Leapfrog Education: An Alternative Present and Future for Chinese Tertiary Education

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Abstract: This paper discusses the application of Leapfrog University principles within the context of Chinese distance education. The paper argues that the proposal of Leapfrog is a viable alternative to the present and future development of Chinese tertiary education, in particular, online teaching and learning based on modern technology. Leapfrog education and its underlying themes are well contextualized for Chinese tertiary education during the transition period from elite to mass education. The co-constructivism of social and contextual meaning suggested by Leapfrog Education 3.0 and 4.0 is particularly pertinent to what is missing in Chinese education. In addition, the Leapfrog Education points out a new direction for research and action-to address the gap between socioeconomic advancement and a slower pace of change in traditional education. Within the traditional education, there is also a call to tackle the startling discrepancy between student and faculty rates of adoption of web-based learning initiatives. Finally, Chinese postsecondary education has the emerging capacity to build up a host of liberal skills for PreK-17 learners who are the primary population the Leafrog Education attempt to serve. In spite of these advantages, the Leafrog Education has to address more conceptual and practical concerns, such as Leapfrog implementation and cost-effectiveness and cost utility. Some implementation suggestions are also provided.

Rapid growing numbers of online users in China

(Start of the text body) With an astonishing surge of internet users in the recent decade, online education has displayed great momentum in China. It was estimated that by September of 2007, the cyber population had reached 172 million (Xinhua News Agent, 2007), which was more than a hundred times the number in 1999[1] (Shaw, 1999). Looking forward, it is predicted that there will be 200 million cybernauts in China (Xinhua News Agent, 2007). Given such a rapidly expanding population, online teaching and learning has become one of the most promising education delivery approaches in tertiary and adult education. Web-based education programs and internet colleges (*wangluo xueyuan*) have been institutionalized nationwide, in both open universities, such as the China Central Radio and Television University (CCRTVU), and dozens of leading conventional universities (Zhang *et al*, 2002). As a result, 66 conventional universities have been approved by the Ministry of Education to offer degree programs online by 2006, with a total enrollment number of 3 million students (Wang & Crook, cited in Zhao *et al*, 2006). As a

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[1] In 1999, the number of internet users was reported as 1.5 million.

whole sector, distance education has conferred degrees to more than half of China's engineering and technology graduates (Postashnik & Capper, 1998).

Leapfrog themes are well contextualized for Chinese higher education

Leapfrog education is on the horizon in this highly dynamic era of education advancement. Leapfrog is a viable alternative to the present and future development of Chinese postsecondary education. First of all, the overarching themes of Leapfrog are well contextualized for Chinese tertiary education, as well as reflected by global trends both in theory and in practice. Essentially, Leapfrog education views the process of teaching and learning as multidiverse, multi-dimensional, multi-directional, multi-collaborational and multi-paradigmatic. Hayhoe (1995), a renowned Chinese scholar, envisioned a multiversity concept while China was about to transition to mass higher education. She encouraged the best universities to engage in program diversification and make themselves accessible to a large number of nonresidential students (Hayhoe, 1995). Leapfrog Education goes further beyond the concept of the multiversity. It projects technological ubiquity and multiple, highly accessible venues of knowledge, furthering Education 3.0, or knowledge production, and Education 4.0, or innovation production. This emerging pattern of knowledge production renders the future of the university more uncertainty (Rothblatt, 2001), a global phenomenon that does not exclude China. In addition, Leapfrog education allows collaboration to take place across different groups of people, institutions and places. The emphasis on institutional Leapfrog collaborations would augment Hayhoe's suggestions of university mergers, in which lower level public institutions are likely to lose their unique identity and characteristics at the expense of educational quality. Most importantly, Leapfrog education doesn't merely remain in theory. Multi-national and collaborative network is already underway among the University of Minnesota, China and Mexico. Leapfrog, in its full-swing should also include action research as a major component. And in actuality it does and will continue to grow in that regard.

Co-constructivism of meaning to fill the education gap

Second, according to the newly released Education 3.0 and Education 4.0, the co-constructivism of social and contextual meaning is particularly pertinent to what is missing in Chinese education. In a study concerning online learning behavior, it as found that for both highly competitive undergraduate students at a top university in China, and working employees taking an online course at the same institution, the majority failed to generate their own learning path, but rather were led by the structure of the online course (Xie *et al*, 2001). Cyber-based learning gives students more latitude for controlling their learning process, however, transformative learning experiences won't occur unless students are proactively seeking an active role in constructing and negotiating their personal meanings with technologies and course structures. In order to transcend legacy-based "download" learning services, Leapfrog University intends to "concentrate on 'upload' pedagogies, based on knowledge production by students and collaborating faculty, together with augmentations provided by a new category of off-campus volunteers" (Education Futures website, 2006b).

Furthermore, the "open source development" promoted by the Leapfrog University, rather than a "banking" approach toward learning experiences, can create a co-constructive outlet in both

virtual and real contexts. For instance, Wiki platforms can help learning communities to contribute students' personally applicable knowledge at little or no cost. Knowledge aimed toward personal applications, along with other modes of knowledge production[2] ought to be employed more frequently and contextually in undergraduate education in China. While it was reported that college students in Shanghai became inspired and more interested in scientific research via industry-sponsored diploma projects (UNESCO project report, 2005), the personal meanings associated with this transformative experience by students, as well as how such innovative partnership have had and will have an impact on undergraduate and co-op education remain largely unaddressed. In other words, many, if not most, subjectively and experientially developed domains of knowledge remain untapped in college education. This also seems to be the case in transdisciplinary and integrative forms of knowledge production. Perhaps students can take advantage of currently available tools, such as Wikis, Blogs, and web-based Bulletin Board Systems (BBS)[3] to solicit as much online democratic participation as possible to test and consolidate multiple ways of problem-solving, and to venture into developing more relevant technologies to facilitate future change processes.

Differential rate of innovation adoption between faculty and students

Third, as one of the Leapfrog's critiques, education and government have much slower rate of change compared to socioeconomic developments (Moravec, 2007). Likewise, within the education sector in China, there is a huge discrepancy between student and faculty rates of adoption for any given initiative. Teachers have long been playing a catch-up role in web-based distance education. A few of them don't even bother catching up. Variations of adoption behaviors among teachers are alarming. In Li and Lindner's (2007) recent study, it was found that of 273 Chinese faculty members surveyed, 14.2% had no knowledge about web-based distance education at all. Over half of the participants were in Rogers' "knowledge" (30.2%) or "persuasion" (26.5%) stages of innovation decision. Only 8.2% of the faculty members had used web-based course delivery and would continue to do so. Adoption behavior also differentiated greatly between different fields of study. Teachers from humanities and social science were at the highest stage of innovation adoption, whereas teachers from the biological sciences were at the bottom.

Modern technologies consolidate further development of online education

Fourth, thanks to the popularity of computer-based technology and exponentially growing online education, Chinese tertiary education has the emerging capacity to build up a host of liberal skills[4] (Education Futures website, 2006b; Harkins, 2007) for PreK-17 learners, some of which

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[2] The Leapfrog defines six modes of knowledge production: scientific and scholarly knowledge; collaboratively developed knowledge for highly practical application; subjectively developed knowledge for personal applications; experientially developed knowledge that identifies contextual limitations; machine developed knowledge; as well as integrative and chaotic knowledge that effectively use the previous five types of knowledge. However, at the current stage of undergraduate education, as the Leapfrog education contends, the full range of these knowledge modes is not adequately explored, in particular, for the last four modes which are routinely under-employed (compared to the first two knowledge modes) (Educationfutures website, 2006a)

[3] A computer system used as an information source and forum for a particular interest group.

[4] The *liberal skills* are the applied derivations of the liberal arts and related areas that may be applied in transdisciplinary contexts in new knowledge production and innovation. The core liberal skills encompass virtual

require threshold investments in technology-intensive physical capital. Broadband capacity, albeit still weak compared to Singapore and Korea (Marginson, 2004), is gradually spreading. With the increased boost of broadband technology, the China Education and Research Network (CERNET) and China Library and Information System (CALIS) will operate more efficiently to bring together all Chinese universities and education institutions (Yang *et al*, 1998). This convergence will include distance education as an intermediate outcome, and ultimately to connect the country's tertiary institutions, secondary schools, and even primary schools to one network (Harwit & Clark, 2001). It seems that the long-term outcome CERNET and CALIS would like to achieve is completely in line with the population Leapfrog education attempts to serve. Technologically supported education and industry, in turn, substantially help expanding needs for human capital, especially tertiary educated workers in technologies and services (Marginson, 2004).

<u>More process, outcome and future oriented indicators and measurements are needed</u>

In spite of all the merits that Leapfrog education entails, two major concerns are noteworthy. The first concern is primarily due to the developmental stage of Leapfrog education. It is still in its infancy despite a stunning pace of development. Although a thought-provoking framework has been made explicit, more substance undergirding the framework is needed to constantly replenish it. For instance, how to jump over obstacles and achieve the goals? To be more specific, to what extent is Leapfrog different from what is already done? Does it consist of the mere idea of sophisticated and novel technology? Since Leapfrog is future oriented, how will educators and learners actually create and use digital tools and virtual learning spaces today and tomorrow? How would Leapfrog educators and the entire learning community socially construct and formulate immediate, intermediate, and long-term outcomes ten years, fifty years and a hundred years from now?

<u>Cost issues associated with technology-intensive learning devices and infrastructures</u>

Cost is another area of concern. Despite the assumption that "open source development" can minimize costs, expenses for many other interactive technologies can be prohibitive (e.g., internet enabled handheld devices), and short-term cost-recovery for them virtually impossible (Hanna, 1998). On the one hand, it is questionable that vast Chinese rural areas can enjoy equal access to distance education as the urban and outskirt areas, where nearly all higher education institutions and electronic resource centers are located. In light of the fact that China has witnessed a sizable rural-urban migration (Rozelle, *et al*, 1999), and rural-born college students rarely return, scaling-up technology and educational infrastructures to rural areas is not only a matter of money but also a matter of utility. The cost-effectiveness of interactive web-based technologies also invites comparisons between urban youths who have easy access to virtual worlds and their less advantaged peers (Mclaren, 2007). How to leverage education access and intervention mechanisms in different geographic settings is a very hard question to be solved within a short period of time.

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time manipulation through simulational thinking, knowledge production, technology, communication, critical and multi-paradigmatic thinking, focused imagination, developed intuition, emotional intelligence, and *s*ystems design (Education Futures website, 2006b; Harkins, 2007).

Summary

In conclusion, Leapfrog education is a worthwhile educational experiment for Chinese educators to consider. The major themes and key concepts of Leapfrog are appropriate in the Chinese context. The co-constructivism supported by Leapfrog expedites the change for a detrimental malady- "downloading" education that is prevalent across the entire Chinese education system. There is an internal mismatch of technological adoption behavior between students and faculties as well as among faculties. However, Chinese tertiary education is equipped with the basic economic and human capital to Leapfrog into the next level. However, Leapfrog education should strive to become more meaty and implementable so as to come up with tangible benchmarks and outcome measurements.

Leapfrog advocates, when working with the Chinese education system, should be proactive yet patient. It took approximately forty years to develop from correspondence courses to postsecondary distance education. Unfortunately, distance education was interrupted for ten years because of the Cultural Revolution. Regular distance education programs were resumed in the late 1970s. During 1980s and 1990s, integrative technologies using radio and TV have played a critical role in reinvigorating distance education. This paved the road for a tidal wave of web-based distance education in the early 21st centaury. Distance education evolves along a non-linear trajectory, with a widening gap between rural and urban areas in contemporary China. Perhaps, Leapfrog education may move to prioritize competing demands: whether to push forward to build virtual campuses in the first place; or to lobby for equality and equity of access for students in rural areas; or to push for integrative technologies, such as cost-saving radios and TVs with low cost digital devices. In the final analysis, however, China must and will move toward and into Education 3.0 (knowledge production) and Education 4.0 (innovation production). Not to do so would prevent China from taking its place among socioeconomically pace-setting countries and regions.

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