



The Impact of Digital Literacy on Learning Outcomes in the Context of Educational Digital Transformation

Yue Wang

Xi'an International Studies University, Xi'an, Shaanxi, China

107242021000640@stu.xisu.edu.cn

Abstract. In the context of the digital transformation of education, digital literacy is becoming increasingly important for learners. At the same time, other regions struggle to meet the needs of digital literacy development, especially in poor areas. This paper argues that this disparity is also a manifestation of educational inequality, which also makes it difficult for students with low digital literacy to develop high digital literacy. This paper analyzes some benefits and problems of digital use in education. Based on the benefits and problems, this paper indicates the necessity of acquiring high digital literacy and gives some suggestions to learners with unsatisfying digital literacy. This paper suggests that learners should focus on improving their information retrieval skills to obtain more digital learning content. Secondly, learners should pay attention to cultivating their self-regulation ability, that is, network self-control, to give full play to the positive and positive function of the network in learning.

Keywords: Digital Transformation of Education, Digital Literacy, Learning Outcomes, Learning Motivation.

1 Introduction

With the development of technology, the Internet is playing more and more important roles in people's lives. In the context of the digital transformation of education, traditional pedagogical methods are being influenced. On the Internet, there is a lot of information when learners are searching for their target knowledge. The ability to search for information on the Internet, which is a part of digital literacy, seems to be of great importance. Paul Gilste described digital literacy as the "use and understanding of information in the digital age" ^[1]. People should be able to get the information they want in the ocean of the internet. He also pointed out that digital literacy refers to the attitude, understanding, and skills to effectively process and communicate information in a multimedia environment. It mainly includes the ability to acquire, understand and integrate digital information, including skills such as Internet search, hyper-text reading, digital information criticism, and integration. For students and learners, it is necessary to get extra knowledge from the Internet in this informational era. Learning online is also accepted by more and more people, especially during the COVID-19 era. In China, many of the students have lessons during the COVID-19

© The Author(s) 2024

Y. Li et al. (eds.), *Proceedings of the 2024 3rd International Conference on Science Education and Art Appreciation (SEAA 2024)*, Advances in Social Science, Education and Humanities Research 866,

https://doi.org/10.2991/978-2-38476-291-0_49

era, too. But surprisingly, it is the first time for the students to use the computer for the first time. Many of them could not search for target information on the Internet. This paper mainly focuses on the necessity of digital literacy and problems to avoid when learning and gives some suggestions about digital use in education in the contemporary era.

2 Core Conception

2.1 Current Situation

According to the Statistical Report on Internet Development in China in 2023, The number of netizens in China reached 1.079 billion, and the Internet penetration rate reached 76.4 percent. Many Chinese people can use the Internet. For children, almost all of them surf the Internet. Indeed, many children can use the Internet and search for information well. The digital literacy of current students still falls short. The methods and effectiveness of digital literacy education for students in society and schools also need to be improved. Chen's report extended that in many libraries activities like camping about cultivating children's digital literacy were launched ^[2]. And the activities were fruitful. However, there are still deficiencies in the digital literacy of current students. The way and effectiveness of digital literacy education for students in society and schools also need to be improved. Libraries in undeveloped areas could not organize such activities well. In the Hebei public library, the activities about children's digital literacy were not done very well. Monotonous teaching content, outdated facilities, low attendance rate of the lesson, and lack of publicity make the cultivation of children's digital literacy hard to promote ^[3]. The example of the Hebei public library is a representative of China's digital literacy education in undeveloped cities.

In some poor areas, things go even worse. Children's digital cultivation activities do not even exist. Indeed, some children have high-level digital literacy, but many children have little digital literacy. In He and Zhu's report on rural left-behind children's digital literacy, they analyzed a sample of 258 girls and 249 boys who were all 10 to 15 years old. They found that only 38.86 percent of the children thought they could search for information online deftly, other children merely use the Internet to get themselves entertained ^[4]. Short video apps like TikTok can be the most accepted apps for children. The problem with short video apps is that the apps would push information instead of asking users to search for information. The pushing system would make users depend on apps more rather than think individually. The apps would harm children's digital literacy if they are using the apps from the first time they use the Internet ^[5].

The former research has shown that children's digital literacies are not at the same level. The imbalanced resources and attention paid to children's education about digital literacy would make the gap larger. This is one of the reasons why most of the students who have high performance are in developed areas.

2.2 Digital Transformation of Education

The digital transformation of education is an epoch-making process of systematic educational innovation, which involves the deep integration of digital technology into all aspects of education, from teaching paradigm, and organizational structure to teaching process and evaluation method, all of which have experienced all-around innovation and change^[6]. This transformation has transformed education from traditional supply-driven to demand-driven, with greater emphasis on quality and equity in education and support for lifelong learning. Through this transformation, the education ecology has been reshaped to become more open, adaptable, flexible, and sustainable, laying a solid foundation for future education development.

2.3 Learning Performance

When talking about learning performance, learning evaluation must be mentioned. Student's learning performance should be valued. Learning evaluation can be classified by many aspects. In the time aspect, learning evaluation can be diagnostic evaluation, formative evaluation, and summative evaluation. These 3 kinds of evaluation value students at times before, during, and after curriculums. They focus on students' starting levels, learning processes, and the outcomes. Learning performance also has something to do with other factors, such as learning motivation and learning anxiety.

3 Relationship Between Digital Literacy and Learning Performance

3.1 Good Effects

Proper use of the Internet can be good for learning. High digital literacy may help students adapt to study in the current era. Today, learners are asked to be better, blended learning is a good example. To learn without limitation of time and space, students can learn online, and with the traditional model of getting knowledge with teachers face to face, that is so-called blended learning. Digital literacy can be a mediate variable between students' sense of learning tasks and students' blended learning adaptability^[7]. That is to say, students' sense of learning tasks has a positive predictability of digital literacy. Meanwhile, digital literacy has a positive predictive ability for students' blended learning adaptability. High digital literacy is not good for students when students face matters of adapting such a model of learning but also required in new models till new high technology is produced.

High learning competencies sometimes require students to have high digital literacy. Excellent students need to raise their level of digital literacy to help them learn better. In a research of 243 English major students, Hua did surveys to figure out students' digital literacy's effect on their self-learning performance. The author processed digital literacy as practical skills, knowledge acquirement, sharing and communicating, solving problems, and entertaining; learning performance was valued as learning motivation and self-regulation^[8]. The result was that the dependent variables

(learning motivation and self-regulation) were all in direct proportion to the independent variables (digital literacy). This can be evidence that students with high learning motivation and abilities of self-regulation are more likely to search for information online to solve problems. Hua thought that educators must manage to cultivate students' digital literacy and self-regulation so that students can use the Internet to learn when necessary ^[8].

Digital literacy can sometimes motivate students. It is a kind of washback effect. For instance, game-based learning, which requires digital literacy, can motivate students. In Sudan, research about outdated children showed a project of game-based learning can prominently increase the children's abilities in mathematics and language use ^[9]. There is also evidence that proves digital literacy has benefits on learning motivation and learning outcomes. Ming-Hung Lin et, al. did research about the effects of digital literacy on learning motivation and learning outcomes, and they found that digital learning can make learning time longer. In this way, students would perform better ^[10]. Not only for students, digital use is also good for teachers, as the authors revealed.

In Lin, Chen, and Liu's research, the three authors also mentioned that digital use can be good for teachers in class ^[10]. Good digital use can create atmospheres that support students to study, in such an atmosphere, students will engage themselves in class more. The teachers can get different experiences and promote their profession. The practical significance of a teacher's digital literacy does not manifest only in class. In Liu's eyes, teachers' digital literacy can cater to the needs of the era, enhance education adaptation, and promote teachers' professional development ^[11].

All above might be evidence that high digital literacy and proper use of the Internet can be good for learning. Education is mutual for teachers and students. In a rapidly developing era, two aspects of education should both develop high digital literacy.

3.2 Problems

High digital literacy does not always represent good learning performance. The use of the Internet would bring some negative effects on children's study performance. The bad effects mainly manifest in 2 aspects: Internet addiction and improper information.

One of the manifestations of students' lack of digital literacy is the weak self-control of the Internet, which will lead to the phenomenon of Internet addiction, thus affecting their learning and development. In traditional views, using the Internet is harmful to learning. Parents are nervous about their children surfing the Internet too much instead of reading books. Internet addiction is detrimental to learning. Moreover, it is detrimental to children's mental health. In 2018, WHO announced that video game addiction was added to the Classification of Diseases, which symptoms are that playing video games uncontrollably and more and more often video games are placed before other life interests, and continuing or increasing the time spent playing video games even if there are negative consequences. In 2018, the National Health Commission defined "Internet addiction" to be uncontrolled impulsive Internet use in the absence of addictive substances, the symptoms are significant academic, occupational, and social impairment. Children have low abilities to control themselves. It is easy

for them to be addicted to the Internet. He and Zhu's research showed that left-behind children use the Internet very often, more than one-fifth of them use a smartphone over 7 hours a day ^[4]. Internet addiction can affect students learning. Chen's view is that Internet addiction would make students distracted so highly effective classes can hardly be built. In addition, Internet addiction can make students' learning efficiency low and ruin the students' self-learning sense.

Information discriminating ability is an important manifestation of digital literacy. However, students with insufficient digital literacy are difficult to screen and distinguish between true and false information in the network, and improper information will hurt students' cognition and behavior. There are lot of information that should be banned for children on the Internet, unfortunately, it is impossible to avoid the information being seen by the children. The left-behind children in He and Zhu's research were getting unproper information easily ^[4]. Children do not have abilities to distinguish things online; they do not have the sense to protect their privacy when chatting with strangers online. If parents do not lead their children properly, children will be affected by the Internet in a wrong way.

4 Suggestion

Digital literacy is necessary in modern days, so all of the children should develop it. Otherwise, children would be left in time. In previous reports, the imbalance of resources and attention put on different areas was revealed. That gives learners from different areas different opportunities to develop digital literacy. Fortunately, there are many free resources that are easy to get online for beginners to develop digital literacy. Learners can develop their digital literacy by searching for easy-finding resources online. For governments, it is important to pay more attention to undeveloped areas, education equality is always an important affair.

4.1 Suggestions of Getting Resources

Although resources offline are few in poor areas, resources online are easy to get. There are a lot of apps that contain many free or cheap resources for learners to learn. Learners should use the apps by searching for information rather than waiting for the apps to push information. In this process, learners can cultivate basic digital literacy and get a high level of digital literacy from the contents. For governments, more resources and attention should be paid to activities and policies for cultivating digital literacy.

4.2 Suggestions for Avoiding the Disadvantages

To get rid of shortcomings of digital use, learners should develop a fatal competence, self-regulation. Self-regulation is the premise that learners would not get lost when using the Internet. Beginners can ask others to regulate them and gradually get used to regular right using. Parents should get involved when cultivating their children's digi-

tal literacy, they are the ones to take the responsibility to avoid Internet addiction of their children; rightly leading them instead of letting them use the Internet freely can make the children develop digital literacy that can be used in practice. Parents' involvement can also prevent children from absorbing card information online to some degree.

5 Conclusion

In the current era, everything is developing rapidly. It is astonishing that in decades, the Internet can have such a big influence on normal people's lives and affect their learning. At present, a new technology called AI is doing revolutions in many fields including education. Digital literacy is becoming more and more important in the current time, and even in the future, it would be importance more. With reforms in education, the appearance of new models of pedagogical methods like bended teaching requires learners to get high digital literacy. In the future, higher and even much higher digital literacy would be required. For both teachers and students, digital literacy is necessary.

However, the Internet used in class can be Pandora's box. Internet addiction is a kind of cyber-illness. As an important content of digital literacy, self-regulation should be attached to great importance for children. And it is also necessary to prevent children from getting improper information.

References

1. Paul, G.: Digital literacy. John Wiler & Sons, Inc (1997).
2. Chen, M.: The impact of "Internet addiction" on Mathematics teaching in primary and secondary school students (eds.) Proceedings of the 6th Academic Forum on Life Education 27-29 (2023).
3. Wang, Y. W.: research on current situation and optimization strategy of digital literacy education services for primary and secondary school students in public libraries of Hebei Province. Baoding: Hebei University (2023).
4. He, C., Zhu, F. J.: Investigation on the status quo of Internet media use and media literacy of left-behind children in the era of intelligent media. News World (02), 46-49 (2024).
5. China Internet Network Information Center released the 52nd Statistical Report on the development of China's Internet Network. Journal of National Library of China 32(5), 13 (2023).
6. Zhu, Z. T., Hu, J.: The essence of education digital transformation analysis and research prospects. China Audio-Visual Education (04), 1-8+25 (2022).
7. Lu, J. Y.: The influence of learning task design on college students' blended learning adaptability: the mediating role of digital literacy. Jinhua: Zhejiang Normal University (2023).
8. Hua, W. F.: A study on digital literacy and autonomous English learning. Foreign Language Teaching (05), 66-70 (2020).
9. Brown, F. L., Farag, A. I., Hussein, A. A. F., Radford, K., Miller, L., Neijenhuijs K., Jordans, M. J. D.: Can't wait to learn: A quasi-experimental mixed-methods evaluation of a

- digital game-based learning program for out-of-school children in Sudan. *Journal of Development Effectiveness* (3), 320-341 (2023).
10. Lin, M. H., Chen, H., Liu, K. S.: A study of the effects of digital learning on learning motivation and learning outcome. *EURASIA Journal of Mathematics, Science and Technology Education* (7) (2017).
 11. Liu, W. K.: The realistic value and improvement path of teachers' digital literacy. *Educational Criticism* (03), 115-118 (2023).

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

