary support, emphasizing measures such as equipment release, platform implementation, and emergency training. This kind of policy has played a positive role in the protection of education continuity in, but their level of institutionalization was limited. A key weakness lay in their temporary and non-sustainable nature. For instance, one-off equipment distribution has pointed out that one-off equipment issuance lacks maintenance and update mechanism, and its policy effect gradually weakens with equipment aging and technology iteration [5]. The broadband subsidy policy is facing fiscal sustainability issues in some countries, which makes its long-term implementation uncertain.

In addition, some emergency policies were gradually withdrawn after the end of the epidemic, resulting in a lack of stable institutional support for schools and students in the process of adapting to the blended teaching model [3]. This policy discontinuity, in part, undermines the ability of education systems to translate digital instruction into long-term reform outcomes.

4.2 Secondary inequality that may arise during the implementation of policies

Although the design of online and blended teaching policies emphasizes universal coverage, their implementation effects vary significantly across schools and districts. Research shows that urban and rural schools and different resources level when performing the same policy have conditions don't agree with each other. Some schools have sound technical support and management experience, while schools with relatively poor resources face greater pressure in platform maintenance, teacher training and learning support [2].

The way funds are allocated also affects the fairness of policies. If the allocation of resources fails to take full account of the starting point differences between schools, uniform policies may amplify existing inequalities in practice. The difference in teachers' digital ability is also one of the potential problems, as some teachers gradually accumulate experience in the mixed teaching environment, while teachers lacking systematic training have difficulty keeping up with the pace of teaching mode transformation [9]. These differences may evolve into new structural inequalities in the long term.

4.3 Long-term equity challenges under the normalization of blended teaching

With the gradual normalization of blended teaching, the influence of students' individual differences on learning outcomes has become increasingly prominent. Studies have pointed out that students have differences in learning motivation, self-management ability and digital literacy, and these factors have an important impact on learning effectiveness in a blended teaching environment [10]. Lack of corresponding support mechanism of policy design, may lead to further study achievement differentiation. At the same time, the digital divide has not completely disappeared due to the popularization of devices. Factors such as network quality, technical support and usage ability continue to affect students' learning experience. The problem of teachers' workload has gradually appeared in the long-term implementation. Mixed teaching puts forward higher requirements for curriculum design, teaching feedback and student management, and the need for related training and support has long-term characteristics [8].

In addition, online assessment and invigilation technologies have sparked new controversies regarding fairness and data privacy. The study pointed out that technical invigilation measures may cause additional pressure on students, its impact on different

groups is different, and related policies still lack adequate equity assessment in the development process [2]. These issues show that post-pandemic blended teaching policies still face multiple challenges in achieving long-term educational equity.

5 Conclusion

Through a systematic review of the literature, this paper draws several core conclusions about the development of post-pandemic online and blended teaching policies and their impact on educational equity. Firstly, in terms of policy types and evolution, the literature shows a clear shift from short-term emergency response during the pandemic to more institutionalized and long-term policy arrangements. Governments and education systems have gradually expanded their focus from basic digital access to broader areas including teacher support, platform development, and curriculum and assessment adjustments. These changes laid the foundation for the normalization of mixed teaching after the epidemic.

Secondly, regarding the impact of these policies on educational equity, the review shows that structural inequalities are still evident. Urban and rural conditions, family socioeconomic background, and personal characteristics of students continue to influence online learning access and learning outcomes. In practice, the differences in policy implementation and limited means that some social group gains more than other groups. Many online and blended learning policies were introduced as short-term responses during the pandemic, with long-term planning and stabilization support often constrained. Problems related to issues such as the digital divide, differences in teachers' digital competence, and inadequate support for disadvantaged students have therefore persisted. In some cases, these issues make existing educational gaps more pronounced in digital and blended learning environments.

In summary, this review highlights that online and blended learning cannot be understood solely in terms of technology or pedagogy but needs to be considered within broader educational equity policy discussions. Future research may benefit from a closer focus on policy practices in specific country and regional contexts, as well as examining long-term impacts through longitudinal and comparative research designs. Furthermore, with the continuous development of digitalization and blended learning, issues such as data privacy, technical regulation, and the fairness of evaluation are also worthy of further consideration. To ensure that the teaching become a stable and inclusive system that supports a fair opportunity to learn, is still the post-pandemic period a sustained challenge of education policy.

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