

# THE INFLUENCE OF EDUCATION INFORMATIZATION ON EQUITY IN EDUCATION: A LITERATURE REVIEWS

Wei FU<sup>1</sup> and Ganratchakan LERTAMORNSAK<sup>2</sup>

1 Department of Educational Administration, Graduate School, Suan Sunandha Rajabhat University, Bangkok, Thailand; s64584951008@ssru.ac.th

2 Department of Educational Administration, Graduate School, Suan Sunandha Rajabhat University, Bangkok, Thailand; ganratchakan.le@ssru.ac.th

## ARTICLE HISTORY

Received: 28 July 2023

Revised: 16 August 2023

Published: 28 August 2023

## ABSTRACT

Equity in education is one of the core requirements of a powerful country in education. To decrease the gap in the education of students in China, and to ensure that every child can receive an equitable and high-quality education, it is necessary for researchers and policy-makers to pay attention to the most effective strategies identified in numerous studies that have the potential to improve the quality of education. Education information technology is one such strategy. To get more information and a systematic understanding regarding the influence of education informatization on equity in education. A literature review synthesizes the existing literature's findings is done to explore how education informatization affects equity in education. This study begins with an overview of education informatization. And this study will also review the influence of education informatization from different equity components in education especially education outcomes, including 1) academic achievement, 2) cognitive ability, and 3) coursework acceptance. Meanwhile, articles on socioeconomic factors affecting equity in education outcomes are also reviewed for this study.

**Keywords:** Literature Review, Education Informatization, Equity in Education Outcomes

**CITATION INFORMATION:** Fu, W., & Lertamornsak, G. (2023). The Influence of Education Informatization on Equity in Education: A Literature Reviews. *Procedia of Multidisciplinary Research*, 1(8), 3

## INTRODUCTION

Nowadays, an increasing number of people are concerned about the problem of educational inequality, especially the equity of the basic education. To decrease the gap of education of students in China, the 19th National Congress of the Communist Party of China pointed out that the Chinese government should pay more attention to the development of education and improve relevant infrastructure construction, and therefore every child is able to have a fair and quality education (Wan & Xie, 2022). Furthermore, the Modernization of Education in China 2035 makes "achieving equalization of basic public education services and further promoting quality and balance" as one of the strategic tasks of national medium and long-term education reform and development. It can be seen that education equity and education quality are intrinsically linked, and it is not meaningful to talk about education equity without education quality (Chu, 2020). And equity in educational outcomes is the proper meaning and measurement of quality of education. Moreover, it is demonstrated that the equity of education will only achieve when students are all treated the same and have access to similar resources (Barth, 2016). This shows that the core issue of education equity in China, which is about to enter the future, has been upgraded to how to achieve "quality education equity".

It is known that education informatization is one of the most effective approaches to improve the quality of education (Borisenko & Volodina, 2015). And, with the development of the Internet and Information technology, education informatization has attracted more and more attention in recent years (Hu et al., 2021). Additionally, education informatization is the most realistic choice to solve educational poverty alleviation (Zhang & Wang, 2018). Informatization may help improve students' academic performance. Furthermore, informatization is conducive to promoting balanced allocation of educational resources. The unbalanced development of basic education in China is highlighted in school conditions, financial investment, and teacher level and education quality. With the help of information technology, increasing the policy inclination to rural and remote poor areas specifying the western part of China and expanding the supply of high-quality digital education resources can alleviate the problem of uneven distribution of education resources to a certain extent.

How to measure "equity in educational outcomes" is one of the key issues to be addressed in this study. There are studies that have been conducted on the multidimensional aspects of equity in educational outcomes. Summarizing the relevant studies, three conclusions can be drawn as following. First, academic performance is the universal definition of equity in educational outcomes. Second, students' cognitive level is one of the important connotations of education outcome equity in the new era. And third, although there are different levels of education outcome equity, the new trend of research has gradually shifted the pursuit of education outcome equity to higher order from the perspective of high-quality development of education, focusing on the enrichment and balance of incremental education outcomes for different students. Thus, it appears that student academic achievement, student cognitive ability level of cognitive ability, and student acceptance of coursework are among the most important indicators of educational outcomes.

Preliminary research into the logical relationship between informatization and equity in basic education outcomes reveals that there are disagreements about whether informatization can promote equity in basic education outcomes and close the digital divide, and these disagreements require empirical evidence to find evidence and basis. We must maintain the value of information technology in order to promote educational equity and avoid the establishment of a new "digital divide," that is, secondary injustice. As a result, in order to have a thorough knowledge for future research, it is required to synthesize empirical studies of information technology to promote equity in educational outcomes.

## **An Overview of Education Informatization**

In an era of knowledge economy and increasing global rivalry, all countries throughout the world are paying greater attention to the development of education informationization. The strategic development level of education informationization shows the level of national education development and influences countries' international competitiveness.

### **Definition of Education Informatization**

Education informatization refers to the process of using information technology in education teaching to reform the traditional education model in order to meet the needs of modernization and sustainability with the development of information technology, thus to achieve the goal of education modernization (Yu et al., 2005). The employment of modern technology tools in the process of education and teaching is the most significant distinction between education informatization and traditional education. Education informatization includes informatization of teaching equipment, information literacy for teachers and students, and sharing of teaching resources, leading to the conclusion that education informatization has all-round characteristics, including the entire educational and teaching process. Among these, the informatization of the teaching process is a critical link in the education informatization Chain. The following are three aspects of education informatization that are frequently disregarded. First, education informatization emphasizes educational reform in all schools, and all schools should carry out a comprehensive reform of education informatization in government micromanagement, and informatization of all schools, with the main emphasis on the entire educational field; second, education informatization emphasizes not only informatization facilities, but also informatization awareness, and schools should be equipped with appropriate hard and soft resources. To promote school informatization, teachers and students should actively identify with the informatization reform and use informatization technology in their learning. Third, there is no specific measure for the development of education informatization; it is a gradual process that develops with the development of educational resources, and the better the educational resources, the higher the degree of education informatization, and the two promote each other.

### **Character of Education Informatization**

The characteristics of education informatization can be split into two categories: technical and educational. The technical level is mostly expressed in the digitalization and intelligence of information technology, whereas the educational level is primarily expressed in the era of modern education informatization, in which education is characterized by openness, sharing, interactivity, and cooperation. The degree of information technology in China has substantially improved as a result of the rapid development of the information technology society. The integration of education and information technology has greatly facilitated the teaching and learning process, which can be carried out anytime and anywhere without the constraints of time and space. Education informatization liberates some human labor and enables the instruction of unmanned operation and human-machine complementation.

In addition to the four features listed above, education informatization includes the five factors listed below: globalization of educational resources, variety of teaching materials, autonomy of learning, virtualization of the learning environment, and cooperation. Globalization of educational resources indicates that educational resources can be shared all over the world and are not limited to a specific place as long as there is a network. Diversification of teaching materials refers to the use of information technology to create virtualized teaching materials with vivid and easy-to-accept contents, which is environmentally friendly and saves the cost of producing paper teaching materials. Learning autonomy means that students can use virtual resources on the Internet to acquire relevant stuff on their own time and in their own place. Because of the virtualized learning environment, the learning environment is no longer confined to the classroom, and students can learn online as long as they have access to the

Internet. People and machines collaborate, and people from distant places communicate and collaborate with each other online.

The process of widely deploying information technology and information systems in the field of education to improve the efficiency and quality of educational activities such as teaching, learning, management, and services is referred to as education informatization. It addresses the use of IT equipment, networks, and software applications within educational institutions, as well as the connectivity and interaction of educational systems with external resources. The goal of education informatization is to use information technology to improve the educational process and teaching environment while also encouraging individualized learning, inter-temporal learning, and collaborative learning for students. Education informatization can broaden access to learning resources, provide diverse learning methods and personalized learning support, and promote students' lifelong learning and development through digital teaching resources, online learning platforms, virtual laboratories, and distance education. Education informatization has the potential to improve the efficiency and efficacy of educational administration and services. Online academic affairs systems and student service platforms, for example, can provide convenient academic and student services such as course selection, registration, fee payment, and student guidance.

## **An Overview of Equity in Education**

Equity in education is one manifestation of social equity and justice, and it is crucial for promoting economic and social growth. Equity in education is the objective evaluation of education from the standpoint of equity, the examination and consideration of the value concept of equity at the educational level, the concrete manifestation of abstract values in the field of education, and one of the manifestations of the logical proposition of the relationship between truth and value in the field of education. Equity in education is a subsystem for gauging social equity and is an extension and expansion of the concept of equity in the realm of education. Equity in education is an aim of modern education and a fundamental premise.

### **Definition of Equity in Education**

According to the UN Universal Declaration of Human Rights, equity in education is proposed as “education shall be directed to the full development of the human personality and to the strengthening of respect for human rights and fundamental freedoms” (Zhong & Zhao, 2007). It also declares that all people have the right to an education. Moreover, it also advocated that primary education be made compulsory, technical and vocational education be made universal, and higher education be more merit-based and open to all. In 2007 the OECD proposed that equity in education begins with gender equality, ensuring that neither individual nor social factors such as gender, socioeconomic status, or ethnicity prevent people from reaching the educational heights that their abilities allow. The second component of equity in education is coverage, which assures that everyone receives a minimal, minimum level of education. This means that equity in education is not about the equal division and averaging of educational resources, not about “giving all children the same education,” but about reaching the educational level that is within one's ability based on one's situation. And that gender, age, and economic and social conditions cannot be included in the scope of the educational marker; otherwise, education discrimination occurs.

Equity in education is the cornerstone of society's smooth operation, and it is primarily manifested as 1) equity in educational opportunities, which is also refers to equity in the starting point of receiving education, 2) equity in the educational process, that related to equity in the distribution of educational resources, and 3) equity in educational outcomes, in other words it also demonstrates as equity in the realization of the educated's goals and potentials. These three are connected. Equity in educational opportunities is the starting point and fundamental premise for achieving equity in education, equity in educational opportunities and educational

process is a critical guarantee for equity in educational outcomes, and equity in educational outcomes is the ultimate goal for equity in educational opportunities and educational process. The three are mutually beneficial and necessary connections. At this point, many theoretical academics describe equity in education from both educational opportunity equity and educational process equity perspectives, or define equity in education as educational opportunity equity. As a result, equity in education in the traditional sense refers to educational opportunity equity. According to the conceptual understanding of equality, equity is an idealized state, and parity in educational attainment is even more utopian; inequalities in educational performance will always exist. The concept of equality in educational outcomes is often mistaken with equity in educational outcomes, which is the pursuit of the same educational process under the same conditions, with equal chances of success and hope for the educated. By adhering to the principle of equity in education, educated persons can receive social position, material conditions, and emotional value, among other things, in proportion to their potential and contribution, through the process of getting education. As a result, equity in education is critical for developing talent, preventing class solidification, and attaining a harmonious society.

### **The Components of Equity in Education**

Equity in education activity processes can be separated into educational opportunity equity, educational process equity, and educational outcome equity. equity in the beginning of education means that everyone, regardless of gender, race, origin, economic status, living environment, and other conditions, can enjoy the opportunity to have equal educational resources and conditions with others; education process equity refers to education in terms of both aspects between teachers and students, and both sides can treat everyone equally. The equality of educational quality is defined as equity. Equity in education begins with equity in educational opportunities, continues with equity in educational outcomes, and ends with equity in educational processes. The articulation process between the two is equity in the educational process. Educational outcome equity and educational opportunity equity. The qualitative part of education equity is equity in the educational process.

Many academics associate equity in educational opportunity with equity in education, demonstrating the significance of equity in educational opportunity. Coleman, an American researcher, introduced the notion of Equality of Educational Opportunity (EOE) in 1966, and it has received extensive academic attention since then. The 1948 Universal Declaration of Human Rights established two fundamental principles: the elimination of racial discrimination and the right of all children to an education. The 1948 Universal Declaration of Human Rights established two fundamental principles: the eradication of racial discrimination and the right of all people to an equal education. This is the foundation of the concept of equal opportunity in education (Dong, 2009).

For equality of education progress, people's desire of equity in education has changed greatly with the advancement and development of the times. People used to be too concerned with the equity of educational options and outcomes, but now the emphasis is shifting to the equity of the educational process. Nowadays, the emphasis is increasingly on the equity of the educational process. In reality, educational process equity should be at the heart of equity in education. It is both a continuation of educational opportunity equity and a prerequisite for educational outcome equity.

In terms of equality of education outcome, the realization of benefits based on individual substantive differences is referred to as outcome equity. If result equity is considered substantive equity, then educational outcome is the substantive equity in education. Educational outcome equity is the criterion as well as the goal of equity in education. Equity in educational achievements is the notion of recognizing educated people's individual distinctions and achieving equity in education. It is the cornerstone of educational growth to

achieve equity. Equity in educational outcomes refers to equity in educational outputs, which means in this regard, it is critical to ensure that each recipient achieves the same educational outcomes such as academic level, academic ability, and academic excellence after receiving the same quality and quantity of education (i.e., having enjoyed equity in education opportunities and equity in education processes). In other words, each participant achieves almost comparable results in educational outcomes such as academic level, academic aptitude, and academic cultivation after obtaining the same quality and amount of education (i.e., enjoying equity in educational opportunities and procedures).

## **Socioeconomic Factors Affecting Equity in Education**

Many research has looked at the four components that influence educational opportunity equity. First, consider the institutional level. The state and government play an important role in ensuring the rights and qualifications of educated individuals, which is a barrier to establishing and guaranteeing educational parity from the start. In investigating the impact of state policies and institutions on the distribution of educational opportunities and equity, some Chinese scholars discovered that government policies have been adjusting the original institutional settings to fit the new market economy, causing them to continue to have an important impact on resource distribution in the new situation. This implies that the increase or decrease in disparity in the distribution of educational opportunities is closely related to relevant government actions (Coleman, 1988). Because the state plays a macro-regulatory role in the system, it directly determines whether educational opportunities and rights of the educated are guaranteed through the allocation of educational resources, which has a large impact on the equity of educational opportunities (Schleicher & Zoido, 2016).

The second aspect is economic. Coleman stated in his 1966 report that the most important element influencing pupils' academic achievement is not schooling or teachers, but the socioeconomic level of students' families. The educated's family circumstances also influence the educational resources they receive; the better the family's economic circumstances, the more subjectively the family values their children's learning and objectively provides more, better-, and better-quality educational resources for their children, and vice versa (Sledg, 2016). However, as compulsory education became more popular and society developed, the influence of economic reasons on the equity of educational possibilities for the educated has gradually lessened, and the concept of education has increasingly surpassed economic factors.

The third consideration is the educational level. The school is an educational opportunity in and of itself, and as a direct user of educational resources, it influences the distribution and efficacy of other educational chances to some extent. Although schools and teachers have far less influence on educational opportunity equity than the economic factors of the family, as educational reform advances and schools assume responsibility for providing equal educational resources, the degree of influence of the factors within them on educational opportunity equity grows.

## **The Influence of Education Informatization on Equity in Education**

This part describes the impart of education informatization of equity of educational outcomes including academic achievement, cognitive ability and coursework acceptance of students.

For, academic achievement is the measurement of student performance across a semester in various subjects, and it is usually represented by the grades students have for particular subjects. It is demonstrated that the use of information technology in the classroom is a protective factor for academic achievement; in other words, the use of information technology in the classroom will increase students' academic achievement (Rashid & Asghar, 2016). And the higher the level of informatization in the school, the better the average academic performance of students (Hu et al., 2021).

In terms of cognitive ability refers to a person's ability to process thoughts. It is skills your brain uses to complete essential day-to-day tasks like thinking, learning, reading, remembering, speaking, listening and paying attention. Although cognitive ability is nature in the brain, one can develop them by improving himself/ herself. Existing research found that cognitive ability test scores for students in different schools with varying levels of informatization differ significantly, and students who study in schools with higher levels of informatization are more likely to have higher cognitive ability test scores (Flowers et al., 2000).

Moreover, coursework acceptance mainly refers to how students act during the class, whether they pay attention to the lessons or not, and how they recognize the lecture. The existing study showed that information-based teaching applications can significantly and positively predict coursework acceptance, which means that the students' study in schools with higher level of informatization teaching application are more likely to accept their coursework. While it is found that information technology infrastructure and educational resources can significantly and negatively predict coursework acceptance, that is, the schools with higher level of informatization infrastructure and educational resources may decrease the coursework acceptance ((Hu et al., 2021). The opposite conclusion suggests that there is necessary to study in-depth to find how informatization affect coursework acceptance. However, there remain uncertain for how all the components of education informatization worked together to affect different indicators of equity of education. And whether there is a synergistic effect of various components of education informatization on the equity of education is still unknown. As a result, the study focuses on the influence of different types of education informatization on the equity of education specifying the details is necessary to be done in order to reduce the gap of equity of education of students in China.

## CONCLUSION

Based on the existing literature, it is demonstrated that socio-economic factors, for example, economic status of family of students related factor such as educational level and occupation, government policies, school level factors including the location of school and the technology level of school, as well as, the capacity of teacher are all the predictors of equity in educational outcomes. Furthermore, the studies evaluated that are relevant to the association between education informatization and components of equity in educational outcomes illustrate education informatization may have a good effect on academic achievements and cognitive ability. Furthermore, it is unclear whether education informatization will affect coursework acceptance positively or negatively, thus further research for in-depth research is required to determine the relationship. Meanwhile the conceptual framework for further study of the association between education informatization and equity in education specifying education outcome is proposed by this study.

The core positioning of education informatization plan is to serve two essential purposes of education development: enhancing education quality and advancing education equity. In other words, education quality and equity are the primary criteria for determining the effectiveness of education informatization techniques. This fact informs us that when analyzing the impact of education informatization on educational progress, we need look beyond the "quantity" level. We should consider not just the popularity of information technology in education, but also whether it has enhanced education quality and promoted educational equity at the "quality" level. The impact of information technology on national education development should be assessed not only at the "quantitative" level, but also at the "qualitative" level, to determine whether information technology has the effect of improving education quality and promoting educational equity.

More research is needed to examine the impact of education informatization on educational equity, particularly educational outcomes that directly indicate the outcome of equity in

education. Because multiple research projects have shown that education informatization can be a factor in enhancing educational equity. As a result, the primary goal of this study is to investigate how different types of education institutionalization, such as 1) the related infrastructure of the school, 2) the technology resources, particularly the technology platforms of the school, and 3) whether teachers used these kinds of infrastructure and resources in their educational process, affect the equity of educational outcomes such as academic achievement, cognitive ability, and coursework acceptance of students. Furthermore, how socioeconomic factors affect educational fairness is taken into account in this study. And it will be done from three perspectives: demographic aspects connected to students, teachers, and economic elements associated to the school where student study.



**Figure 1** Conceptual framework for further study

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**Data Availability Statement:** The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

**Conflicts of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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