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(Dis)Empowering Technologies: ICT for Education (ICT4E) in China, Past and Present

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Information and communication technologies (ICT) are often presented as the cure-all for various problems: ICTs for education (ICT4E) are considered promising tools for promoting self-directed, creative learning and bridging various divides, such as those between developed and developing countries, urban and rural regions, and so on. While the lofty goals of ICT4E are continuously being highlighted, surprisingly little attention has been paid to how these technologies are embedded in sociocultural and political environments.

China is no exception to this narrative of techno-determinism. In China, new technologies are being widely propagated as effective instruments for erasing differences between learners and learning communities, particularly with regard to transplanting "modern" education into rural communities. The novelty of 21st century ICT, however, tends to obscure the fact that these techno-optimist beliefs date back to attempts in the early 20th century to uplift rural China through the implementation of modern technologies. The article will scrutinize this history of techno-optimism and will relate it to recent attempts at "transformation by technology." Finally, I will discuss how the new keyword in both educational modernization and the knowledge economy—"creativity"—functions as the conceptual ideological heir to "production capacity," the core ingredient of the industrializing societies of the 19th and 20th centuries.

Keywords: ICT4E; techno-determinism; techno-optimism; creativity; rural China

Introduction

In the field of education, information and communication technologies (ICT) are often presented as the cure-all for a variety of problems: on the one hand, ICTs for education (ICT4E) are considered appropriate and promising tools for promoting self-directed and creative learning, which are deemed crucial for education in the 21st century. On the other hand, these new technologies are expected to bridge various divides, such as those between developed and developing countries, urban and rural regions, affluent and poor neighborhoods, and so on, by spreading the most up-to-date knowledge and skills to every classroom on the globe. While the merits and lofty goals of ICT4E are continuously highlighted in the research on ICT4E, surprisingly little attention has been paid to how these technologies are embedded in sociocultural and political environments after they are designed in national contexts and implemented in local schools. In a manner that can be best described as both ahistorical and apolitical, both ICT4E practitioners and policy makers assume that the newly promoted technologies, by virtue of their novelty, will automatically transform and improve learning both in and outside the classroom.

China is no exception to this narrative of techno-determinism. New technologies are being widely propagated as effective instruments to both erase differences between learners and learning communities and raise learning behaviors and outcomes to a new level of quality. This has been true particularly with regard to transplanting "modern" education into rural communities. The novelty of 21st century information and communication technologies,

however, tends to obscure the fact that these techno-optimist beliefs date back to early-20th century attempts to uplift rural China through the implementation of modern technologies. The article first will discuss the problems that arise from basing development on a techno-optimistic agenda. Second, I will scrutinize the historical forerunners of this techno-optimism by looking at early attempts of Chinese "rural modernizers" to conceptualize the countryside and revitalize it by the use of modern technologies. Third, I will provide a critical review of recent Chinese strategies within the field of education to "transform by technology." Finally, I will discuss how the new keyword in both educational modernization and the knowledge economy—"creative capacity" (*chuangxin nengli*)—functions as the conceptual ideological heir to "production capacity" (*shengchan nengli*), which was the core ingredient of the industrializing societies of the 19th and 20th centuries. I will argue that particularly with regard to the countryside, Chinese history has repeated itself by basing modernization programs on the overly simplistic assumption that new technologies will make rural education, and thereby rural China, more "modern" and "creative" and thus more economically capable.¹

The materials selected for this critical review focus on the major actors in the field of educational development through new technologies. For the historical analysis, the sample of texts was drawn from the journal *Educational Review* (*Jiaoyu Zazhi*), which was published by the powerful Shanghai Commercial Press and was one of the most influential educational journals of the 1920s and 1930s. It constituted a mouthpiece for central educational agents—many of them educated abroad—who were active in the countryside and part of the rural construction movement as well as other pivotal societies, such as the Chinese Association for Vocational Education (*Zhonghua Zhiye Jiaoyushe*), the Chinese Association for Reforming and Promoting Education (*Zhonghua Jiaoyu Gaijinshe*), the Chinese Association for Promoting Education for Ordinary People (*Zhonghua Pingmin Jiaoyu Cujinhui*), and so on. These agents are the functional equivalents of today's development practitioners. The analytical sample comprises all articles that were published in the 1920s and 1930s and dealt with rural education.

Regarding the analysis of contemporary documents, the policy papers and guidelines on ICT in education issued by the Chinese Ministry of Education (MOE) and the Chinese Ministry of Culture (MOC) were selected, as well as the reports published by the Beijing-based UNESCO International Research and Training Centre for Rural Development (INRULED).² Included were reports and evaluations that provide information and assessments of ICT4E projects in the Chinese countryside. Also consulted were studies that appraised Chinese development projects in general. I discussed some critical aspects of these reports and appraisals with the staff of INRULED and the Beijing-based National Center for Educational Technology during my fieldwork in September 2014. Concerning the topic of "creativity by new technologies," my selection of texts is based on a keyword search in the database China Academic Journals (CAJ). Out of the sample of over 2,000 journal articles, 50 articles were randomly selected for analysis (identical authors were excluded).

The analysis of historical and contemporary material was based on the following guiding questions:

- *Actors' intentions*: What are the aims of and motivations behind spreading new technologies to the countryside? Which are the preferred ways of diffusion?
- *Actors' conceptualization of technology*: What is the communicated vision regarding the use of new technologies? What kind of user is envisioned?

- *Actors' conceptualization of recipient*: Are recipients (farmers) conceptualized as autonomous subjects or passive objects? Can they participate in defining local problems and requirements, or are they considered part of the problem?
- *Actors' conceptualization of success/failure*: Which criteria are used to assess the success or failure of a project? Is failure attributed to people or to structural problems?
- *Relationship between ICT and creativity*: How is creativity defined? What evidence is provided to show the positive correlation between ICT and creativity?

Putting the cart before the horse?

Various forms of uneven development, inequalities, and differential distributions of power affect present-day Chinese society—economically, politically, culturally, and socially (W. Sun & Guo, 2013). In particular, unequal access to opportunities in education have triggered critical debates by the public (including online forums), in the media (see e.g., Cai, 2012; Yin, 2011), within academia, and among policy advisors (e.g., the blue books on education) (e.g., D. Yang, 2012), as well as among policy makers (see e.g., the special section on the rural divide in MOE, 2012). There is a clear urban-rural divide in China concerning the social and learning opportunities of schoolchildren (Li & Ranieri, 2013). In his New Year's speech in 2010, former premier Wen Jiabao explicitly addressed the issue of educational inequality, proclaiming the right of every child to enter a good school (Wen, February 12, 2010). Subsequently, the issue has become a recurrent topic in discussions of educational policy and reform.

Educational inequalities exist along various dimensions, such as class and social background, economic status, and proximity to political power. However, it is above all the urban-rural divide in educational access and quality that has drawn the most attention in China. This is because of several intertwined reasons. First, according to the Chinese policy makers' predominant rationale of human capital, education will spur China's transition from an industrialized to a knowledge economy. A decade ago, both educators and politicians identified the need for "specialized, technically adept and useful talents" (H. Sun, 2004, p. 34) that could serve as a solid base for technical innovation and the evolving knowledge economy (see e.g., MOE, 2011). Production capacity in the form of manual labor alone is no longer judged sufficient to boost the Chinese economy. However, manual laborers have been primarily recruited from the countryside; consequently, the rural population is seen in great need of upgrading in order to fit the agenda of the emerging knowledge economy. Second, providing educational opportunities to the rural population is part of the nation-wide strategy to build China's "new socialist countryside" and thus bring both mainstream civilizational values and socio-political stability to remote regions (Harwood, 2013; Schubert & Ahlers, 2011). Third, the diffusion of educational and training opportunities to disadvantaged areas fits well with the global development agenda of "Education for All" (EFA), as proclaimed by the United Nations.³ Consequently, educational development projects in the countryside have been launched not only by the government but also by (Chinese and other) volunteer organizations and nongovernment organizations (Lo & Lee, 2011; Menefee & Nordtveit, 2012; Yu, 2011; Yuan & Tan, 2011).

The advent of the digital age has prompted many expectations and a great deal of wishful thinking with regard to both the inequalities within and across societies and the persistence of social hierarchies (for a prophetic account, see Cohen & Schmidt, 2013). Particularly in the earlier stages of the Internet age, activists and researchers alike voiced their

hope that the worldwide web would be able to level spatial-geographic, economic, and social hierarchies, because theoretically, it can provide the same kind of content to everyone in any place at any point in time. ICTs were thus rendered effective and affordable instruments of development and change, transporting, transferring, and implementing new information and knowledge at high speed and low cost. Consequently, Toyama (2010) called ICTs used for development (ICT4D) "a magnifier of human intent and capacity." They have been adopted as first-choice methods both by international agencies, such as the World Bank⁴ and the United Nations, as well as by national governments, particularly in developing countries (Chaudhuri, 2012).

Nonetheless, the evidence for the proclaimed beneficial effects of ICT4D policies has been discussed as controversial. Recent works have shown that existing inequalities and divides are being reproduced digitally and even reinforced (regarding China, see e.g., Y. Guo & Chen, 2011; Yan & Sun, 2012). In addition, Chaudhuri (2012) maintained that most published results are issued by international agencies, who, having subscribed to the ICT4D agenda, have a natural interest in legitimizing their choice. As Chaudhuri (2012, p. 328) criticized, they tend to "highlight cherry-picked outcomes rather than critically analyzing the broad spectrum between success and failure." In contrast, a recent volume about the effects of ICT on poverty reduction in East and Southern Africa came to a much more favorable conclusion (Adera, Waema, May, Mascarenhas, & Diga, 2014).⁵

Cause-effect relationships become even more complicated when processes that are difficult to measure, such as learning, innovation, and modernization, are involved. Nonetheless, all three of these factors figure prominently in the Chinese Ministry of Education's (MOE) strategies on the informatization of society and education, which pay particular attention to digital divides (MOE, 2006, 2012). The MOE's strategies are based on the assumption that the implementation and use of these new technologies by default will also renew the ways in which knowledge is taught and learned. Aims that have been on the table since the new curriculum reforms were launched towards the end of the 1990s and that were part and parcel of the more overarching educational project of raising the "quality" (*suzhi*) of the nation,⁶ were now explicitly linked to the project of ICT in education (or education through ICT): among them, holistic (instead of particularized, exam-oriented) learning, student-centered teaching, and independent and creative thinking (Dello-Iacovo, 2009). Thus, rather than using the reforms to launch an ICT initiative, ICT are now employed to push and implement the reforms – reforms that have shown particularly poor outcomes in China's rural regions (for various reasons; see e.g. A. Kipnis, 2001).

None of the policy documents (and research papers associated with the documents) attempts to explain why ICT should be able to realize a reform that so far has failed in the countryside. Why should the cart be able to drag the horse if the horse has obviously not succeeded in pulling the cart? The techno-optimism that is apparent in this rationale—that is, the belief that with only the right and most recent technologies, can social transformation be achieved—has in fact been noted also with regard to developing countries. According to Zheng and Heeks (2008), these countries display a techno-centric or techno-determinist approach when they attempt to advance development by using ICT. Historically, within the framework of "educating the countryside," Chinese reformers have often worked on the symptoms in order to change the causes. In the 1920s, new technologies (at that time, agricultural technologies) were heralded as the drivers of modernization and reform. However, the imagined users of these new technologies, Chinese farmers, remained remarkably resistant to modernization and change.

A history of techno-determinism: The rural turn

China's history of both modernization and humiliation is generally said to have begun in the 1840s, with the military and economic invasion by the Western powers and the subsequent need to either modernize or perish (Bailey, 1998). The line that was drawn both discursively and with regard to reform policies was that between backward China and the modern "Western" world.⁷ Politicians, military personnel, economists, engineers, physicians, and educators traveled abroad or became inspired by foreign ideas and then devised reform plans that would propel their country into modernity (Buck, 1980; Harrell, 1992; Hayhoe & Bastid, 1987; LaFargue, 1987 [1942]; Z. Wang, 2002). Until the 1920s, under these joint efforts to erect a modern, strong China, the reform projects that emerged were confined mainly to urban areas. Reformers and intellectuals alike were marked by a growing "unfamiliarity [...] with rural conditions" (Y. C. Wang, 1961, p. 421). Even newly installed institutions that were meant to target the rural population were no exception. For example, 80 percent of the modern agricultural schools, which comprised half of all vocational schools and were established to modernize Chinese ways of farming, were located in urban areas (Y. Huang, 1922).

This neglect of the countryside went through a dramatic transformation in the 1920s, when rural China was beginning to be seen in terms of its "production capacity" (*shengchan nengli*) (Fu, 1927, p. 2). This was an important shift towards a human capital approach to education. Not only were farmers to become "enlightened" but also construed as objects of educational investment that would bring returns if the investment were placed properly. The countryside now was identified as the breadbasket of the nation, the root of a "robust and sound" population (p. 4), and thereby the motor of all progress:

Among the population in the countryside, farmers constitute ninety per cent. Since old times, our country has relied on the farmers and to the present day, it constitutes one of the world's biggest agrarian nations. The progress and evolution of the rural population affects the progress and evolution of the entire nation's population; the prosperity or demise of the agrarian sector affects the prosperity or demise of the nation. (Fu, 1927, p. 2)

Chinese reform-minded intellectuals and educators were taken by surprise when they discovered on their educational trips abroad that other countries (particularly the USA and Denmark) had already systematically dealt with rural or agrarian education (*xiangcun jiaoyu*). The concept was virtually unknown in China until then (Zhu, 1923). By reading Western works on rural life (e.g., Courtis, 1914; Haggard, 1911), rural sociology (Vogt, 1917), rural community organization (e.g. Hayes, 1922), as well as rural schools and education (e.g. Betts, 1913; Fought, 1918; Woofar, 1917), these educators familiarized themselves with the countryside as a distinct *research object*.

This objectification of rural China was facilitated by two novel concepts. First, the introduction of statistical methods allowed for more "scientific" observations and measures. Instead of being led by subjective impressions and "looking down upon the flowers only from horseback" (Zhu, 1923, p. 9), educators began to explore the countryside with modern survey and statistical methods. These succeeded in establishing the rural areas as entities that were fundamentally different from the cities. In 1929 alone, the Agrarian Institute of Jinling University (the predecessor of Nanjing University) dispatched its students into 22 different provinces, where they collected data on 2,560 rural families in 168 regions (Xia, 1998). Second, in the educational reform movement in the 1920s, China was characterized by a peculiar alliance of actors, educators, and entrepreneurs from the agrarian, industrial, and banking sectors, who joined forces in order to modernize and save their country. The

arguments used by educators were thus increasingly couched in terms that originated in economics (Schulte, 2012a, 2012b).

Because of these surveys and as part of educational reform plans, a number of experimental regions were set up throughout rural China during the 1920s. By 1935, more than 100 experimental regions existed, each of them hosting several thousand individuals (Lu, 1935). The objective of these "experiments" was to establish a type of education that was specifically geared to the characteristics and needs of rural China. Rural schools were no longer to copy their urban counterparts, by which they were outperformed anyway. Instead, in addition to teaching their children, rural schools were to target entire families and focus on spreading knowledge that was directly related to farm life and farming technologies. The reasoning was that if only farmers were better schooled in using the right technologies, both the quality of and the profits from husbandry would improve greatly.

However, spreading and implementing modern farming technologies proved very difficult in practice, particularly beyond the confines of the experimental regions, but even within them. Critics (see e.g. Feng, 1927) traced this to two problems. First, knowledge transfer from the schools to the fields hardly took place. This was because the local educational bureaus assessed the projects' success by the numbers of student enrolment; it was of minor importance to them if students could actually apply their knowledge independently (*zidong shixing*) or if knowledge and technologies were adapted to the specific farming contexts. Students often learned about technologies that they would never be able to use, either because they were irrelevant to their particular home environment (e.g., crops that did not grow in their region) or because the farmers lacked the proper machines to use these technologies. Second, many "rural education" schools continued to be located in the cities, not the countryside, and reformers lacked appropriate ways and efficient means to reach the farmers through these schools. Moreover, the intended mission of "rural schools," which was to increase agrarian productivity, was constantly subverted by the rural clientele. Sons from peasant families who managed to graduate from a rural school rarely had the intention to apply their knowledge to farming; instead, they used it to migrate to the cities and thereby upgrade their family's social status (R. Guo, 1930).

Contemporary reports indicate frustration caused by the futility of experimental rural education:

If one looks at the experimental projects, there is an abundance [of new knowledge and technologies] that has reached the ears and eyes of the common people, but [opportunities to] apply these in reality are not sufficient. Although agrarian education has now existed for years, the mode of farming has hardly changed [according to this education]. Personally, I have been defeated because of this many times, and I am convinced that now and in the future, we can only succeed in advancing farming if we establish a method to spread scientific farming knowledge among the common peasants. (Feng, 1927, p. 4)

Even if a technology were used by a peasant family, who began to modernize their farming methods accordingly, the reformers would meet with resistance from surrounding families. When the "model families" used the new methods successfully, their neighbors would envy them their accomplishment, and when they failed, they were confronted with their neighbors' *schadenfreude* (T. Guo, 1925). This hostility towards new farming technologies made it extremely difficult for graduates from agrarian schools to test their new knowledge at home.

The main obstacle to the successful transfer of technology was the asymmetric relationship between the rural population and urban modernizers. The latter had, with their

value matrix of urban/progressive and rural/backward, produced a divide between rural and urban China that turned any attempt to modernize the countryside into a quasi-colonial endeavor.⁸ Developing these regions had clearly become a unidirectional enterprise in which modern knowledge and technologies (first "Western," then Chinese urban) were passed down to the peasants, with little say at the receiving end. This top-down perspective on development was not without critics. The educationist Yang Xiaochun (1895-1938)⁹ pleaded to let the farmers take their renaissance into their own hands instead of leaving the development work to "government, bankers or philanthropists" (Yang, 1934, p. 81). One of the original driving forces behind the rural reconstruction movement, the famous intellectual and philosopher Liang Shuming (1893-1988), criticized the undemocratic procedure of these rural education programs. They always sided with the government in order to transform the peasants, instead of siding with the peasants in order to transform the government (Liang, 1939).

Thus, the rural reconstruction movement was not monolithic. It involved actors who aimed to democratize and empower the countryside. However, the majority of reformers who were active in the implementation of rural educational development projects were marked by "progressive conservatism" (Schulte 2013b, p. 229). Their greatest interest was to make the countryside economically productive but keep farmers in their place (instead of encouraging upward social or geographical mobility).¹⁰ These agents subscribed, at least tacitly, to a patronizing attitude towards farmers. Even if they did not literally reproduce the common urban prejudices that peasants were "stupid and backward" (Fu, 1927, p. 8), they would find more sublime (and academic) ways of degrading the countryside, such as attributing to it "cultural problems," such as superstition and a fixation on the past (p. 8), or gambling, laziness, slackness, self-isolation, and a fatalistic attitude towards calamities and natural catastrophes (CAVE, 1929). "People's thought and ideology [*sixiang*] are too simple", wrote Fu Baochen (1893-1984),¹¹ and Jiang Hengyuan (1886-1961; known under the pseudonym Jiang Wenyu) remarked on the need for a top-down approach in rural education: "Since peasants and urbanites are not the same and the culture [of the peasants] is too low, it is inevitable that someone molds and governs them" (Jiang, 1935, p. 39). The overall aim was to forge a strong economy and a unified nation; therefore, agrarian education could no longer focus on individual differences, such as those between "men and women, old and young, rich and poor, submissive and cunning, healthy and handicapped." All were now subsumed under and targeted as the "entire race" (p. 44).

These judgments show disquieting parallels with current political agendas that target the Chinese countryside, which see peasants as a "resource to be optimized" (Göbel, 2012, p. 54) and in need of guidance, in order

to turn from peasant beliefs to scientific understandings, reject superstition, transform traditions, get rid of bad habits, establish advanced ideas and good morals, promote a scientific and healthy way of life, and promote the generation of a social outlook based on cultural advancement in the villages. (Göbel, 2012, pp. 61-62)

The more the peasants became packaged as backward subjects to be uplifted and transformed, the less leeway they would be given to perform this transformation on their own terms. Thus, there was no space for them to become *agents* in the use of new technologies; instead, they were deemed *executors* of ready-made technological solutions, which were labeled as "scientific" and therefore modern, efficient, and beneficial. Paolo Freire referred to this educational approach as the

banking concept of education, in which the scope of action allowed to the students extends only as far as receiving, filing, and storing the deposits. [...] In the banking concept of education, knowledge is a gift bestowed by those who consider themselves knowledgeable upon those whom they consider to know nothing. [The banking concept of education] serves the interests of oppression, [and is] based on a mechanistic, static, naturalistic, spatialized view of consciousness, it transforms students into receiving objects. It attempts to control thinking and action, leads women and men to adjust to the world, and inhibits their creative power. (Freire, 2005 [1970], pp. 70 and 77)

Remarkably in line with current criticisms of educational development projects, these early recipients of modern technologies were mainly dealt with in ways that can be best characterized as follows:

- i. *quantitatively focused*: e.g., considering school enrolment instead of context-specific use;
- ii. *uprooting*: disregarding local knowledge and practices;
- iii. *politically and morally loaded*: aiming for social stability and national cohesion at the expense of individual needs;
- iv. *economistic*: reducing individual life trajectories to their economic usefulness.

This clearly can be called a "minimalist agenda or an incomplete agenda for human development" (Vandermoortele 2003, cited in Tarabini, 2010, p. 209).

ICT to rural China: New wine in old bottles?

In examining present-day Chinese development strategies to bring new technologies to the countryside, one cannot help but see the similarities between past and present. Certainly, there is the distinct difference that, in the case of ICT, the technologies to be transferred can also be used as the medium of transfer. They therefore constitute the missing link that the above-quoted Fu Baochen was seeking so desperately, namely a "method to spread scientific farming knowledge among the common peasants" (1927, p. 4). This makes ICT unique, compared with other technologies transferred for educational, political, or economic reasons. However, similar to earlier attempts to transform the countryside through new technologies, current programs—such as those specified in the Ministry of Education's strategy paper on the nation's informatization (MOE, 2006)—are formulated within a logic of the top-down and center-periphery transfer of technology. In MOE's strategy paper, in the section on informatizing the national economy, the countryside¹² is made a clear priority. The flow of knowledge and technology from China's eastern regions to the central and western areas not only ensures an "even educational development" but also helps to transform these areas into "the new countryside" (*xin nongcun*) (MOE, 2006). Grounded in an overly optimistic belief in these modern technologies, the MOE happily states that ICT can advance various causes in a "quick and good" manner (MOE). The benefits of spreading ICT—both infrastructure and skills—to the countryside are framed as measures to boost the economy and strengthen the nation, which bears witness to the continuing human-capital understanding of developing the country.

Regarding implementation, some more parallels with past developments were revealed. Chinese ICT4D/E programs have suffered from obstructed diffusion and ephemerality (Xia, 2010). Successes are often confined to local experiments that may evaporate as quickly as they were launched, and the prevailing departmentalism among the various ministries' divisions and bureaus prevents large-scale cooperation and sustainable learning processes.

Moreover, many programs are the result of (often centrally induced) model campaigns rather than of solid legal regulations, with the side effect that priorities at the local level can shift quickly if the ideological climate changes (Liu, 2012). Finally, and again similar to past practices, development strategies are often aimed at the directly measurable. Connectivity (e.g., infrastructure and equipment) is prioritized over content and applications (Xia, 2010). In a recent strategy paper on China's informatization, the Ministry of Culture conceded that the implementation of ICT development programs is unsatisfactory. Indeed, people are "climbing the horse blindly," only to abandon the projects even before they are finished (MOC, 2013). Too much weight, according to the MOC, is put on starting new things and not enough on maintaining the things that already exist. The exclusive focus on new technologies has diverted the attention from the importance of (reliable) data, and because it is always the results that are foregrounded, efficient management strategies are neglected. Ironically, very little advice has been given on how to tackle these problems concretely.

Current attempts to bring ICT to the countryside involve at least two different operations.¹³ One aim is to informatize farmers and provide them with knowledge and information platforms with content that is deemed crucial for living and working in the countryside. This entails both the provision of ICT infrastructure and hardware so that peasants have easy access to new information and the creation of digitally available content that is specific to farmers (agricultural information service systems; see e.g., INRULEDa). This content includes, for example, information about new farming methods, entrepreneurial information about selling agricultural products, and online diagnosis platforms for treating and preventing diseases that affect crops and animals. It also contains managerial and administrative information specific to rural cadres. The other aim is to enable, by using ICT, rural youth to catch up with their urban counterparts in order to reduce the urban-rural (digital) divide. In this ICT4E approach, development projects aim to both increase ICT access and use and improve rural education in general by digitally linking the countryside to urban regions. Although these ICT4E projects and others that focus on the informatization of farmers might overlap, such as by sharing hardware facilities among students and farmers, they are usually separate, distinct projects.

The design, implementation, and evaluation of ICT4E projects (e.g., the Chinese Schools Modern Distance Education Project in Rural Areas¹⁴) reveal the same shortcomings as those outlined above. As one report critically stated, "common problems of Chinese educational informatization projects are 'hardware over software' and 'construction over application'" (INRULEDb, p. 10). For example, 85 percent of funds went into hardware, while teachers' ICT training had to be financed locally (and often did not take place). Grassroots training was only provided for purely technical matters (e.g., hardware maintenance), thus again putting the cart before the horse. Improved educational quality was expected to happen automatically by using the new technologies. However, even more revealing is that the report itself evaluated the project largely from a diffusionist perspective, in which conceivable communication and exchange structures consist of one-way channels from the (urban) centers to the (rural) periphery. The only feedback loop that was built into the system was reserved for reporting technical problems. Although the report maintained that the project "encouraged the enthusiasm and creativity of schools, teachers and students" (p. 17), it did not become evident how schools were actually allowed to not just use, but also appropriate (and thereby change) the technologies they were given.

Assessing the success of ICT development is of course directly tied to the agenda and implementation of the ICT strategies described above. Many studies that attempted to assess the outcomes of ICT projects in the countryside followed the oversimplified causal logic that

improved technology leads to improved learning, which is in fact tautological: examples are the reasoning that having a computer leads to increased computer skills (Mo et al., 2013) or that computer-assisted tutoring programs increase performance in school subjects (Lai et al., 2013). Furthermore, such studies have said very little about the perspective of the learner. They have not assessed whether learners actually benefit from their allegedly enhanced literacy, whether their newly acquired skills affected their individual perceptions of well-being in any positive way, or whether these skills improved their status in society and enabled them to partake in decision-making in different and better ways than before.¹⁵ Neither the projects nor the reports that evaluated them examined these dimensions; instead, they took the transformative capacity of technological change for granted. In addition, apparent resistances are often dealt with either superficially or in a technocratic manner. For example, it is a known fact that many teachers (and even prospective teachers) are reluctant to integrate ICT into their teaching (noted also in INRULEDb). However, most research is simply concerned with identifying and then removing the obstacles to ICT use (Sang, Valcke, van Braak, & Tondeur, 2010), instead of asking whether teachers have valid reasons for not integrating ICT into their instruction. If teachers do not comply with the proclaimed ICT development strategies, they are predominantly deemed lacking either the competence or the insight for proper ICT use. Such studies thus have been based on the same unidirectional and teleological premises as the development projects they investigate. A bottom-up channel for unforeseen but legitimate uses (or non-uses) of ICT is not provided for because such uses are either ignored or termed "distortions" or even "abuses" (e.g., using ICT for online gaming or chat room functions).

Comparisons usually have flaws, and this one is no exception. In the 1920s, during the rural construction movement, the ideological center of China was not as strong as it is today. This enabled the engagement of nongovernmental grassroots' organizations to a much greater degree than those today, which thereby shaped educational (and other) projects.¹⁶ Moreover, unlike the 1920s, technology development projects today, particularly ICT4D/E, are deeply intertwined with the interests, capabilities, and marketing strategies of companies that can both profit from state policies and be restricted by them (Liu, 2012).¹⁷ Finally, while "equality" and "democracy" were only optional attributes used to justify educational projects in the 1920s—and many chose not to heed them—such neglect would be unacceptable today. Strategies behind the "Sent-Down Internet" are clearly framed in the language of equal access and equal opportunities. However, the proclaimed multi-effectiveness of ICT in terms of facilitating access and erasing inequalities makes it easy for policy makers to obscure underlying structural inequalities, which continue to exist.

Refurbished magic: ICT, modernization and creativity

In Chinese strategy documents, informatization is ascribed all sorts of powers and effects, among them economic growth, effectiveness of political and administrative rule, military strength, enhanced national security, environmental protection, provision of health services, facilitation of commerce, and cultural revival. Informatization is also presented as an educational undertaking, not only by generally teaching ICT skills but also by making it possible, through ICT, to educate "distant" parts of the population, such as rural communities and migrant workers (MOE, 2006). The underlying assumption is that ICT leads to modernization by default (Zhao & Xu, 2010). As discussed in the first part of the article, China looks back upon a history of linking technology to modernization to the point that "technology" attained causative power. By circumventing social, economic, and political obstacles, which were particularly palpable in the rural regions, technology would be able to

induce change. As has been argued, in the past, "change" primarily meant improvement through increasing a nation's "productive capacity," which was seen as the formula for economic success and thus national survival/revival.

In the policy papers on ICT development, and under the banner of the emerging "knowledge economy", "productive capacity" has been strategically replaced by "creative capacity," the core ingredient in 21st century economies. However, the above-quoted "creative power" of individuals (Freire 2005 [1970], p. 77), which is both critical and emancipatory in nature, is not heralded in this strategic move. Instead, "creativity" has been hijacked from this educational discourse to be made the centerpiece of a human capital approach towards education. MOE's (2006) strategy paper makes the "construction of a creative nation" paramount in the age of global competitiveness, when "creativity" is considered economically useful. With regard to the curriculum, ICTs are expected to "improve curriculum implementation, diversify educational contents, increase the quality level of teacher resources, and improve the effectiveness of teaching" (MOE, 2006). In another document by the MOE (2012), digital learning and creative learning are discussed as twin siblings: the terms "creative" and "creativity" appear 60 times in the document. ICTs, as the document maintains, generate creativity by inducing learning processes that are individualized, diversified, and autonomous; however, no evidence is provided to substantiate the cause-effect relationship between the use of ICT and increased creativity.

Similarly, the Ten-Year Plan for Educational Reform and Development makes sixty-three references to creativity in its call for fostering "creative talents" as well as for overcoming, "by promoting autonomous learning and strengthening independence [...], exam-oriented learning." (China, 2010). In a literature review, R. Huang (2008) declared creativity the "core value" of ICT in education, in addition to "change." Correspondingly, numerous Chinese publications have made a positive connection between ICT and creativity and have made recommendations for efficiently exploiting the beneficial relationship between class instruction and learning processes.¹⁸

Unsurprisingly, the ICT/creativity narrative is also linked to the overarching project of "quality education" (*suzhi jiaoyu*), with the usual suspects: "teaching modeled on inspiration, research, discussion and participation," with "learning in the center," characterized by "active, autonomous and cooperative learning" (MOE, 2012). The underlying (and sometimes outspoken) assumption is that using digital media for teaching contravenes traditional instruction. However, it is far from self-evident why digital media could not also be used for traditionally modeled learning and teaching. In fact, as Xie and Wang (2004) pointed out, Chinese teachers tend to use ICT mainly in presentations, not as a cognitive tool. The class observations that I conducted in 15 primary and secondary schools in Beijing, Yunnan, and Zhejiang Province between 2011 and 2014 confirmed this claim. ICT solutions in class instruction did not lead to open learning processes so that students could develop their own ways of thinking. On the contrary, interactive components and customized learning, which are often praised as virtuous characteristics of ICT4E, were used to monitor student learning activities and behavior much more closely than would have been possible traditionally. These practices have potentially counterproductive effects on creative outcomes if deviations from the norm can be detected and sanctioned early, with the help of technology.

As Loveless (2008, p. 64) argued convincingly, "the potential [for creativity] lies not in the technologies themselves, but in the interaction with human intention and activity." This evokes Toyama's above-quoted function of ICT as "magnifier[s] of human intent and capacity." Why do these documents and papers make such a strong connection between ICT4E and creativity if evidence for the relationship is lacking?

Chinese policy makers and educationists are of course not alone in their euphoric appraisal of the blessings and powers of ICT in education. For example, neighboring South Korea has embarked on a so-called SMART learning initiative. The acronym SMART stands for self-directed, motivated, adaptive, resource-enriched, and technology-embedded learning. The initiative has also been noted positively by the UN and has developed a somewhat model character for like-minded policy makers.¹⁹ Moreover, a number of ICT companies has also capitalized on this new boom and offer smart learning packages to customers in the educational business.²⁰

Nonetheless, China's wholesale devotion to ICT4E is notable. There are reasons to suspect that the embrace of ICT is grounded in the fact that these new technologies seem to provide simple (smart) solutions to complex educational (and other) problems that hitherto have proven to be substantial if not unsolvable, that is, to generate creative capacity in an environment that is not conducive to creativity. As stated above, China's curriculum reforms (in the name of "quality education") have been carried out for 15 years now, and boosting creativity has been the centerpiece of reform (Zhong & Cui, 2001). However, very few structural adjustments have accompanied these reforms. Most importantly, the all-decisive examination system is still in place, which prevents millions of students from thinking more creatively, not to mention the political-ideological system, which sets clear limits (particularly on voicing one's thoughts). The curriculum reform has been particularly unsuccessful in the countryside. This usually has been attributed to lower quality teaching personnel, stronger traditions of rote learning, and the fact that rural families are less familiar with "modern" education. All these shortcomings—if they may be termed as such—are complex problems and thus are difficult to resolve. It would require immense resources and much time to raise rural schooling to the level of its urban counterpart. Because of these complexities, the quick and easy cure by way of technology seems an obvious solution. However, this solution could also be called a declaration of social and political bankruptcy because it tends to conceal the underlying problems and prevents actions from being taken to tackle these problems.

Conclusion

Various studies have shown that digital divides and digital literacy consist of multiple, complex layers, which are manifest not simply as geographic divisions (Ferro, Helbig, & Gil-Garcia, 2011; Graham, 2011). Reducing divides and advancing literacy is therefore not a straightforward endeavor but needs to be contextualized. This article has looked at the particular context of top-down ICT4D/E initiatives in the Chinese countryside, by investigating:

- i. how agents and patients of development and change are positioned;
- ii. what types of development narratives are circulating, and who has the power to frame them;
- iii. in what ways these narratives are built into, or are absent from, development programs;
- iv. how these narratives and programs are embedded in existing social, political, and economic structures.

This critical review has argued that China's efforts to integrate ICT into the countryside are grounded both in historical legacies and in the current re-definition of development and change. Historically, Chinese reformers look back on a tradition of the top-down induced diffusion of new technologies as a means to modernize the countryside and thus enhance its

productive capacity. Development schemes were largely unidirectional and teleological. Farmers were overwhelmingly construed as passive receivers. The top-down character of development projects has been preserved in recent attempts to modernize the countryside. However, improvement by development has now been tied to the enhancement of "creative capacity," which is considered the driving force in the present-day knowledge economy. In a literally "smart" move, the educational concept of "creativity" was thus hijacked by an economist narrative, which made it a default ingredient of ICT. Increasing economic productivity and lessening urban-rural divides have thus become technological rather than structural problems.

In an attempt to take the term "information culture" seriously, Zheng and Heeks called for a holistic understanding of technology and development, which, from the socio-cultural perspective, analyzes "a nation's progress towards the goal of 'informatisation'," as well as the question of "which conditions and capacities are to be addressed in pursuing such a goal" (2008, p. 2). This approach takes into account the ways in which information *cultures* are shaped by social practices, norms, and power constellations, and how these affect different understandings of ICT use and digital literacy. Such "cultured" understanding can also help us link technology use to the development of individual "capability," which, following Amartya Sen, should lie at the heart of any notion of "empowerment," lest the term become a nondescript, empty shell:

Capability reflects a person's freedom to choose between different ways of living. The underlying motivation—the focus on freedom—is well captured by Marx's claim that what we need is "replacing the domination of circumstances and chance over individuals by the domination of individuals over chance and circumstances." (Sen, 2003, p. 44)

The "freedom to choose" is based on the precondition that people know their choices and are free to communicate them. Development strategies, such as those discussed in this article, which present their aims as the only possible choice, are misnamed. Indeed, a more accurate term is "constriction strategies."

Notes

1. The discussion presented in this article results from a larger interdisciplinary research project on the digital society in China. The project has received generous funding from the Swedish Research Council (VR 2012-5630). Class observations of ICT use in Chinese classrooms have been made possible through a grant by Riksbankens Jubileumsfond (The Swedish Foundation for Humanities and Social Sciences, P11-0390:1).
2. See http://www.inruled.org/en/about_inruled/ (accessed 19 August 2014).
3. See <http://www.un.org/en/globalissues/briefingpapers/efa/> (accessed 27 June 2014).
4. See e.g., the World Bank paper on Africa. Retrieved from <http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/282822-1346223280837/Education.pdf> (accessed 26 June 2014).
5. See also the discussion in Heeks (2010).
6. There is by now an abundance of literature on the *suzhi* project, including Anagnost (2004), Kipnis (2006), Murphy (2004) and Woronov (2009).

7. "Western" is a discursive rather than a geographic category. In addition, Japan was an important reference society for Chinese reformers because of its apparently successful modernization by Western standards (see e.g. Reynolds, 1993).
8. Because of space constraints, I cannot expand on the colonial aspects of educational or civilizing missions here. For a discussion, see e.g. Conklin (1998), Duara (2004), Pomeranz (2005), Schulte (2013a and 2013b), and the edited volume by Watt and Mann (2011).
9. Yang was strongly influenced by the famous pedagogue Tao Xingzhi (1891-1946), who was a disciple of the American philosopher and pedagogue John Dewey (1859-1952) and thus a proponent of the pragmatist tradition in education.
10. This is part of the reason that, during ideologically heated phases (such as the Great Leap Forward or the Cultural Revolution), agents were so hostile to technical or vocational education, as these programs entailed a strong class component and were therefore deemed "bourgeois."
11. Fu was educated at Cornell University and Yale University.
12. Consisting of the "three rurals": countryside, rural production, and rural population. Interestingly, the latter also comprises rural (political and administrative) cadres, which have also become the targets of ICT-based distance education, in order to be updated to the digital age.
13. These do not necessarily include the Internet. Particularly in regions where access to the Internet is difficult, satellite broadcasting and CDs/CD players have been used as substitutes.
14. The project was organized and implemented between 2003 and 2007 by the Ministry of Education, the National Development and Reform Commission, and the Ministry of Finance. See e.g., Wang and Li (2010) and INRULEDb.
15. ICT seems to provide remarkably good communication devices for those who are traditionally marginalized, as Hilbert (2011) showed regarding women's use of digital technologies; yet Chinese strategy documents remain conspicuously silent about how ICT can empower such groups in sustainable ways.
16. For an overview of this quasi-corporatist educational governance, see Schulte (2012a).
17. Companies can take on roles as either hardware or software providers. To a certain extent, this is not entirely new. Historically, the textbook industry profited greatly from educational reforms.
18. As mentioned in the section on my selection of materials, a keyword search for "informatization of education" and "creativity" in the China Academic Journals database yielded more than 2,000 journal articles.
19. See e.g. Yang (2012). See also the UNESCO presentation by Seo (2012).
20. See e.g. the advertisement on <http://www.youtube.com/watch?v=EfL4zBWSRHA> (accessed 27 June 2014).

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