

## Research Article

# ICT in Education Reform in Cambodia: Problems, Politics, and Policies Impacting Implementation

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### Abstract

*This article serves as a critique of an ICT in education reform in the nation of Cambodia. Although an ICT in education policy was adopted by the Cambodian Ministry of Education, tangible, quantifiable, and measured progress of this reform has, to date, been limited in nature. Hence, to understand the limitations of this reform, the author uses Kingdon's multiple streams model to investigate streams of policy, problems, and politics. This model allowed the author to explore existing data, events, and experiences in a robust manner. The current research is an analysis of policy papers, government documents, IGO briefs, personal experiences, and other nations' experiences with similar ICT in education reform movements. It was determined that failure to fully address the political stream has caused stress on the adoption process of this reform and has, in effect, slowed its progress.*

Researchers, policy makers, and international development educators are increasingly focused on how less-developed nations can use information and communication technologies (ICTs) to most effectively bridge their global digital divide (Hepp et al., 2004). Peizer (2004) concluded that, when incorporating ICTs into projects in less-developed nations, planners and leaders must work "within the constructs of the existing system by leveraging its strengths and limiting its weaknesses" (87). Increasingly, the focus for improvement is on the education system. However, "one of the most unfortunate by-products of the digital divide is its negative impact on educational efforts throughout the developing world" (Tiene, 2002, 212). To minimize the negative impact the digital divide wields over education systems in less developed nations, there is an urgent need to better understand ICT in education reform efforts.

In response to this problem, in December 2004, through the Ministry of Education, Youth and Sport (MoEYS, 2004c), the Cambodian government adopted a policy entitled *Policy and Strategies: Information and Communication Technology in Education in Cambodia*. The MoEYS set ambitious goals for the ICT in education policy that included: increased access to basic education for all using ICT as a major tool; improved quality of basic education; and the creation of a workforce eligible to participate in the global knowledge-based economy.

The present study is an analysis of the implementation of Cambodia's ICT in education reform. The analysis is based on MoEYS policy docu-

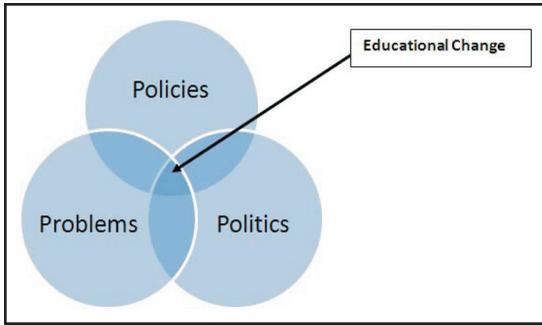


Figure 1. Multiple Streams Model.

ments, international governmental organization (IGO) supporting documents, and the researcher’s experiences working in Phnom Penh, Cambodia, on an IGO-supported ICT in education project. The prime focus of the current article is to explore reasons why full implementation of this reform movement has been stalled.

The current study is contextualized around Kingdon’s (2003) multiple streams model. The model was used to investigate factors that led up to the reform and to better understand the challenges the Kingdom of Cambodia faced, and is facing, while trying to implement an ICT in education reform. This model is appropriate because quantitative measures to evaluate the policy are scant or simply do not exist. The multiple streams model, therefore, is used to better integrate the evidence that does exist, be it qualitative or quantitative.

The current article demonstrates that because politics, problems, and policies failed to remain interconnected, an ICT in education reform has yet to be fully embraced in Cambodia. What follows is a discussion of the multiple streams model and analyses of how the ICT in education reform was introduced, as well as a description of its current status. The research concludes with a discussion of how the streams may continue to interact and impact the implementation of this reform.

### Multiple Streams Model

Kingdon (2003) developed the multiple streams model to better understand government agenda setting. As displayed in Figure 1, Kingdon claimed that national reform occurs only when three process streams unite: streams of problems, policies, and politics. Porter and Hicks (1997) claimed these

streams are independent of one another, yet sustained reform comes from their interdependence.

Problems are recognized and defined according to processes that are different from the ways in which policies are formulated and political events unfold; Policy alternatives are developed according to their own criteria of selection, whether or not they are solutions to recognized problems or sensitive to political considerations; Political events flow along on their own often unpredictable schedule, whether or not they are related to problems or policy proposals. (52)

Kingdon’s multiple streams model will be used in the current research to demonstrate that the opportunity for an ICT in education reform arose in Cambodia because these three pressures were present and temporarily united. This model will demonstrate that the current inactivity within the Kingdom of Cambodia regarding an ICT in education reform is the result of a breakdown in maintaining linkages among the political, problem, and policy streams.

### Political Stream

The current political environment in Cambodia began in October 1991 with the signing of the Paris Peace Agreement: an 18-country international settlement among four warring factions within the country. This resolution effectively opened Cambodia’s borders to the outside world after almost two decades of isolation. This event was followed by Cambodia’s first multi-party elections held in July 1993. By September 1993, a national constitution was adopted. The constitution established the Royal Government of Cambodia as a multi-party, liberal democracy under a constitutional monarchy. On July 15, 2004, Cambodia peacefully set up a coalition government between the Cambodian People’s Party (CPP) and the National United Front for an Independent, Neutral, Peaceful, and Cooperative Cambodia (known under the French acronym, FUNCINPEC).

Since the mid-1990s, various organizations supported ICT for development (ICT4D) initiatives generally and ICT in education initiatives specifically. Organizations such as UNESCO, UNICEF, the Asian Development Bank, and the World Bank, among others, have demonstrated their willingness to incorporate ICTs into development projects in Cambodia. Recent projects include: Cambodia Schools, which, partially funded by the World Bank, equipped

schools with various ICTs and solar panels to run those technologies; the Village Motoman Project, sponsored by the American Assistance for Cambodia, used motorcycles equipped with mobile access points and a satellite uplink to bring email and Internet search results to rural villages; and the development of community information centers (CIC) funded by the Asia Foundation, USAID, and Microsoft. With the increase of available funds, policymakers within the MoEYS took notice of this opportunity and began to investigate the potential for an ICT in education reform.

As a Southeast Asian nation, Cambodia has become increasingly influenced by the success of its neighboring countries. Singapore and Malaysia have made tremendous strides with regard to ICT (i.e., computing and communications mechanisms, both tangible and intangible, that facilitate teaching and learning) in education in particular and IT (i.e., knowledge, skills, and understanding needed to employ ICTs) in general. Thailand and Vietnam have both seen successes in these arenas to a lesser degree than Singapore and Malaysia, but to a much greater extent than Cambodia.

Malaysia's Multimedia Super Corridor Project is but one example that may have influenced Cambodia's political choices (Dux, 2001). Through this project, Malaysia continues to focus on both economic and education improvement. This ambitious national technology project is intended to help transform Malaysia into a developed nation by the year 2020. In addition to fostering a technology-based economy, Malaysia piloted 90 Smart Schools in 1999. These schools were given hardware and network systems for ICT use in education, along with continued professional development of the teaching staff. The Malaysian Ministry of Education set guidelines for other schools to gradually introduce appropriate levels of ICT, noting that the government did not have the ability to convert all 8,000 schools to Smart Schools on its own. The Malaysian government planned to have all schools converted by 2010 through outside initiatives rather than government mandates or government funding. The successes witnessed by other Asian nations after the millennium is a testament to the acceptance of technological change in the region. Since other Asian nations have experienced tremendous growth due to embracing this paradigmatic change, there was strong

political pressure for the Cambodian government to respond in kind.

In August 2000, Cambodia created the National Information Communication Technology Development Authority (NiDA). Duties of NiDA (2005) include: promote and formulate IT development policy for the short, medium, and long term; implement IT policies to ensure maximum economic growth; and monitor and audit all IT-related projects in Cambodia. By creating a government body to address IT needs, the Cambodian government politically prepared itself for future ICT-based reforms.

Political pressures from other Asian countries, international funding agencies, and IGOs were evident. Through these developments, the political stream was putting pressure on numerous ministries within the Cambodian government to help develop the economy, increase human capital, improve capacity, and foster democracy in a modern and technologically responsive manner. The political need, political will, and politicians were thus preparing to embrace an ICT in education reform.

### ***Problem Stream***

Economic and social problems have continued to prevail in Cambodia since the end of the civil war, which lasted from 1974–79 and completely devastated the country; its effects are still being felt today. Based on 1999 data, the International Labour Organization (2001) claimed that almost 45% of Cambodia's population is less than 15 years of age, with 85% of the population living in rural areas. According to 2005 estimates, the UNDP (2007) claimed the adult literacy rate is 73.6% (231). The public expenditure on education was 2% of the GDP for 2002–04 (UNDP, 2006, 321).

According to the UNDP (2007) Cambodia continues to remain one of the poorest countries in the world. As of 2005, the estimated earned yearly income for a Cambodian female was USD\$2,332 and for a Cambodian male USD\$3,149 (328). Less than 12% of the Cambodian labor force receives wages, while 52% are self-employed and 35% work as unpaid family workers (International Labour Organization, 2001). In 2007, Cambodia's Gini index, which is a measure of inequality of income distribution, was 41.7 (UNDP, 2007, 283). This income inequality metric was higher than that of most Asian countries and better than only four of the 10 nations in the

Association of Southeast Asian Nations (ASEAN) region.

Calavan, Briquets, and O'Brien (2004) noted that corruption is largely to blame for Cambodia's poor economic and social gains.

Politicians skillful at resisting and diverting the international development community are just as capable of controlling a largely rural population through demagoguery, false promises and intimidation. The raw power of the state, complemented by fear and the distribution of small gifts and favors at critical junctures, will continue to provide a veneer of political legitimacy. Under this cloak of legitimacy, were it to be allowed to persist by the international community, the rapacious exploitation of Cambodia's economy will continue with unforeseen consequences for the country's political and socioeconomic development. (2)

Corruption and disproportionate economic gains continue to impact the common Cambodian citizen. The UNDP (2001) warned that as the Cambodian economy continues to grow, the disabled, the elderly, the orphaned, the widowed, the landless, the unemployed, the subsistence farmer, and the indigenous ethnic minority are at risk of being left behind. Beginning in 2004, with the help of UNESCO (2006), the Cambodian government began to look for technology-infused educational solutions to lessen the extent of these problems.

First published in 2001, the *Global Information Technology Report* (Dutta, Lopez-Claros, & Mia, 2006) serves as a global benchmark used to determine a nation's ICT strengths and weaknesses. This series of reports bases its conclusions on the Networked Readiness Index (NRI).

The NRI has been designed as a macro level tool for policymakers and global leaders. The Index signals broad trends, flags opportunities and deficits, and makes a unique contribution to the understanding of how nations are performing relative to one another with regard to their participation in the Networked World. (Kirkman, Osorio, & Sachs, 2002, 12)

Cambodia first appeared in the 2006–2007 report and was ranked 104 out of 115 nations. Other ASEAN nations' rankings included: Singapore, 2; Malaysia, 26; Thailand, 36; Indonesia, 68; the Philippines, 70; and Vietnam, 75. This data indicate the

current ICT infrastructure of Cambodia is quite poor in contrast to its neighboring countries.

The MoEYS (2004b) claimed that, as of 2004, only 13% of the 698 secondary schools are on the electric grid, while 8% used generators and 4% used solar panels. Of the Cambodian public schools, 6% of lower secondary and 35% of upper secondary had between one and two computers restricted to administrative purposes. Only eight upper-secondary schools had more than 10 computers.

Richardson (2006) conducted an analysis of a UNESCO-sponsored survey aimed to determine the state of ICT in schools in seven rural Cambodian provinces. Richardson found that, of the 96 schools in these provinces that used computers for student learning, primary schools had an average of 2.52 computers, lower secondary schools had an average of 8.17 computers, upper secondary schools had an average of 10.29 computers, and post secondary schools had an average of 22.75 computers. Only 37.5% of the schools reported that 50% or more of their students could access the computers. Richardson also found that 15.6% of the schools never allowed their students to access the computers. Additionally, 22.9% of the schools reported that none of their teachers had access to the computers, while only 14.6% of the schools reported all of their teachers had access to the computers. The MoEYS (2004c) noted,

Not all colleges have enough computers to run ICT courses effectively and some have problems with power supply for example having to rely on a generator or having to turn off all other electrical appliances in the college while the computer room is in use. (9)

These data indicate that Cambodia's IT situation is dire. Its technological infrastructure is low, the government is frail and susceptible to multiple levels of corruption, and economic disproportionalities are prevalent.

Finally, Cambodia's education system is in need of improvement and expansion. The immediate choices made by the MoEYS will directly impact the likelihood of successful expansion and improvement of the current education system. The MoEYS (2004c) noted:

With the many obstacles Cambodia needs to overcome in order to provide quality education for all, it may seem that ICT should be low on its list

of priorities. On the other hand, unless actions are taken soon, the country will fall further behind its neighbours and its young people will lack the skills they need for life in the digital age. (6)

Cambodia is in a unique situation in contrast to most other ASEAN nations. In many ways, Cambodia is just beginning to transform and thus has the potential to leapfrog old technologies and ways of educating its citizens and opt for new technological solutions to improve its education system.

Hepp et al. (2004) noted that less developed nations traditionally turn to ICTs for three reasons. First, as societies shift to knowledge economies, a new set of ICT-focused skills will be required. Second, "schools are information- and knowledge-handling institutions" (1). Thus, ICTs are fundamental to efficiently address the information retrieving and knowledge generating goals of schooling. Finally, Hepp et al. noted there exists the potential for ICTs to help schools "create more effective learning environments and improve life-long learning skills and habits in their students" (1). How to effectively and efficiently use ICTs in Cambodia to foster information-rich, knowledge-generating, life-skills that will be applicable in a knowledge economy was a problem that demanded concerted efforts.

### **Policy Stream**

In July 2004, the Cambodian government developed the *Rectangular Strategy for Growth, Employment, Equity, and Efficiency in Cambodia* (Royal Government of Cambodia, 2004). The Asian Development Bank (2005) found that through this policy, "the [Cambodian] Government has signaled its commitment to addressing deeply entrenched governance issues that have long hindered development and social progress and has also initiated a number of measures to address some of the structural constraints to growth" (i). Each area of the Rectangular Strategy stressed the increased use of ICTs.

Cambodian educational policies of the 1990s focused on equitable access, quality improvement, and strengthening planning and management, as is evident in the national *Socio-Economic Development Plan 1995/2000*. This plan became possible when the United States lifted its trade embargo against Cambodia in January 1992, which effectively normalized economic relationships between the two nations. Lifting this embargo was a sign to other na-

tions, as well as to international donors and aid agencies, that Cambodia was a relatively safe place in which to invest and a nation worthy of increased loan, grant, and project support. In addition to this economic policy focus, national education policies in the post-millennium era began to stress technology integration. These shifts led to an increased presence in the number of NGOs as well as IGOs. As of 2001, there were 185 IGOs and 384 local NGOs registered in Cambodia (Cambodian NGO Directories, 2001).

Cambodian education policies from 2000–2005 primarily focused on capacity building, as evident in the UNICEF-supported *Expanded Basic Education Program 2002–2005* (MoEYS, 2002b). Through this policy, the Cambodian government made a commitment to achieve the goals of *Education for All* as well as the *Millennium Development Goals*. The Cambodian MoEYS (2002a) stated it is "gradually moving toward a sector-wide approach to education development and a shift from 'donorship to partnership,' characterized by strong national ownership and genuine partnerships in development" (1). World Bank projects for this time period included higher education reform, demobilization, rural electrification, teacher development, rural infrastructure, and basic education.

The MoEYS (2004b) published the *Education Strategic Plan 2004/08* (ESP) in September 2004. The Ministry claimed a crosscutting strategy for enabling the ESP would be the increased use of ICTs. The ESP earmarked USD\$7.9 million to science, technology, and ICT facilities expansion. Through these actions, the MoEYS has shown a policy commitment to strengthening ICT infrastructure at all levels, including districts and schools in remote border provinces. One goal of this ESP was to construct science and ICT facilities in 50% of the nation's schools by 2007 and 100% of the schools by 2009. To date, no publishable data are available to ascertain if these goals have been met or if this facility construction is underway.

UNESCO (2006) implemented the *Establishing the Effective Use of ICTs in Education for All in Cambodia* project from July 2002–July 2006. Key outputs of this project were: helped the MoEYS formulate a national ICT in education policy; trained 526 out of 676 teacher trainers and lecturers at all teacher training colleges in the country to use ICTs for teaching and learning; provided ICT access to

1,000 primary and secondary school teachers; and established the National ICT-Based Clearing House for users outside of Cambodia. This project sought to promote and develop capacity for ICT in education primarily through universities and teacher training institutions. The project additionally sought to develop and implement mobile ICT units in an effort to extend ICT access to deprived groups. UNESCO reported that, as of July 2006, the mobile learning bus had reached 5,030 disadvantaged youth and adults, including orphans, street children, and out-of-school youth who accessed its facilities by using laptops or digital cameras, or by watching educational videos. This UNESCO project facilitated the donation and dissemination of 838 secondhand laptops and desktops and 33 new desktop servers among the 26 teacher training colleges in Cambodia. UNESCO noted challenges that impaired the project included the lack of resources in the Khmer language, poor English skills of the trainers and trainees, poor infrastructure, a lack of hardware, and the lack of action taken by the MoEYS to implement the current ICT in education policy.

Farrell and Wachholz (2003) claimed that “the international community has been responsible for the key initiatives that introduced and expanded ICT into the country [of Cambodia]” (74). The American Assistance for Cambodia began an initiative called *Village Leap* ([www.VillageLeap.com](http://www.VillageLeap.com)) which provided Internet connections to three rural schools in the village of Robib. The Internet connection is currently being used to sell local silk handicrafts globally via the Internet. The American Assistance for Cambodia and Japan Relief for Cambodia run a Web site ([www.cambodiaschools.com](http://www.cambodiaschools.com)) that solicits funds via the Internet to construct Cambodian schools. The funds are additionally used for teacher salaries, installation of solar panels, and Internet connectivity.

Through the policy stream, the Cambodian government was positioned to create and adopt a responsive ICT-based educational policy. In 2003, after a national summit on ICT policy and strategy, and with the help of UNESCO, the MoEYS (2004a) published a draft ICT in education policy. In December 2004, the MoEYS officially adopted the *Policy and Strategies of Information and Communication Technology in Cambodia* (MoEYS, 2004c). As detailed in Appendix A, the MoEYS set policy goals and objectives that included: improve the quality of basic education; increase the use of ICT in post-secondary

education; increase community ICT use and skills through non-formal education; improve the ICT infrastructure within the education system; and increase stakeholder satisfaction.

In December 2005, the MoEYS (2005) published the *Education Strategic Plan 2006–2010*. This policy supported ICT expansion by earmarking USD\$5.5 million to science, technology, and ICT facilities expansion. The same document, however, noted there may be a \$107 billion riel (USD\$26.75 million) potential shortfall to achieve the goals of this new plan.

### Union of Problems, Politics, and Policies

The opportunity for educational reform arose when the problem, political, and policy streams came together. The Cambodian government, through the influence of its ASEAN neighbors and international development agencies, fostered the ICT-based educational reform by first focusing on broader economic policies, thus influencing other government agencies to focus on ICTs. The Cambodian public required changes as social problems, such as poverty, low educational participation, limited educational funding, and social inequalities, escalated. The MoEYS began to incorporate ICTs into educational policies, which signaled an understanding of the importance of these new technologies. Through the union of these multiple streams, the opportunity was taken to develop a national ICT in education policy in Cambodia. Due to a breakdown in maintaining the linkages of all three streams, however, an ICT in education reform has yet to take hold.

### Breakdown in Linking Policy, Politics, and Problem Streams

Porter and Hicks (1997) detailed that reform efforts often falter due to partial couplings described as: “solutions to problems, but without a receptive political climate; politics to proposals, but without a sense that an important problem is being solved; [or] politics and problems, but without a clear policy alternative to advocate” (52). However, coupling all three streams “increases the odds that an authoritative choice will be made and implemented” (52). In the case of Cambodia, partial couplings may be to blame for the failure to institutionalize the ICT in education reform. Porter and Hicks (1997) claimed:

If one of the three elements is missing, a solution is not ready and available, a solution is ready but it is not attached to a problem of any prominence, or support is not forthcoming from the political stream, then the issue's presence on the agenda is fleeting. (53)

The current study details that, in Cambodia's case, full implementation of the ICT in education reform stalled due to a failure to merge the political stream with the streams of problems and policies. What follows is an analysis of different aspects of the ICT in education policy that have yet to be achieved juxtaposed with aspects of the policy, political, and problem streams that failed to remain connected.

### ***Politics and Stakeholders***

Direct stakeholder support appears to be gained only at the upper levels of the Ministry. If gained, support from teacher trainers, teachers, students, and parents occurred post hoc. For example, Richardson (2006) found that in seven rural provinces in Cambodia, only 10.4% of the schools that had computers for teaching and learning purposes actually received a copy of the MoEYS's national ICT in education policy after 18 months of its adoption. Only 3.1% of these schools were following the mandates of the national ICT in education policy. Thus, students living in rural communities who have been underserved, continue to be underserved despite the adoption of this policy. Teachers, parents, and students in rural areas have different needs than their urban area counterparts. Failure to distribute the policy to these stakeholders, coupled with these schools' failure to enact the tenets of the policy, either by force or free will, indicates that their support was neither garnered nor necessitated. Since this policy only set the direction, without funding, training, leadership, and motivation, it has not been put into action; it remains only a policy on paper. Thus, the needs of these coalitions of diverse individuals (at least with regard to rural schools) were not directly addressed.

Pelgrum and Law (2003) claimed that teachers and administrators "play a crucial role in the adoption and implementation of ICT in education" initiatives (26). The majority of these stakeholders may support this ICT in education policy, but these stakeholders require added training, support, and access to technologies. As of summer 2006, UNESCO

(2006) provided 96 hours of ICT training to all teacher trainers in the country and to 24 teachers in secondary schools. Nonetheless, Hepp et al. (2004) found that successful implementation of any ICT in education policy necessitates that professional development of teachers be ongoing.

Without teacher involvement, most students in primary levels in particular, but also in higher levels may not take advantage of all the available potential on their own. Teachers need to become active participants for effective ICT educational use, such as providing guidance, help and usage rules for the students. Teachers are needed to organize the learning spaces and to guide toward the achievement of significant learning objectives. (3)

For many teachers, however, ICT in education may be a double-edged sword. Pelgrum and Law (2003) found that technological innovations are highly challenging to teachers. ICTs require teachers to adopt new roles and shift pedagogical paradigms. They also found that school leaders may resist an ICT in education reform if they feel they are not prepared to lead the change. Hepp et al. (2004) found that "perhaps the most important lesson from past initiatives is that a technology-centered policy (i.e., one that focuses primarily on deploying machines, software and Internet connections) will not produce meaningful results or the expected impact on students [sic] learning." (2)

Analysis revealed that parental support for this ICT in education reform was not gained prior to implementing the ICT in education policy. The MoEYS (2004b) planned to increase basic education enrollment to 96%, enrollment of lower secondary education to 50%, and the net intake rate for six-year-olds into Grade 1 to 95%. In discussing child labor issues in India, Docksai (2008) noted "with poverty widespread and highly skilled jobs scarce, rural children typically have had to leave school early and join the workforce, earning what little they could to help feed the families" (8). Parents who lose this labor force may prove to be ardent resisters. Additionally, Hepp et al. (2004) detailed how experiences in Chile have shown that in order to sustain local ICT in education efforts, parents must support it with their own time and money. Parental resistance may soon come from those families facing these added burdens.

Additionally, stakeholder support was not garnered at the community level. Afele (2003) warned that national ICT in education reforms may create an internal digital divide between rural and urban communities. Afele found that many ICT programs in less developed nations have predominantly focused on schools in urban areas. "Education in rural areas should be the challenge and opportunity for developing countries and the telecommunications sector in order to test the possibilities of reaching remote areas with high-quality education and realize the universality in 'education for all'" (123). Hepp et al. (2004) found that "rural schools pose different and more complex challenges than urban schools" and thus "require and deserve special considerations and distinct strategies" (6). Hepp et al. additionally noted how rural schools can be critical change agents of the ICT in educational reform in their local communities. In Cambodia, many remote schools are funded and controlled by the local pagoda where the village children are instructed by local Buddhist monks. These schools are neither funded nor directed by the MoEYS. Thus, ICT in education reform has yet to reach these communities (Richardson, 2006).

The ICT in education policy promotes "education for all, regardless of age, gender, ethnicity, disability or location through distance education and self learning . . . by integrating ICT with radio, television, printed materials and other media" (MoEYS, 2004c, 5). Analysis of other projects focused on ICT in education within Cambodia and MoEYS documents indicated the Ministry has yet to directly address how these ICTs will or can be adapted to the local needs of the poor, the marginalized, the disabled, and those living in the remote provinces. Tinio (2003) found that "ICTs are a potentially powerful tool for extending educational opportunities, both formal and non-formal, to previously underserved constituencies" (6). Since disparities are so vast in Cambodia, there is a need to extend extra support to disenfranchised groups, including rural inhabitants, the poor, the elderly, ethnic minorities, girls, and the disabled. In Mexico, for example, a program called Progreso extends educational grants to mothers to increase school participation. It was found that this program had a significant impact on enrollment rates and reduced poor-unpoor inequality in enrollment (Schultz, 2001). In Cambodia, these ethical considerations appear to be minimized in this policy.

This situation is vital given that, as of 2005, 80.3% of Cambodia's population lived in non-urban areas (UNDP, 2007, 245).

The Cambodian ICT in education policy directly notes that all stakeholders are valued and considered in the ICT in education process, yet it offers no mechanisms for gaining or maintaining stakeholder input and support. It is clear, however, that stakeholder support was mustered at the macro level (e.g., IGO, NGO, international, corporate). In the ICT in education policy, the MoEYS (2004c) explicitly noted the need for cooperation and partnerships. Two stated goals are:

Promote cooperation with nation, non-governmental and international organizations and charity individuals inside the country and abroad to give a thrust to the development of ICT in education. . . . [and] build partnerships with civil societies and private entities inside the country and abroad to share ICT resources to minimize digital gaps in the region. (16)

Direct resistance to this reform has yet to arise because the policy has yet to be enacted for the majority of the Cambodian populace. Mashile and Pretorius (2003) found that the major challenge of implementing ICT in the South African higher education system was meeting the needs of individuals from lower socio-economic communities. These researchers stated that "attempts need to be made to find solutions that will incorporate low-socioeconomic communities into the digital dispensation" (139). Mashile and Pretorius found that, in addition to improved access, concerted training efforts are needed in these lower socio-economic communities. Although no mechanism yet exists in Cambodia, the fact the policy notes the need for cooperation and partnerships is promising.

### ***Politics and Values***

An added source of resistance to this ICT in education reform has recently arisen in Cambodia: the government itself. Reuters (2006) reported that the Cambodian Prime Minister Hun Sen has "banned 3G [third generation] mobile phones after a complaint from his wife and her friends about receiving pornography on them" (1). These 3G telephones have the ability to connect to the Internet in addition to video conferencing. Hun Sen was quoted as saying "we can wait 10 more years [for this level of

technology] until we have managed to improve morality in society" (Reuters 2006, 1).

It is evident that in Cambodia, where a dictatorial style of government with highly centralized planning is prominent, it is easy for a figurehead to accept or reject innovations on a whim. Attempts to control the use and dissemination of new technologies will have ripple effects on the adoption of current and future ICT reforms. This may significantly impact non-formal and informal education efforts. It is still unclear if the beliefs and needs of certain political figures will continue to counter the efforts to solidify an ICT in education reform.

### ***Politics and Scarce Resources***

In the summer of 2006, the World Bank (2006) announced it may cancel 43 contracts worth USD\$11.9 million of aid to Cambodia due to issues of corruption. It must be noted, however, that a draft of anti-corruption legislation has been with the Cambodian legislature since 1994. In a report funded by USAID, Calavan et al. (2004) wrote that, in Cambodia:

Impunity is the norm. No one with the patronage of the state is punished, whether for massive pillaging or petty theft. In fact, those most at risk are individuals and organizations that dare to resist corruption. Most Cambodians regard resistance as a futile act. Corruption is structured more or less as a pyramid; with petty exactions meeting the survival needs of policemen, teachers and health workers, but also shared with officials higher in the system. Patronage and mutual obligations are the center of an all-embracing system. Appointment to public office hinges on political connections or payments of surprisingly large sums, and those payments are recouped through a widely accepted 'right' to collect bribes. (3)

Obtaining resources in an environment of scarcity is imperative in Cambodia. As noted above, the *MoEYS Education Strategic Plan 2006–2010* (2005) anticipates a USD\$26.75 million shortfall in educational funding. With the misappropriation of funds, limited resources that may be earmarked to support ICT in education reform may never be allocated to the intended efforts.

### ***Politics and Supporting Policies***

The Cambodian ICT in education policy is supported by the national ESP. Given this support mechanism, it is fitting that both policies be scaled up according

to the progress of the other. The MoEYS (2004b) detailed how implementation of the ESP will focus on equitable access, quality, efficiency, and capacity building. Implementing the ICT in education policy will thus need to focus on these aspects as well.

The Cambodian ICT in education reform, however, is weak in regard to costs to the education system. The MoEYS (2004c) reported that, in post-primary education, there are 486 lower secondary schools and 212 upper secondary schools. Only 20% of the students ages 12–15 have access to these schools. It was noted that 75% of all secondary schools have no power supply at all, while 6% of lower secondary and 35% of upper secondary schools have minimal access to computers. A focus of Cambodia's ICT in education policy is to improve infrastructure by providing access to ICT for all teachers and all students. To achieve the goal where 100% of schools have modern ICT facilities, 456 lower secondary and 137 upper secondary schools will need to be fitted with computers and 523 secondary schools will need to get some form of electricity by 2008–09 (MoEYS, 2004b, 58). These figures do not include demands made by new school construction and an increase in the number of students.

The Cambodian government is setting high expectations without putting in place support mechanisms to achieve these objectives. Poor ICT infrastructure and initial set-up costs will continue to be a burden on the Cambodian education system as well as on general national infrastructure. In Malaysia, for example, these costs are explicitly noted as shared responsibilities of the public and private sectors garnered through innovative partnerships and initiatives. In Cambodia's case, these types of partnerships are noted, but no evidence was located that indicated they were being sought. Further, in Cambodia, the ESP 2004/2008 and the ESP 2006/2010 earmarked money for ICT facility expansion and staff development, but no published policy or budget mentioned a devoted budget for ICT professional development nor plans to obtain external support. This will be problematic in regard to sustainability. Since the MoEYS' policy overlooks the importance of creating a mechanism for obtaining and increasing stakeholder buy-in, ongoing support cannot be expected from these resources. Again, the policy clearly notes the need to meet the needs of all stakeholders. However, present data indicate

that these needs are not being directly addressed. In conclusion, the feasibility of Cambodia's ICT in education policy was determined to be highly unlikely.

## **Comparative Implementation Issues**

Analysis of UNESCO (2006) policy documents showed the MoEYS, with the aid of UNESCO, set policy goals and objectives by comparing ICT in education policies of other countries. However, it remains to be seen if the implementation phase will incorporate these lessons learned. Tinio (2003) claimed, "the introduction of ICTs in education, when done without careful deliberation, can result in the further marginalization of those who are already underserved and/or disadvantaged" (19). Increased marginalization is already evident by the failure to keep the rural populations informed and engaged in the ICT reform process. To avoid creating a deeper digital divide, the Cambodian government can choose to act with forethought by focusing on the lessons learned from other countries that have adopted similar policies. What follows is an analysis comparing lessons learned from implementing ICT in education policies in other countries contrasted with what Cambodia has done with its ICT in education policy.

Tinio (2003) conducted an analysis of ICT in education reform in countries, including Thailand, Mexico, India, Indonesia, China, Japan and South Korea. Tinio found that nations that have succeeded in implementing an ICT in education policy conducted a thorough assessment of their current education system to determine goals, needs, and implications. Success required harmonization of stakeholders, piloting, and determining sources of continued financing and development. In the present analysis, it is evident that the Cambodian MoEYS is abreast of the goals and needs, but after four years of adopting this policy, the Ministry has failed to harmonize stakeholders, conduct pilot tests, or plan for sustained financing and further development of the ICT in education policy.

Tinio (2003) also found that nations that have successfully implemented an ICT in education policy considered physical facilities and the availability of telephony and electricity. This aspect seems to be present in Cambodia's ICT in education policy; however, it was minimized when the MoEYS (2004c) claimed these issues will be resolved through the private sector. This shifting of infrastructure respon-

sibilities, without blending economic and education policy, may slow the success of the ICT in education reform. The UNESCO (2006) ICT in education project did provide limited ICT equipment to all teacher training colleges and 24 secondary schools as well as distribute numerous generators to secondary schools. These donations, nevertheless, were small compared to the country's overall needs.

Tiene (2002) researched the use of ICT in education in less developed nations since the late 1980s and found that, when using ICT in less developed nations' education systems, governments should concentrate on secondary and tertiary schools first. Tiene noted that "eventually the focus can shift to earlier grades, so as to gradually develop basic technology skills throughout the entire school-aged population" (p. 218). Tiene suggested there is great opportunity for ICTs to improve school administration, leadership skills, access, and opportunities, and to provide information to poor nations. In support of this lesson, Akkoyunlu (2002) found that, for the ICT in education policy to be more effective in Turkey, the ministry needed to concentrate on teacher training and focus on the use of technology integration into the learning process. Cambodia neglected this lesson and opted for complete ICT integration at all levels of schooling. The Cambodian MoEYS (2004c) stated it is "introducing various initiatives to facilitate greater integration of information and communication technology (ICT) to improve the effectiveness of education at all levels" (4). However, the Cambodian government appears to again be shifting this responsibility to IGOs, NGOs, and the individual learner. For example, at the IGO level, the recently completed UNESCO (2006) ICT in education project trained all teacher trainers in the country, plus a small number of secondary school teachers as well, and also provided computing hardware to colleges and public secondary schools. At the NGO level, the Open Forum of Cambodia was developed to increase access and use of ICTs within Cambodia. At the individual level, the ICT in education policy explicitly states that using ICTs "will also encourage a culture of self-learning" (MoEYS, 2004c, p. 6).

Pelgrum and Law (2003) found that ongoing professional development was pivotal to the success of ICT in education policies. In researching ICT in education in Africa, Cawthera (2002) found it was vital that professional development occur when ICTs are first introduced in the schools of a less developed nation. Hinostroza, Guzman, and Isaacs (2002) com-

pared ICT in education case studies and found that, in Chile, there was no impact on student learning with the use of ICT in schools because teachers were not trained adequately to use the ICTs. Hepp et al. (2004) found ICT policies that succeed include funding for an ICT coordinator. "These professionals have a special role in infusing ICT inside schools, supporting teachers and keeping the hardware and software up-to-date and workable" (17). In a speech to officially close the UNESCO ICT in education project, the representative of the Phnom Penh, Cambodia UNESCO office noted that "the Ministry can help eliminate Cambodia's digital divide by first formulating a fiscally responsive action plan that takes into account ICT training, upgrading, maintenance, and increased technology support in addition to earmarking money to reach the rural populations" (Jinnai, 2006, 1). Thus, there remains a need for the Cambodian MoEYS to be proactive by furthering professional development as well as local level support.

Capacity building appears to be planned in retrospect in the Cambodian case. The ICT in education policy claims to support non-formal education efforts. However, the current policy fails to plan for teacher and administrator professional training as well as ongoing technical support and content development. In January 2006, UNESCO donated a mobile e-learning bus equipped with numerous laptops, learning CD-ROMs, and educational VCDs; in addition, the bus could connect to the Internet. The intention of the mobile e-learning bus was to help bring ICT access to rural areas via non-formal and informal education programs. Nevertheless, Richardson (2007) found that the UNESCO-donated mobile e-learning bus sat idle since its donation to the MoEYS in early 2006. The MoEYS has yet to allocate funding to continue this non-formal ICT in education initiative, although its use is specifically noted in Cambodia's ICT in education policy, as described in Appendix A. Cawthera (2002) found that costs of ICT in education reforms are lowered with increased usage of the ICTs, which might mean extending ICT use after-school to the community. Thus, long term costs of these initiatives could be lowered by collecting a fee for their extended use.

In Cambodia, there is need for local language content development. Pelgrum and Law (2003) found that educational content remains a challenge

for many countries engaged in an ICT in education reform. They stated, "it is very difficult to locate educational content suited to particular local needs" (54). Since the market is relatively small, comparatively speaking, publishers are resistant to invest in developing linguistically and locally appropriate educational software, general use software, books, Web sites, and other forms of media. Additionally, since organizations and individuals in countries such as Cambodia fail to adhere to copyright laws and freely distribute pirated software, there is little financial incentive for software developers to invest in this market. After completing an ICT in education project in Cambodia, UNESCO (2006) noted that the "slow growth of content in Khmer on the Internet impedes the development of ICT in the classroom. Most Khmer information on the Internet is produced by government ministries which inhibits any critical commentary and restricts access to global ideas and information" (8). The Cambodian ICT in education policy does make note of this need, but this lesson must not be overlooked. Research from other countries has shown that to gain community buy-in, educational initiatives must be relevant to the local needs.

The final challenge noted by Tinio (2003) is that of expectations. The MoEYS must ask itself, "Will ICT be the silver bullet that will rid Cambodia of all its educational problems?" Tinio stated that technology cannot drive education; rather it is educational goals and needs and careful economics that must drive technology use. As a general rule, Wilson (2004) found that, to achieve higher levels of technological progress, nations with a low level of development should build human capital, lower government distortions, respect intellectual property rights, and sustain an enabling environment of civil liberties. Vice versa, opening communication channels may, in turn, help build human capital, lower government distortions, foster intellectual property rights, and embrace an environment of civil liberties.

## Conclusion

Streams of politics, problems, and policies united to create the potential of an ICT in education reform in Cambodia. However, the failure to forge the political stream with the streams of problems and policies continues to hinder the mass adoption of this reform. The political stream has yet to be coupled

with: the problems of stakeholders; the values of competing political coalitions; the resources available to competing goals, individuals, and policies; and the policies that support the ICT in education reform.

The present analysis has demonstrated that, as Cambodia progresses in planning and implementing the ICT in education policy, government policy makers would be advised to thoroughly plan the implementation process versus allowing implementation to be ad hoc. The current analysis indicated that to institutionalize the ICT in education reform, focus needs to be placed on the political stream. Based on the data presented above, a few conclusions and recommendations can be made for this reform's implementation and evolution.

First, there is a need for the MoEYS to be proactive and develop an ICT in education action plan. It is understandable that the government is hesitant to commit funding and resources. However, if the government developed an inclusive, yet flexible, action plan, NGOs, IGOs, international lenders, local business, and local communities could better rise to the challenge and determine where best to put their resources and expertise. This need is linked with closely monitoring ICT in education projects to ensure all aspects of the action plan are addressed by the most competent institutions in the most efficient and effective manner possible.

Second, buttressed with the need for an action plan, is the need for the Cambodian government to pass anti-corruption legislation and thus increase the nation's transparency. The risk of losing further aid and the possibility of paralyzing future ICT in education efforts is currently quite great. If Cambodia wants to be a global competitor, the government needs to adopt a culture of internationally accepted transparency, governance, and business ethics.

Third, the Cambodian government should distribute and support ICT infrastructure in the education system equitably and ethically in the short and long term. This infrastructure includes continued professional development of teachers, administrators, technology coordinators, and support personnel throughout the country. Internal inequality will erode social, ethical, and national ethos. To leapfrog out of a digital divide and become a global competi-

tor, equity and social justice must be a guiding principle.

Fourth, if Cambodia is serious about an ICT in education reform, it must be willing to take daring risks. The United Nations Economic and Social Commission for Asia and the Pacific (2004) found that, as early as 1993, Cambodia became the first nation to have more mobile telephones than fixed lines. Wireless technology may be a viable alternative to the existing poorly wired-telephone infrastructure. Additionally, banning technologies such as 3G phones signals that the government is not fully prepared to accept the ramifications that access to information may bring.

Fifth, the MoEYS may need to focus on grassroots and community level information and education campaigns and advocacy. This will increase local stakeholder support and increase ownership of ICT-enabled education reforms. Partnering with local government units, youth organizations, NGOs, and IGOs to affect demand for such reforms from the bottom up will only increase quality, sustainability, and scalability of ICT in education projects. These acts would ideally make the political stakeholders act together to realize the needed reforms.

Lastly, lessons learned from other countries should not be overlooked by Cambodian leaders. These leaders must determine the implications of ICT in education, remain focused on the infrastructure of rural and urban communities, proactively build capacity, energetically develop indigenous language and content, remain cognizant of costs, and focus on reasonable expectations.

The nation of Cambodia has experienced major trials and tribulations. From its height of power in the Angkorian era to its decline during the reign of the Khmer Rouge, the nation has experienced many successes and challenges. The challenges that exist today are not for political power, but for knowledge and innovation. Improving the education system in Cambodia to meet the future needs of a global society is perhaps the most pressing need for this nation. The present analysis has shown that ICT in education may be part of the solution, but only if the reform is implemented through a competent, responsible, and proactive approach that unites streams of policy, problems, and politics. ■

Appendix A. Goals, objectives, and current state of Cambodia's ICT in education policy.

Goals	Policy Objectives	Current State of Goal
<b>1. Improve quality of basic education</b>	<ul style="list-style-type: none"> <li>• Promote lifelong learning</li> <li>• Promote innovative thinking, communication, and problem solving skills</li> <li>• Update curriculum / training of primary / secondary teachers to include ICT</li> <li>• Provide a budget for ICT to all primary and secondary schools</li> <li>• Provide mobile ICT learning services to deprived areas</li> <li>• Increase management and administration efficiency through the use of ICT</li> <li>• Provide power to all elementary and secondary schools</li> <li>• Improve secondary education in areas of science, foreign languages, social sciences, and mathematics</li> </ul>	<ul style="list-style-type: none"> <li>• No evidence—difficult to measure</li> <li>• No evidence—difficult to measure</li> <li>• No evidence of curriculum reform</li> <li>• No evidence budget has been allocated</li> <li>• Effort withdrawn as evidenced in UNESCO (2006)</li> <li>• NiDA is making progress</li> <li>• Not completed as evidenced in Richardson (2006) and MOEYS (2004c)</li> <li>• No evidence</li> </ul>
<b>2. Improve ICT infusion in higher education (both formal and non-formal)</b>	<ul style="list-style-type: none"> <li>• Establish formal and non-formal opportunities to improve ICT skills</li> <li>• Promote ICT-based research activities</li> <li>• Equip teacher training colleges with ICT hardware and infrastructure</li> <li>• Promote use of community learning centers, community information centers, and community libraries</li> <li>• Promote cooperation with national, NGO, and international organizations to develop ICT in education</li> <li>• Build cyber campus consortium linking virtual campuses in other countries</li> </ul>	<ul style="list-style-type: none"> <li>• No evidence at ministry level; In progress at IGO / NGO level</li> <li>• No evidence</li> <li>• Completed under UNESCO project</li> <li>• No evidence</li> <li>• In progress as evidenced by UNESCO (2006)</li> <li>• No evidence</li> </ul>
<b>3. Increase ICT skills of population</b>	<ul style="list-style-type: none"> <li>• Use ICT as tool for learning, teaching, searching, and sharing information</li> <li>• Improve ICT skills needed for a knowledge economy</li> <li>• Promote ICT content and development in the Khmer language</li> <li>• Promote digitization of books in the Khmer language</li> <li>• Promote development of an operating system in the Khmer language</li> <li>• Promote open schools and distance education for dispersed locations</li> </ul>	<ul style="list-style-type: none"> <li>• No evidence in basic education; evidenced in teacher training colleges noted by UNESCO (2006)</li> <li>• Minimal effort as evidenced by UNESCO (2006)</li> <li>• No evidence</li> <li>• No evidence</li> <li>• Completed</li> <li>• No evidence</li> </ul>
<b>4. Improve ICT infrastructure</b>	<ul style="list-style-type: none"> <li>• Provide hardware for education and training</li> <li>• Train government and school personnel in ICT maintenance and repair</li> <li>• Set up educational TV and radio stations</li> <li>• Encourage use of open source software</li> </ul>	<ul style="list-style-type: none"> <li>• Evidence of success from UNESCO (2006)</li> <li>• Evidence of success from UNESCO (2006)</li> <li>• No evidence</li> <li>• No evidence</li> </ul>

Appendix A. (Continued)

Goals	Policy Objectives	Current State of Goal
<b>4. Improve ICT infrastructure, <i>continued</i></b>	<ul style="list-style-type: none"> <li>• Provide Internet connectivity to schools</li> <li>• Link all educational offices to data-bases</li> </ul>	<ul style="list-style-type: none"> <li>• Minimal evidence from UNESCO (2006)</li> <li>• No evidence</li> </ul>
<b>5. Increase stakeholder satisfaction</b>	<ul style="list-style-type: none"> <li>• Set up National Clearinghouse in Khmer and foreign languages</li> <li>• Ensure links to educational portals and websites</li> <li>• Ensure ICT in schools abides by ethical standards</li> <li>• Offer ICT as a life skill course in schools</li> <li>• Build partnerships with civil societies and private entities inside Cambodia to minimize digital gaps within regions of the country</li> <li>• Provide educational opportunities in dispersed locations of the country</li> <li>• Provide a choice for learners of what, when, and where they want to learn</li> <li>• Provide opportunities and safety nets for dropouts</li> <li>• Promote vocational training</li> <li>• Use available resources to full capacity</li> <li>• Work with NGOs to provide more facilities for out-of-school youth</li> </ul>	<ul style="list-style-type: none"> <li>• Completed under UNESCO (2006)</li> <li>• In progress</li> <li>• No evidence—difficult to measure</li> <li>• No evidence</li> <li>• Reuters (2006) points to contrary evidence</li> <li>• Not completed as reported by Richardson (2006)</li> <li>• No evidence as reported by UNESCO (2006)</li> <li>• No evidence</li> <li>• No evidence</li> <li>• Difficult to measure</li> <li>• No evidence</li> </ul>

Adapted from: MoEYS (2004b). *Policy and strategies of information and communication technology in Cambodia. Phnom Penh, Cambodia. Ministry of Education, Youth, and Sport.*

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