

Using cultural capital to analyse the digital divide experienced by students living in remote areas

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ABSTRACT: This study investigated the digital learning of children living in remote areas of Taiwan and the cultural capital investments made by their parents. The interactive effects between these two factors were then demonstrated to infer the research conclusion. The results obtained were as follows: 1) the current digital learning status of students living in remote areas was satisfactory, although the scores for information accessibility were far lower than those for information application performance; 2) comparatively, the cultural capital investments made by the parents of these students were significantly lower, with embodied cultural capital scoring far less compared to objectified cultural capital; 3) the digital learning results of students from high cultural capital families were significantly superior to those for students from low cultural capital families; 4) the cultural capital investments of parents had a positive effect on the digital learning results of their children; and 5) during the digital learning process, information ethics and literacy play a mediating role between information accessibility and information application. In conclusion, the cultural depth and related behaviours inherited from parents were a factor that contributed to a digital learning divide, the effects of which warrant increased public attention.

Keywords: Cultural capital of parents, digital divide, digital learning

INTRODUCTION

The beginning of the 21st Century has been characterised by the emergence of information and communication technology (ICT) and the change in global communication induced by the digital environment. Every country in the world places great importance on ICT development trends and they are actively proposing macro policies to provide a blueprint for information development. Because of its constant development, ICT has become an inseparable aspect of life. Furthermore, the differences in ICT knowledge acquisition, usage conditions and application levels have led to inequality in the information society, increasing the gap between people regarding their information sufficiency. This has created a so-called digital divide. In other words, to prevent information sufficiency from transforming into an M-shaped hierarchy, governments have committed to improving information infrastructures and enhancing students' information processing abilities through the education system.

Research has shown that the establishment of relevant ICT policies also generates disparities in people's ability to understand ICT, as well as their use habits and application ability [1]. For example, although the Taiwanese government encouraged the switch from an analogue to a digital broadcast system from 30 June 2012, the majority of the public only understood the need to replace old TV, not the objectives of information and digital policies. This limited understanding resulted in the public lacking the ability to respond appropriately, leading to limited compliance. This also caused economically disadvantaged families to experience further adversity by depriving them of their television viewing rights. Therefore, to examine this issue of a digital divide, research must consider not only the level of ICT accessibility, but also the public's ICT information literacy and application ability. This study adopted these three equidistant dimensions as the criteria for measuring the digital divide to explore the correlation between these factors, achieving one of the research objectives.

Another topic that requires urgent consideration is the gap between urban and rural areas. This gap manifests not only as an economic issue, but also a digital learning issue. According to research conducted by the Organisation for Economic Co-operation and Development (OECD), the digital divide refers to the disparity resulting from the varying opportunities that individuals, households and local organisations have to access ICT resources, with the situation being significantly less favourable for people residing in remote areas compared to cities or densely populated regions [2]. However, education practitioners understand that *...education must be fully implemented regardless of the level of adversity*. The learning rights of disadvantaged groups should not be ignored. Characterised by comparatively poorer

socioeconomic conditions, the learning environment offered in remote towns naturally differs from that in cities. However, if students in remote areas are also unable to access digital learning because they cannot afford computers, difficulty connecting to global information occurs, further generating learning barriers. Therefore, this situation necessitates exploration of the digital divide in remote areas, as examined in this study. For this investigation, the Bourdieu theory of social capital was adopted as the theoretical framework. This theory asserts that differences in the cultural conditions of parents generate differences in the economic or employment performances of their children [3].

Other studies have indicated that high cultural capital families provide children with more learning resources and that the academic performance of students from such families is typically superior [4]. Thus, if a family's lack of cultural capital leads to differences in digital learning opportunities, students' academic performances will be impaired, creating so-called double barriers. However, studies exploring the phenomenon of a digital divide among students by considering their parents' cultural capital are rare. Therefore, in this study, parents' cultural capital investment was set as the independent variable and digital learning results set as the dependent variable. The correlation between information access, information ethics and information application was subsequently explored.

LITERATURE REVIEW

The Connotations of a Digital Divide and the Research Related to It

The term *digital divide* is frequently used to describe unequal access to information resources. Considering related literature, discussions of a digital divide typically involve the following aspects: 1) the definition of a digital divide [5]; 2) the connotations of a digital divide [6]; and 3) the cause and details of a digital divide [7]. Since 1995, the US Department of Commerce has conducted a long-term investigation tracking the digital divide phenomenon. The method of investigation uses individual computer and Internet accessibility for the basis of assessing digital imbalances. Accessibility is defined as individual computer ownership and Internet access (*haves* or *have nots*), and usage rates (*does* or *does not*).

Himma contended that an information gap should not only denote a gap between individuals' access to and use of information technology, but should also include gaps in opportunities and the ability to apply information because of socioeconomic background differences [8]. A number of studies have also explored the information technology accessibility disparity between countries, as well as ethnic groups. Tseng and Wu supported and proposed similar views. However, with advancements in ICT, new interpretations of the definitions for a digital divide have also emerged [9].

Before conducting an investigation, Tseng divided the concept of a digital divide into *quantity* and *quality* [10]. Regarding quantity, her study primarily explored the gap in information accessibility, which includes the ownership of a computer, Internet access and Internet usage behaviour, using clear, quantitative data to measure the digital divide based on information hardware, Internet prevalence and ICT infrastructure implementation. Concerning quality, the study evaluated information competency, which comprised the characteristics of usage cognition and application ability.

Hargittai and Hinnant also indicated that when analysing digital divide, user ability and performance should also be considered [11]. The American Association of School Librarians [12] and Niederhauser et al [13] contended that students of the Information Age should, to a greater extent, develop the ability to use information; thereby, transforming themselves from passive information recipients into persons capable of employing knowledge and innovation to solve problems. Comprehensive cognition of information competency should include the ability to use, search, employ, monitor, innovate and share information [14]. Scholars in both the public and private sectors have suggested that when discussing the concept of a digital divide, the level of information accessibility and users' information literacy and application ability should be investigated [15]. In addition to exploring the indicators of a digital divide, digital divides resulting from differences in personal and family backgrounds also demand significant attention [16]. Numerous studies have shown that parents' socioeconomic status, education levels and cultural differences are all factors that may contribute to a digital divide.

Framework and Connotations of Cultural Capital Theory

Cultural capital theory was proposed by the famous French sociologist Pierre Bourdieu (1930-2002) in the 1960s based on his reactionary thoughts regarding the forces controlling social classes. He argued that socioeconomic conditions could not fully explain class differences and suggested the concept of non-financial cultural capital [17]. Bourdieu asserted that cultural capital can be inherited by various means to cultivate cultural depth; thereby, improving social mobility [3].

Culture develops from the sentiments, customs and habits of people; family inheritance and learned behaviour engender what is known as *cultural reproduction*. In addition to social and economic differences, cultural reproduction inputs can also generate class mobility. Cultural levels can be enhanced by using tangible or intangible cultural investments to prompt the external environment to offer new prestige or recognition to individuals. Bourdieu defined cultural capital as an individual's implicit and explicit behaviours projected onto the refined culture of the upper classes, characterised in the form of social recognition [18].

Conversely, Lin contested that cultural capital represents all the cultural resources that individuals can possess in the social structure or that the acquisition of cultural depth results from the combined effects of long periods of socialisation, indoctrination and assimilation, after which cultural qualities and tastes slowly emerge. In other words, the more abundant the cultural capital is, the higher the individual's status becomes [19].

To measure cultural capital, Bourdieu divided the concept into three types: objectified, embodied and institutionalised [18]. Objectified cultural capital denotes the investment of tangible cultural items, such as the acquisition and ownership of property, clothing, food, luxury goods and artworks. Embodied cultural capital, which is intangible, denotes projected qualities of appearances, conversation style, taste and cultivated demeanour. Institutionalised cultural capital generally refers to official diplomas, certificates or important qualifications that an individual has received from an institution. Generally, the amount of time required to acquire embodied cultural capital is longer because the internal transition process is relatively slower. Therefore, embodied cultural capital is commonly attained by *being in the environment*.

Although the majority of the population considers the acquisition of cultural artwork a shortcut to possessing cultural manifestations, it has a relatively minimal effect on the individuals and does not reveal their cultural depth. Regarding the acquisition of tangible certificates and qualifications to demonstrate social status, this requires rigorous processes and significant effort, with time also serving as a critical factor. Combining the above theories and related research, the author of this study defined cultural capital as the sum of cultural cultivation and cultural depth activities that parents invested in their children. The concept of cultural capital was, then, divided into objectified, embodied and institutionalised cultural capital before being transformed into quantitative indicators to measure their differences.

A number of studies have shown that academic achievements and digital learning satisfaction possess a positive correlation [20]. The addition of cultural investments as a variable indicates that the higher the proportion of household expenses related to culture is, the more positive the effects on children's academic performances, school attachment and self-efficacy [21]. However, literature shows that varying geographical regions contribute to differing perspectives regarding the dependent relationship between family cultural capital and digital learning [22]; thereby, necessitating the investigations of this study. This study surveyed students from remote areas to examine whether the amount of cultural capital investment influenced their digital learning results, which was proposed as Hypothesis 1. Then, whether a causal relationship existed between the two factors was explored in Hypothesis 2. Finally, the correlation between information accessibility, information literacy and information application was considered in the proposal of Hypothesis 3.

METHODOLOGY AND ANALYTICAL RESULTS

To conduct this study, the questionnaire survey method was employed. The design of the questionnaires was based on digital learning and literature related to cultural capital theory. The answer choices were developed using a 7-point Likert scale that ranged from *strongly agree* to *strongly disagree*. After the draft questionnaire had been reviewed and appropriately modified by experts, a pilot test was conducted. Regarding the construct validity of this study, exploratory factor analysis was conducted, where principal component analysis was combined with the maximum variance method to perform an orthogonal rotation.

Three common factors, possessing an eigenvalue greater than one, were extracted from the digital learning items; these eigenvalues were 2.279, 2.157 and 5.937, and represented information accessibility, information ethics and literacy, and information application. These three common factors explained a variance of 15.19%, 14.381% and 39.579%, generating a cumulative explained variance of 69.15%. Concerning the cultural capital of parents, two factors were extracted from the items using principal component analysis. These factors exhibited an eigenvalue of 3.609 and 1.431 and represented embodied cultural capital and objectified cultural capital, with an explained variance of 27.406% and 22.995%. The cumulative explained variance was 50.401%. The internal consistency reliability (Cronbach's α) for digital learning and the cultural capital of parents was 0.812 and 0.785.

The formal questionnaires were distributed to students studying at junior high schools in remote townships of Pingtung, Taiwan. Overall, 551 (96.67%) valid questionnaires were returned. Although the descriptive statistics showed an overall digital performance of 4.64, their information accessibility ($M = 4.22$, $SD = 1.66$) was relatively lower than information literacy and information application. This indicated that the digital learning environment for students living in remote areas was poorer than expected, and only reached a mediocre level. However, the poor ICT environment did not hinder the students' information learning performance, verifying the presence of a well-established education system and student focus on information education.

Data in Table 1 indicate that the total cultural capital was comparatively lower ($M = 3.56$, $SD = 1.24$); the average embodied cultural capital was 2.66, far less than the objectified cultural capital ($M = 4.16$, $SD = 1.36$). This suggests that families living in remote areas experience a severe absence of embodied cultural capital investments, which results in the students lacking embodied cultural depth. Although nearly all the parents understood how to add cultural and artistic furnishings to their home, they were unsure of how to improve their children's embodied cultural depth. This phenomenon is not restricted to families living in remote areas; most parents are busy with work and rarely have time to interact with their children. In addition, they are unable to join their children in participating in activities that cultivate

their cultural depth. These findings reflect contemporary parents' preference for materialism over spiritual culture. The test results for the other hypotheses proposed in this study are presented below.

Table 1: Digital learning analysis summary ($N = 0\ 551$, t -test value = 4).

| | <i>Mean</i> | <i>SD</i> | <i>t</i> | <i>DF</i> |
|------------------------------|-------------|-----------|-----------------------|-----------|
| Information accessibility | 4.22 | 1.66 | 3.13 ^{***} | 550 |
| Information ethics | 4.59 | 1.04 | 13.27 ^{***} | 550 |
| Information application | 5.21 | 1.68 | 16.97 ^{***} | 550 |
| Overall digital learning | 4.64 | 1.04 | 14.48 ^{***} | 550 |
| Embodied cultural capital | 2.66 | 1.44 | -21.70 ^{***} | 550 |
| Objectified cultural capital | 4.16 | 1.36 | 2.71 ^{***} | 550 |
| Overall cultural capital | 3.56 | 1.24 | -8.34 ^{***} | 550 |

^{***} $p < 0.001$

- H_{01} : There is a significant difference between the culture capital of students' parents and the digital learning performance.

To explore the cultural differences of parents, the K-means clustering classification method was used to divide the sample cultural capital scores into various levels: high culture parents accounted for 42.3% of the sample and low culture parents accounted for 57.7%. A single-factor multivariate analysis of variance (one-way MANOVA) was conducted to understand whether the level of culture generated a difference in students' digital learning.

The statistical results showed that the difference in cultural capital had a significant effect on students' overall digital learning performance (Wilk's $\lambda = 0.320^{***}$), and that the effect was significant for information accessibility ($F = 293.304^{***}$), information literacy ($F = 497.235^{***}$) and information application ($F = 445.583^{***}$). The results also showed that students from the high cultural resource group possessed superior digital competence compared to students from the low cultural resource group. To reduce this disparity, the importance of both cultural depth and digital learning performance must be communicated to parents to facilitate these students in promptly adapting to the imminent digital learning era.

- H_{02} : The cultural capital of parents has a positive effect on the digital learning results of their children.

Based on the path hypotheses, both the independent variables and the dependent variables in the test structure model were examined for linear causality relationships. A significant regression path coefficient value indicated that a direct effect existed between the causal variables; otherwise, no direct effect existed between the causal variables. These results are shown in Table 2 and Figure 1. These results suggest that besides the cultural capital of parents, all other variables had a positive effect on information application. These findings partially confirmed H_{02} . The linear dependencies can be interpreted as children's increased enjoyment of digital resources when parents allocate greater attention to cultural capital investments, which enhanced the information competency of the children. This indicates that cultural differences can produce a divide in the digital learning of children.

- H_{03} : Information accessibility, information ethics and information application are interrelated.

Based on Figure 1, the path coefficients of the three variables were positive and achieved significance. This result indicates that information accessibility simultaneously influenced information ethics and literacy ($\gamma = 0.322$, $p < 0.001$) and information application ($\gamma = 0.424$, $p < 0.001$). Therefore, information ethics can be considered a mediating variable. The mediating effect was tested using the Sobel Z test, where the Z value achieved a significant effect ($Z = 4.299^{***}$, $p < 0.001$). Information accessibility exhibited a direct effect of 0.424 on information application and an indirect effect of 0.087 ($0.322 \times 0.271 = 0.087$), achieving a total effect of 0.511. These results showed that information ethics and literacy clearly possessed a positive mediating role between information accessibility and information application. The key to good overall digital learning abilities is the supply of a high-quality digital learning environment, followed by correct use of computers and the Internet. This allows students to enhance their computer and information competencies and generate positive and perpetual learning capacity.

Table 2: Regression results of research hypothesis structure.

| Independent variables | Dependent variables | Standardised coefficient β | <i>t</i> |
|-----------------------------|---------------------------|----------------------------------|-----------------------|
| Cultural capital → | Information application | -0.05 | -1.324 |
| Information accessibility → | | 0.424 | 11.258 ^{***} |
| Information ethics → | | 0.271 | 7.191 ^{***} |
| Cultural capitals → | Information literacy | 0.342 | 9.137 ^{***} |
| Information accessibility → | | 0.322 | 8.610 ^{***} |
| Cultural capital | Information accessibility | 0.197 | 4.717 ^{***} |

^{***} $p < 0.001$

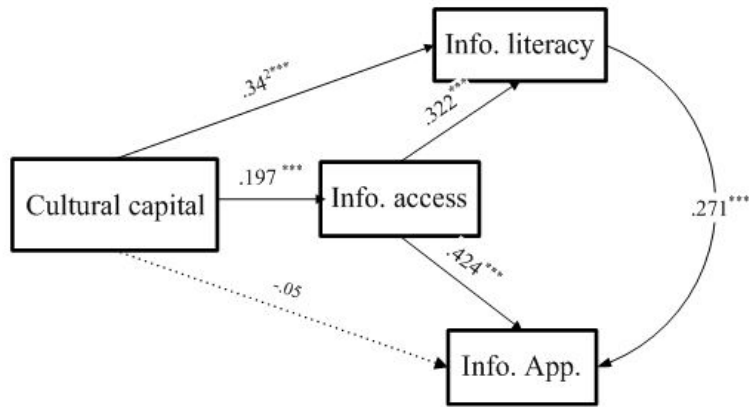


Figure 1: Path analysis.

CONCLUSIONS

The objective of this study was to understand the effects that the cultural capital of parents had on the digital learning divide of students living in remote areas. The results indicate that embodied cultural capital and objectified cultural capital within the family were crucial factors that contributed to differences in students' digital learning opportunities. The amount of cultural investments by parents not only affected the children's cultural depth, but also influenced their digital learning performance. Figure 2 is a schematic diagram that shows the gap between the ideal situation and the actual situation. Despite all parents wishing to secure the optimal education environment for their children, the implementation of education should not depend solely on material resources.

Students, parents, and schools should consider the arrival of the digital era and effectively fulfil their respective responsibilities: schools should provide a high-quality digital learning environment to accommodate economically disadvantaged families, and parents should allocate more attention to their children's academic performances and digital competence. Parents should also accompany their children and participate in cultural activities during their spare time to enhance their children's cultural depth and facilitate multifaceted development.

This study found that information ethics is a factor that links information accessibility to information application, signifying that a greater cultural depth leads to higher degrees of ethical practice, verifying the need to promote parent-child cultural activities. Culture is the foundation of a country with no shortcuts for parents to invest in the cultural cultivation of their children. Children's ability to grow and thrive in a cultural environment depends on the continued attention and personal practice of their parents. All parents should be reminded to provide their children the necessary objectified cultural capital and, more importantly, facilitate their permanent immersion in a deep and profound cultural environment. By experiencing various cultural activities, children can learn the importance of culture for basic national literacy, a notion that has become increasingly valuable in the current digital information age.

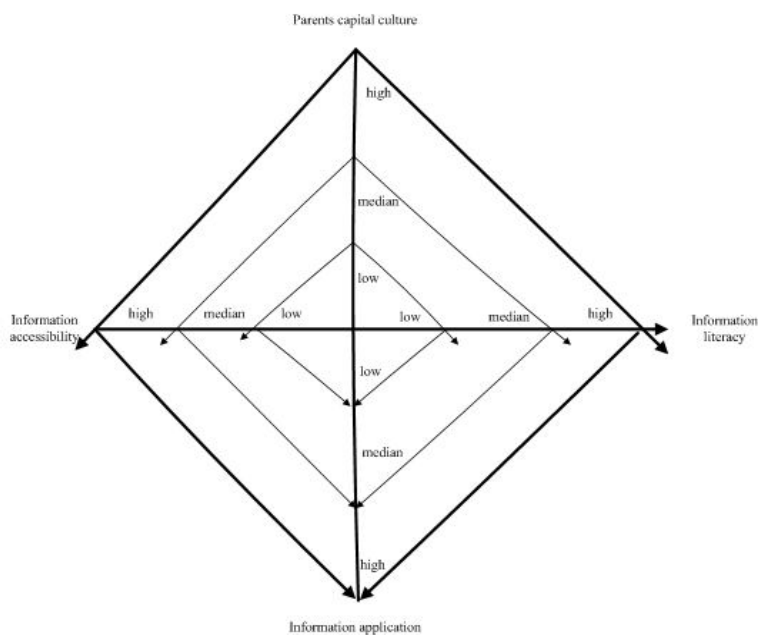


Figure 2: Schematic diagram of the integrated relationship between cultural capital and digital learning.

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BIOGRAPHIES



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