Educational Communications and Technology: Issues and Innovations

Ian A. Lubin *Editor*

ICT-Supported Innovations in Small Countries and Developing Regions

Perspectives and Recommendations for International Education

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Editor

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Educational Communications and Technology: Issues and Innovations
ISBN 978-3-319-67656-2 ISBN 978-3-319-67657-9 (eBook)
DOI 10.1007/978-3-319-67657-9

Library of Congress Control Number: 2017952700

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The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Foreword

The most exigent needs in education surround its quality; yet, our steadfast and urgent response is to provide more access. The frenetic pace of change today is staggering in its breadth and scope. Two overarching dimensions characterize this change. The first is technology. The tools with which we extend our reach have become so sophisticated that we can scarcely ever understand our relationships with them. Their ability to help us compress time and transcend space has led to the emergence of the second overarching dimension of our era: globalization. Globalization is a process through which various forces minimize social, cultural, and economic distances and unmoor local influences, creating translocating phenomena that dominate an increasing number of spheres in our lives.

Technology makes globalization possible. The technology of transcontinental navigation enabled conquest and colonization on a scale unimaginable before the sixteenth century. In just over three centuries, the technology of some 20,000 transatlantic voyages, motivated by profit and the urge for power, created an African diaspora. This institution of slavery reverberates today. The term "human trafficking" conjures up poignant images of global movement in a world of inequality—all made possible through the application of particular technologies for particular purposes.

Globalization of communications has seen ICT applied to the problem of teaching and learning. International educational development organizations have put ICT at the forefront of their initiatives. The richer countries of the world have declared their commitment to *education for all* and to shared global prosperity and peace. We hope that ICT can provide access to education and e-commerce in order to benefit the world's marginalized, most isolated, and poorest. Thus, the United Nations has put forward a global education agenda, complete with prescribed policies and priorities for the developing world to embrace and adopt.

Despite these agendas and efforts, the world's peoples are not equally at risk. Nation states are not equal in natural and human resources nor in strategic vulnerabilities. They are also not equal in their susceptibilities to environmental damage, often wrought by the larger and wealthier nations. In this regard, *small* developing societies must be viewed as facing even greater challenges in communications and

technology than the rest of the developing world. An attractive "solution," frequently proffered, has been to counter the apparent deficiencies by increasing access to technologies, especially in educational settings.

However, mounting evidence indicates that providing access to technology does not necessarily improve the quality of education. In fact, while ICT has the potential to support education quality and to promote equity and equality, the smallest developing nations are seldom equipped to make the best use of the advantages of these borrowed technologies. Without critical and sensible implementation, these imported innovations also have the potential to further aggravate existing inequalities in impoverished contexts. Just like the imperialism that preceded it, globalization gives but takes away as well. We may gain more expanded access to the global community but lose local languages and histories, with entire cultures becoming homogenized.

This volume seeks to explore this complex set of paradoxical processes and the inherent inequalities of globalization and international education development, while particularly focusing on ICTs for learning in small states and developing regions. The authors of this volume are not claiming to solve these problems; rather, they point to dilemmas and contradictions in education that have emerged for small societies in the globalized world. The contributors argue that the pursuit of better quality in education through ICT is both nobler and more adequate a goal than simply increasing educational provision.

This book will be of interest to educational technology researchers, policymakers, and practitioners who are involved or interested in advancing educational communications and technology in international contexts. This could include but is not limited to educational technologists in private and public settings, administrators, teachers and faculty, technology researchers, instructional designers, and technology evaluators.

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Acknowledgments

Many kind and generous people were involved in this project. The author would like to thank the following individuals for their comments and other assistance regarding this volume including Luanne Serieux-Lubin, Alvinus Melius, and Michael Thomas. A special thank you is extended to all the contributors and reviewers who have made this volume possible. Heartfelt appreciation goes out to Robert Kozma (happily retired), who provided thoughtful advice during the development of this book.

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The original version of this book was revised. An erratum to this book can be found at DOI 10.1007/978-3-319-67657-9_9

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Part I
Introduction. Theoretical and Methodological Insights

Chapter 1
Global Forces, Local Needs, and ICT-Supported Innovations in Small Countries and Developing Regions: Overcoming the Misalignment. An Editorial Introduction

Ian A. Lubin

Abstract Developing countries receive international assistance allowing information and communication technologies (ICT) to be increasingly accessible for education development purposes. Despite substantial global investments to export technology-supported educational innovations, evidence pointing to improvements in education quality is mixed and inconclusive. This raises questions on how best to achieve implementation and adoption of technology innovations outside of the contexts that inspired their creation. Are the features of ICT innately and universally transferrable, supporting mass diffusion, or should we be paying greater attention to local social conditions that foster acceptance and use of ICT in developing countries? The unique contextual features of small developing countries impede their ability to take full advantage of these borrowed ICT innovations, even with relevant adaptations. Beyond mere access afforded by ICT, domestic issues of quality, equality, and equity in education are of growing concern for small countries and developing regions.

Keywords ICT educational innovations • Small countries • International development • Educational technology research

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The original version of this chapter was revised. An erratum to this chapter can be found at DOI 10.1007/978-3-319-67657-9_9

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I.A. Lubin (ed.), *ICT-Supported Innovations in Small Countries and Developing Regions*, Educational Communications and Technology: Issues and Innovations,
DOI 10.1007/978-3-319-67657-9_1

1 Introduction

Many technology-supported educational innovations taking root around the world are driven by international development policies. These policies are fundamental to the global education agenda and depend heavily on the use of information and communication technologies (ICT). It is believed that ICT have the potential to improve learning outcomes while also promoting greater social and political equality and stability in a given society (see Kozma, 2005; World Bank Group, 2012). ICT can thus assist in generating the human capital needed for domestic social and economic growth as well as global competitiveness (World Economic Forum, 2015). These potentials of ICT are in part responsible for the set of *technology in education* priorities that are passed on to poorer countries by the richer countries of the world. These exported priorities are presented as gifts, commonly referenced as international assistance, however domestic reforms are expected in return. For developing countries, implementing foreign-based ICT-supported policy reforms can be financially burdensome and can also present unintended sociocultural and political consequences, such as creating new economic and social disparities among citizens (Di Battista, Dutta, Geiger, & Lanvin, 2015).

In general, despite the many promises, it remains a matter of debate whether ICT innovations for international development are worth the substantial investment. For example, while nearly 75% of the World Bank's project portfolio contains ICT components, results are reported to be mixed, with less than 60% of projects reaching or likely to reach their objectives (World Bank Group, 2012). Additionally, the World Bank's Independent Evaluation Group has concluded that after more than USD 4 billion in investments in ICT, project outcomes have regularly been unsuccessful (Independent Evaluation Group, 2011).

A fair amount of education research and evaluation is focused on a separate question concerning whether ICT can actually improve learning outcomes and the quality of education. The results are mostly inconsistent and inconclusive (Clarke, Wylie, & Zomer, 2013; Lowther, Inan, Strahl, & Ross, 2008; Lowther, Ross, & Morrison, 2003; Tamim, Bernard, Borokhovski, Abrami, & Schmid, 2011), or they point to outright failures (Dodson, Sterling, & Bennett, 2012). For further discussions see Higgins, Xiao, and Katsipataki (2012), Kozma and Wagner (2005), and Winthrop and Smith (2012). In spite of the alarming rate of implementation and adoption failure and the inconclusive evidence of ICT's impact on education quality, the international donor community and local beneficiaries in the developing world appear to be engaged in ongoing policy endeavors geared toward the continued use of ICT for educational improvement and development. Developed countries see ICT as an attractive option for modernizing education in poorer countries. Developing countries view the inability to take advantage of the ICT revolution as being left behind in a globally competitive world.

The policies mentioned above reveal a broader thematic agenda for education that touts the utopian goals of globalization: poverty reduction, shared prosperity, open borders and markets, equality of opportunity, and a global ubiquitous culture.

Yet, with globalization, the questions must always be raised about what local knowledge, cultures, languages, identities, and ways of being in the world are being homogenized out of existence. Furthermore, we must question whether and how we, in the field of ICT for learning and development, are being the arbiters of the extermination.

While a comprehensive review of the impacts of globalization on education is beyond the scope of this chapter, there are a few points to consider here that are pertinent to a more balanced conversation about the implementation of ICT internationally. First, the transfer of international priorities (diffusion of knowledge) mentioned above is not unidirectional, that is it does not proceed solely from advanced countries into the developing world. Secondly, foreign-based policy reforms are regularly contested and even sometimes rejected in the developing world. Consequently, it is important not to rationalize developing countries as impotent, inert beneficiaries of exported policies. It is equally important not to misattribute the failures of ICT implementation as stemming strictly from the hegemony of globalization forces. In fact, a wide variety of contextual contingencies in developing countries seems to suggest that technology innovations should not be expected to work in the developing world as well as they do in their places of origin. Consider instead that international education policies and programs go through many transformations as they are repackaged to fit domestic level needs in their places of implementation. Also, this process of reshaping global priorities in local spaces, in turn, exerts influence on how policies are re-conceptualized and re-constituted in their places of origin.

Lacking in our research endeavors are more opportunities to assess the role of local contexts: the social conditions, governance, politics, histories, and ecologies that may influence the implementation and adoption of the global ICT in education agenda. Current research, for instance, does not examine the local development needs and ambitions of small countries and developing regions (SCDRs) to determine how, if at all, they may shape or reshape the thematic agenda for international education and development involving the use of ICT.

This volume seeks to illuminate processes, transactions, discourses, and learning experiences in small developing countries as they relate to technology-supported innovations in education. It examines how the implementation of educational technology internationally has created a particular attitude toward knowledge diffusion that is often uncritical and culturally misaligned. Notwithstanding, the volume highlights the ways in which the current ICT landscape is being mutually shaped by the interrelations among international donor and research communities and the relevant actors in local places of implementation. The project brings together technologists, researchers, scholars, academics, and industry professionals with a range of expertise in applying technology to educational needs in developing contexts. The chapters that follow reveal the diversity of the issues and also of the contexts. Small developing countries have common characteristics but are remarkably heterogeneous in terms of cultural heritage, languages, identities, and behaviors.

The volume, therefore, is about educational technology trends and innovations as they transpire in small countries and developing regions: though, also by necessity,

it draws from the field of education development, with elements of international and comparative education. This interdisciplinary approach has implications for how the various methods within the volume are discussed and how the potentials and special qualities of the inquiries featured in the text are presented. This also influences how the literature related to ICT is traced through social science and educational technology research. This opening chapter serves to set the mood, to introduce some historical and contemporary issues that are key to subsequent discussions, and to pay a proper acknowledgment to the countries and regions that are the local settings of the book as well as highlight the variety of challenges for ICT in education in these contexts.

2 Small Countries and Developing Regions

Developing countries are generally characterized as having less advanced industrial bases and persistently smaller economies than developed countries. In addition, developing countries are considered to have populations with lower levels of education, life expectancy, and household income. A distinctive set of developing countries, however, has an additional feature that further compromises their chances for advancement – that is their *small* populations and land area (keeping in mind that some larger countries can have small populations).

Small countries have traditionally been overlooked in educational technology research mainly because of their smaller population sizes and low-income statuses and also because ICT use in these contexts has generally lagged behind the more developed world. Yet small countries represent a sizeable portion of the world's independent states and studying them offers a unique and important opportunity to gain a comparative perspective into educational technology policies and practices.

There exist no formal criteria for defining small countries or states. Classifications are varied and new conceptions continue to emerge. In terms of a working classification for small countries, the literature points to states with an upper population limit of five million (e.g. Bacchus, 2008). The Commonwealth and the World Bank both use 1.5 million as the population marker for small states (World Bank/Commonwealth, 2000). Small *island* states feature prominently based on these classifications as they make up nearly 30% of countries with populations of fewer than five million. Importantly, some islands combine to form multi-island nations (e.g., The Federated States of Micronesia) while some others are grouped together (e.g. the Caribbean) because they share linguistic, cultural, and socioeconomic traditions. This volume, therefore, makes references to small countries as well as developing regions.

Even if countries may not meet the population criterion (i.e., they may have relatively larger populations), they may still be considered small due to economic, sociocultural, and other development factors (Crowards, 2002). While the population and land area are common proxies for a country's 'size', a way of judging a country's level of development is examining the status of its economy. For example,

the International Monetary Fund (IMF) has classified the world's countries into what it calls the advanced economies versus the emerging and developing economies (IMF, 2015). A small country typically is considered the latter, as measured by the gross domestic product (GDP), gross national product (GNP), and human development index (HDI) as well as the standard of living and the industrial base. However, it is worth noting that not all small countries are considered as poor or having low-income economies – further complicating any attempts at concrete classifications.

Granting that there is no explicit way to define *smallness*, the World Trade Organization (WTO) has followed conventions set up by other international organizations mentioned above. Nonetheless, a notable contribution by the WTO is in categorizing small states in terms of their trade flows, more specifically their share of global trade export (Jansen, 2004; Nottage, 2014; WTO, 2002). This trade flow conceptualization brings additional nuance into describing this diverse set of countries but does not solve the problem of finding a discrete definition of small countries.

A group of territories from around the world has been selected as the illustrative subject of this volume. While not implying any notions of homogeneity, inclusion in this set corresponds to having all or a combination of the following characteristics: political independence and sovereignty, a small population size of less than five million, and a small or emerging economy as defined by development organizations. Most of these countries also have relatively small land areas.

2.1 The Big Deal with Being Small

Problems experienced in small countries are not altogether different from those experienced in other developing countries. For example, developing countries that are not small may similarly experience poor economic outcomes (Easterly & Kraay, 2000). So why should special attention be paid to small countries? Small countries provide a sensitizing context for understanding the people, practices, and rationales surrounding international development. The *work* of transferring international development policies and practices accounts for the concentrations of foreign nongovernmental organizations (NGOs), donor agencies, researchers, technologists, scholars, and other development professionals present in these local contexts. Given that development problems are thought to be acute in small countries, due to the interplay of some of their unique features, and since problems and solutions are often better illustrated under aggravated circumstances, small countries could serve as the workspace as well as the magnifying lens for conducting ICT research and evaluation. In this volume, the chapters that follow all deal with particular ways that the diffusion of ICT has transpired among various international and local actors. The stories from small states contain lessons about contextual complexities that have exacerbated the potentials for ICT failure. Looking exclusively at development markers like the GDP or GNP of these states could mask their true economic

vulnerabilities that also come as a result of contextual factors such as small size, remoteness, insularity, and susceptibility to natural disasters (Briguglio, 1995). Some of these unique features of small states that have implications for ICT implementation and adoption are discussed below.

Geography, land area, and population size Most small countries are either single- or multi-island nations scattered throughout a wide expanse of ocean, which means that they are isolated and insulated (World Bank/Commonwealth, 2000). On one hand, this isolation often creates diversity in local knowledge, languages, and cultures. Still, geographic location can impede development capacity in small territories in many important ways (Everest-Phillips, 2014). An example would be the manner in which remoteness and isolation impose higher costs for doing business, especially with regard to trade and transport. Small states are geographically removed from major markets making international trade costs prohibitive. Additionally, inter-island transport essential for agriculture, fisheries, and tourism is often irregular and unreliable (UNCTAD, 2014). ICT can reduce the costs of both regional and international trade, yet ironically, it is in these small countries that ICT is most underutilized.

Small land area and population sizes are associated with higher costs per unit for both public administration and physical infrastructure (World Bank/Commonwealth, 2000). Small countries tend to have public sectors that are relatively large as compared to larger developing countries, which can equate to higher costs for providing public services per person. According to the OAS Executive Secretariat for Integral Development, this high cost is the result of resource constraints in both human and physical capital (OAS/SEDI, 1997). Human capital includes the knowledge, skills, and other intangible assets held by the people of a country (Becker, 2008). While there is always a need for improvement of human capital, this is particularly important in the case of small countries because they lose many of their brightest minds and most skilled individuals to migration. Everest-Phillips (2014) argues, "The percentage of college graduates who migrate is as high as 86% in Guyana and 83% in Jamaica" (p. 8). This leaves these countries with "a small manpower base from which to draw experienced and efficient administrators" (Briguglio, 1995, p. 1617). Physical capital includes commodities such as machinery, buildings, and computers. In many instances, these resources are outdated and function inefficiently, at best, and the cost of providing and maintaining these resources can be unsustainable for small countries.

The small size of domestic markets Small market size directly affects the cost of accessing public utility services (e.g., the Internet) and makes it difficult to regulate such services (Kirkman, 2002). Since small countries are unable to provide services on their own due to high costs, they must rely on foreign companies. However, using the size of the potential market as the foundation, foreign companies can argue that market shares are too small to allow for competition, thus bargaining for exclusive provider rights. Consequently, small market sizes increase the existence of monopolies, which tends to result in little or no competition (Briguglio, 1995). Therefore, costs remain high and quality of basic services less than adequate.

To compound the above issue, the small size of domestic markets limits the development of indigenous businesses that depend on high volumes of commercial activity to make successful starts, increase their scope, and become sustainable. Homegrown businesses are presumably more suited to provide for the local needs of their domestic markets. However, because of high failure rates of local businesses, goods and services must be sourced from external companies and countries. This requires small countries to source foreign currencies to pay for large import bills, which increases the national debt.

Undiversified economic bases and reliance on primary commodities In addition to the high import predicament, because of their size, small states have difficulties with export diversification. Reliance on primary commodities increases economic vulnerability as these commodities "have little or no value added to them" (UN-OHRLLS, 2016, para. 3). Furthermore, reliance on a narrow range of export products means that small economies remain vulnerable to market fluctuations – both in terms of price and demand. In order to be competitive, small countries usually require preferential agreements/treaties (OAS/SEDI, 1997) that can come with political pressures to secure their implementation (World Bank/Commonwealth, 2000).

Extreme vulnerability to external shocks External shocks are defined as "the unexpected and unpredictable events that affect a variable" (UN-OHRLLS, 2014, p. 12). Most small countries are unable to adequately deal with such external events. An example is the rapid inflation of prices of imported food products that can specifically pose problems for small countries. External shocks also wreak havoc on domestic sectors. As an illustration, many small states spend more than 30% of their foreign exchange annually on fossil fuel imports (UNCTAD, 2014). Reliance on fossil fuels for electricity means even small increases in international oil prices can severely cripple the local energy sector in a given small country. This would impact economic activity in both the public and private sectors (UN-OHRLLS, 2014).

Extreme vulnerability to natural disasters Many small countries are tiny islands or archipelagos and, as such, they are quite vulnerable to hurricanes, earthquake, tsunamis, etc. (Everest-Phillips, 2014). Hurricane Matthew of 2016 resulted in the death of nearly 900 people in Haiti and caused up to 90% destruction to some areas of the island (BBC News, 2016). More recently, hurricanes Irma and Maria of 2017 devastated several small countries in the Caribbean (The Guardian, 2017). Many islands have airports and cities in coastal areas that are critically affected by severe weather patterns. Other infrastructures such as telephone, road, and electricity networks are also compromised during natural disasters. This affects trade and transportation in general; it takes some time to repair and reconnect these networks after the disaster and with damaged infrastructure comes the cessation of economic activity, which imposes additional losses. Natural disasters can have devastating effects on undiversified economies, decimating their agricultural and tourism bases. This level of destruction of public infrastructure inevitably requires governments to seek aid and loans from international lenders. The inexorable truth is that natural disasters are a major factor in increasing the burden of debt on small countries.

Historical and sociocultural considerations The vast majority of small developing countries share a colonial history. The impact of colonization on small countries is far-reaching. Most colonization was agriculture-based, which means these territories served, for the most part, as remote plantations. This scenario continued to play out long after independence, with newly sovereign states continuing to trade with their former colonizers (Umemura, 2016) often with preferential treatment agreements. These trade relationships would eventually become either unprofitable for the colonizers or subject to free-trade laws. Many small countries were decolonized in the 1970s and some even more recently (Everest-Phillips, 2014). This implies that they are very young nations, still struggling to develop institutional capacity and continuing to build their private sectors. Political independence generally meant the termination of support and the withdrawal of key resources formerly provided by the colonizer. Ironically, in many cases, this political independence only reinforced the economic dependence on colonizers and on countries with more advanced economies.

Beyond economics, colonization also carried ethno-social implications for small states. In every case, colonization and discrimination were symbiotic processes. The colonized were always persons of a different race, religion, and/or culture from the colonizer. In the case of small islands both dependence and discrimination have continued and in many instances widespread inequalities have perpetuated ethnic rivalries, affecting the political and socio-economic development of these nations (Augustin, 2007).

Regional Integration Efforts As small countries develop and form socioeconomic linkages the need for geopolitical integration has become imperative. The concept of 'strength in numbers' suggests that acting as an individual state on certain issues is socially and economically detrimental. This causes some small states to attempt to strengthen their impact by seeking to interact with the international community as a regional body. Inclusive in this type of integration arrangement are regional policies that govern local policies and international interactions, thus reducing the autonomy of individual countries since decisions must benefit the entire regional body.

3 Classifying Small Developing Countries and Regions

The countries in this book are important because of their small size and their economic status as developing. However, it is easy to misrecognize these countries as being more homogenous than they are in reality. Doing this can have consequences for ICT in education endeavors. For instance, a landlocked territory in South America is different from a tiny island in the pacific, yet they are both considered developing. Failure to differentiate between these contexts more astutely means that a number of different social, economic, and ecological conditions may be conflated. Without more targeted classifications it is not likely that nuanced understandings of

the role of technology can be properly cultivated. These distinctions are important in discovering why context matters in education, in general (Crossley, 2010), and especially as it relates to ICT.

Within the development literature there already exist classifications for developing countries. Below is some tabulation to bring into sharper focus the comparative significance of the smallness of countries appearing in this book. These comparisons are based on extant data and are derived by integrating multiple development indices from various development institutions. The classifications presented are not discrete or definite but they are intended to provide organizational guidance and help generate a better appreciation of the commonalities as well as differences among these countries.

3.1 Political Independence and Sovereignty

The first common characteristic among small, developing countries referenced in this book is their political independence and sovereignty. Table 1.1 includes sovereign countries with a population of fewer than 5M, as outlined in World Population Prospects (UN ESA, 2015). Many non-sovereign nations (e.g. Martinique, USVI, etc.) fit the population criterion but are excluded as these countries may have circumstances or realities that differ from fully independent countries. For example, Martinique is influenced by and benefits from being a present-day Department of France, in ways that Saint Lucia does not as a former British and French colony.

3.2 Comparing Income Categorization

Table 1.1 also illustrates other ways small developing countries are categorized, namely geographic region, population, and gross national income (GNI). Country populations are listed in millions. GNI range is listed in USD and is calculated using the World Bank Atlas Method (World Bank, 2017a). The figures listed for GNI are for 2015 and the groupings are as follows: low = under 1025; middle = 1026–12,475; and high = above 12,476.

3.3 Comparing Economic Base and Growth Potential

Yet another way to differentiate among small developing countries and regions is by grouping them based on the type of economy and potential for growth. In this regard, the physical, geographic, institutional, and social characteristics that determine their economic vulnerability and their relative position in the international community are examined. These characteristics influence the economy base and the