

Information Competencies: Bridging the North-South Knowledge Gap

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ABSTRACT

Knowledge is readily available in middle-income developing countries through international information repositories on the Internet. However, most citizens from the Southern Hemisphere do not possess the information skills or information competencies to access, use and understand such knowledge wealth. Most economically evolving developing countries have made progress in education in recent decades, but they still lag behind in information use/generation, such as book and serials production. Their educational systems seem to inhibit the development of information skills, i.e., competencies that are crucial to citizens to benefit from increasing knowledge growth or to cope with ever-present technological innovations and the changing complexities of the world economy. The development of information competencies in Southern countries is critical to reduce North-South gaps, where knowledge inequality is probably the most important among them. In this paper, information development indicators are utilized to illustrate the current knowledge status of countries and the significant role that constructivist educational systems play in the development of information competencies.

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INFORMATION: A TOOL FOR DECISION MAKING

Cancun, the sunny Mexican Caribbean Riviera and well-known resort of world travelers has recently been the location for the Fifth Ministers Meeting of the World Trade Organization (WTO). The hot topics on the agenda were agricultural subsidies, copyright, and service-oriented trade. Most of the ministers--about three quarters -- came from developing countries, outnumbering those from the industrialized world. Negotiations during the three-day meeting were difficult and intense. The results, however, were not favorable to Southern countries, especially on agricultural matters. The meeting ended without a general agreement, a sign that leaders from developing countries failed to convince their hardheaded counterparts from wealthier regions to reduce or eliminate agricultural subsidies. Agriculture is a survival activity in developing countries, especially in the least-developed nations, where most of the population work on farms. Even in countries with middle development such as Mexico, 25% of the population still makes their living in this sector. Unfortunately, Southern farming depends on the use of basic farming tools, small plots, limited funding and the harvesting of a few staple grains, such as corn or rice. Agriculture in the Northern Hemisphere is just the opposite: plots are large, seeds are genetically modified, pests are biologically controlled, and technology is abundantly evident. In addition to these great differences are the government subsidies to farmers from the richest countries. Subsidized crops from the USA and Europe have the largest share of world grain exports because their prices are lower. The impact on agriculture in developing countries is devastating: they are unable to compete in international grain markets and their farming fields are increasingly being reduced in size. It is cheaper to import than to grow grains, creating migration of unemployed farmers to cities.

It is assumed that the negotiators from Southern countries who attended the WTO meeting came with limited background information to make the right decisions and probably lacked the basic techniques to negotiate their arguments. Not only may leaders from developing countries have lacked the proper information competences to successfully convince their counterparts from the developed world of trade inequalities, but they may have also lacked business intelligence to back their decisions. Many of the Southern leaders might have even had limited support from information professionals or libraries. In addition to those limitations, they may have attended universities where education was teacher-oriented, information use was limited and no libraries were available. Information is important for any human activity, but it is crucial to leaders, because their actions have a potential impact on the economic, social, and political welfare of their countries. International negotiations are not based just on goodwill; participants must be well read, well informed and well organized to put their arguments into effect.

The world is not a charity planet; it is a highly competitive place, and international economic interactions follow nature's principles of self-selection. Those who are

better informed, with better plans and better strategies, succeed. Southern countries need to apply the classical strategic competitive model of Michael Porter, who clearly states that competition is based on information [8]. Government leaders need to know about their current and potential international trade competitors, their clients, and about new scientific and technological developments that can substitute for their national products or to help to improve their industries.

This paper discusses the North-South knowledge gap as well as its association with socio-economic and information development, education and information literacy. Information development--the information progress of a country--is analyzed using indicators of generation, storage, and demand of recorded information/knowledge. Most concepts are discussed from the point of view of developing countries, nations that basically fall within the Southern Hemisphere. The term developing economies is used to group middle-, low- and least-income nations that share general characteristics but also have several differences even within their own regions/states. The analysis is simplistic and does not attempt to give a full conceptual scientific explanation to North-South knowledge gaps. The term literacy is used to denote the various competences that citizens are required to master at the basic level. The most familiar meaning of literacy is the one related to basic reading and writing. However, literacy has become a common word to denote elementary skills that are needed by most, if not all, members of society, such as computer literacy, math literacy, and information literacy.

SOCIO-ECONOMIC DEVELOPMENT

Development is usually measured using economic indicators of wealth production and accumulation, where countries with smaller economic output are labeled less-developed. Nations are normally clustered according to their Gross National Product (GNP) income per capita and grouped into the usual ranking of high-, middle- and low-income nations. According to GNP statistics, nearly a billion people live in the wealthy nations of the world and more than five billion people live in developing countries where the low- and middle-income populations are similar in size (See Table 1).

Table 1

World Population 2002 (World Bank [14])	
Income Groups	6,201,303
Low-income	2,495,033
Middle-income	2,741,531
Low- & middle-income	5,236,564
High-income	964,739

The developing regions are mainly concentrated in East Asia and the Pacific, South Asia, Europe and Central Asia, Latin American and the Caribbean, and the Middle East and North Africa (See Table 2). The abysmal economic differences among countries are similar to the social *stratas* that prevail within most countries, where a small proportion of society owns a great portion of wealth, and the largest lower social segments get a small share of the GNP. Poverty not only means scarcity of economic resources, but also implies limitations or absence of health facilities, housing, proper knowledge competencies and proper management skills.

Table 2

Developing Regions (World Bank [14])		
Regions	Population	GNP per Capita
East Asia & Pacific	1,823	900
Europe & Central Asia	475	1,970
Latin America & Caribbean	524	3,580
Middle East & North Africa	301	2,220
South Asia	1378	450
Sub-Saharan Africa	674	460

The development of nations can also be measured according to their information progress because it shows how a country generates and uses knowledge, especially the printed type. Recorded knowledge has a production cycle: inventors, researchers, and authors *generate* information/knowledge in the form of articles, books, texts, and patents that are then *processed* by publishers, database builders, webmasters, and electronic media companies. Processed information is, in turn, *stored* and *distributed* by bookstores, libraries and other information providers to meet the *demand* of researchers, faculty, students, companies, and society in general (See Table 3).

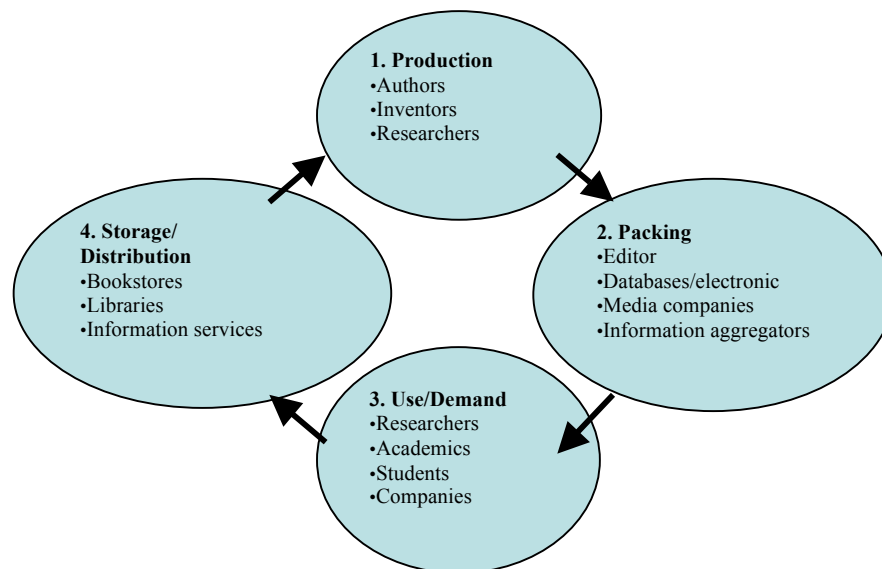
Nations that excel in the production of knowledge/information also excel in economic development. However, countries in low economic *stratas* tend to have a poor information infrastructure, even those with middle development. It seems that nations do not achieve information development until they are fully developed. For example, Mexico and Brazil are nations that have middle economic development and rank among the 12 largest economies of the world, but they lack proper information development in spite of their significant Gross Domestic Product (GDP) progress. Their production of books, scientific journals, among other indicators, is low, as will be analyzed in the following section. These nations seem to have not only industrialized their economies with foreign

investment, but also with imported knowledge, that is, patents and information from countries to the North.

INFORMATION DEVELOPMENT

As stated, statistics on recorded information can show the information potential of a nation. The following sections include an analysis of information development among regions of the world, according to their GNP per capita. The statistics are taken as general indicators and have the limitation of hiding national and local differences among countries. Some nations, especially the least developed economies, face challenges in collecting and submitting statistics to United Nations Education Scientific Cultural Organization (UNESCO), the main provider of information and education-related data [11]. The term knowledge is used as synonymous with information, despite the fact that it has a different connotation. Few indicators are used to simplify the description of the knowledge gap among the Southern and Northern hemispheres. The statistics are, in several cases, for different years, and the reliability of indicators differs from country to country. Nevertheless, the figures do provide a pattern of the North-South knowledge gap.

Table 3
Knowledge/Information Cycle



Before information development is discussed, it is important to note that it is also influenced by several variables, such as religion, which fosters reading skills that seem to play an important role in the social information cycle. Protestant religions, for example, encourage people to read the Bible, and countries with these beliefs tend to have more libraries and higher book production, even in their early stages of socio-economic growth. Catholic societies read the Bible

less, and in general have fewer libraries, even among the middle-developed countries, as is the case in some Latin American nations. Climate and politics also seem to play an important role. Northern countries with cold climates seem to read more, like Scandinavian nations. However, in the following sections only recorded information indicators are taken into account to describe international information development.

Knowledge/information production. Knowledge is generated by researchers, authors and writers, among other key players. The recording of scientific discoveries, technological developments, and human experience, in general, is normally measured by taking into account the number of patents and publications, such as reports, articles and books. Statistics for people engaged in research are also a good indicator of knowledge-creation and information demand in a nation. The knowledge-generation differences among continents and countries are dramatic when these indicators are taken into account. African countries have fewer researchers (71,000) than the developed country of Canada (80,000). The American Continent, without the two major economies of Canada and the USA, also has an abysmal difference: 125,000 compared to more than a million researchers for the two industrialized nations when their numbers are combined. European countries and Japan and Asia generally rank high in number of researchers. However, the Asian group includes China and India, two highly populated nations that fare better in this indicator, although if researchers are distributed per capita, they would rank low (See Table 4).

Table 4

Researchers International Distribution (UNESCO [11])	
Country	Researchers
Africa	71,308
America	124,899
Asia	4,483,881
Europe	1,892,307
Oceania	60,066
Canada	80,510
Japan	651,099
United States	*962 700

The research indicators discussed illustrate the world knowledge gaps and the potential implications for development. Research is an important activity in fostering socio-economic progress because it contributes to the generation of

discoveries that industry can develop into new products and services to solve local problems. The leading role of the developed world in number of researchers gives them a strong stand in the production of science and technology. Research activities are highly dependent on information competencies because researchers require full information skills to successfully benefit from the research work of others and to avoid inquiry overlap.

Another strong indicator of knowledge production is the number of registered patents of countries. The developing countries generate 14% of patents compared to the striking figure of 86% for the highly developed nations (See Table 5).

Table 5

Patents (WIPO [13])		
Country	Patents	Percentage
USA	44.609	40%
Germany	15.269	13%
Japan	13.531	12%
SUBTOTAL	73.409	65%
United Kingdom	6.274	5%
Other developed economies	4.877	215
SUBTOTAL	25.389	86%
Rest of the world	16.202	14%
Total	115.000	100%

Information Packaging. The recording of information takes different forms, among them books, serials, databases, and websites. The recorded output of a country, i.e., publishing, reflects the national capability for knowledge packaging, an activity that is also heavily concentrated in the developed world. Scientific serials have been traditionally published in the developed world. The indicators of Table 6 show that Africa has slightly more than seven thousands International Standard Serial Records (ISSN). Latin American countries have less than 30 thousand ISSN records, while the USA holds the rather high figure of more than 160 thousand serial records, and Canada more than 110 thousand records [5]. As cited for Africa and Latin America, the rather minimal number of serial records produced by the developing world is a strong indication of the information state of the countries because journals represent a key form of knowledge encapsulation (See Table 6).

Table 6

Serial Titles (ISSN [5])	
Country	ISSN Records
Africa	7,094
Asia	37,369
Europe	584,632
Latin América / Caribbean	27,842
Oceanía	51,691
Canada	111,918
Japan	30,947
United States	161,031

Another information medium, normally more accessible to the general population, is newspapers. They document the current, daily in most cases, information of a society, and because dailies are cheaper than books and other serials, they are accessible to the general citizen. However, even with this indicator, the difference among developed and developing economies is significant. Circulation is 226 papers per 1,000 inhabitants in the developed countries, a large three-digit figure compared to the 60 copies that circulate in developing nations, and the 8 copies that are produced in the least-developed countries. The newspaper reading gap between North and South is similar to that of serial publications. Table 7 shows in greater detail the geographical differences between continents, where some of the largest economies represent the greatest newspaper demand.

Table 7

Newspapers / Circulation (UNESCO [11])			
Continents	Number of Dailies (000)	Circ. Total (millions)	Per 1,000 inhabitants
World total	8 391	548	96
Africa	224	12	16
America	2939	111	141
Asia	3 010	229	66
Europe	2 115	190	261
Oceanía	103	6.4	227
Developed countries	3 972	276	226
Developing countries	4 419	272	60
Last developed	172	3.9	8

Newspaper publication in paper is decreasing because leading newspapers have summaries or are published in full text on the Internet. However, they are still a good measure of information packaging in developing countries because news media is printed in traditional presses and the Internet is not yet readily available to all members of society. Newspaper consumption is another good proxy for measuring information progress because dailies have become national and are printed mainly in the nations' capitals or in the big cities, and, in some instances, reprinted in different sites. Newsprint paper consumption also follows a similar pattern to newspaper circulation: the wealthy nations of the North use 10 times more newsprint than less-developed countries, and their consumption is 10 times larger than the poorest or least-developed nations (See Table 8).

Table 8

Newsprint Consumption (UNESCO [11])			
Groups of countries	Production (MT)	Consumption (MT)	Consumption per Inhabitants (Kg)
World total	36	35	6.1
Africa	0.4	0.5	0.7
America	17	14	18
Asia	6.8	10	2.9
Europe	11	9.4	13.1
Oceania	0.8	0.8	28.2
Developed countries	31	27	21.9
Least developed countries	0.04	0.1	0.2

Storage and Distribution. Information stocks are normally held and distributed in different types of places: e.g., bookstores, information centers and libraries, among other information distributors. Here libraries, library holdings, and computer networks are used as indicators because there were statistics available for most countries. The most comprehensive library statistics are from national and public libraries. The holdings of the first type of libraries are excellent indicators of national information wealth, because national library collections represent the local information production in different media, not only printed material. In other words, the stocks of national libraries are the indicators of nationally-produced information. These holdings vary dramatically from North to South. Europe has nearly 300 million volumes, a figure that looks astronomically large compared to Africa's holdings of less than three million bibliographic items. Asia, a highly populated continent, holds 46 million volumes, but a significant share belongs to a single nation, Japan, the leading information economy in the Eastern Continent (See Table 9). USA statistics were not available because of its non-UNESCO membership payment.

Table 9

National Library Collections (UNESCO [11])		
Country	Units	Volumes
Africa	13	2,920
America	10	20,560
Asia	26	45,992
Europe	63	278,194
Oceanía	1	2,441
Canada	1	6,387
Japan	1	5,528

Public libraries, on the other hand, represent an indicator of information availability to the general citizen. Here, again, there are large disparities among regions. Africa accounts for 6 million books, and the Latin American Continent, where Canada is excluded, holds 18 million items compared to those of Europe with the outstanding figure of 2.5 billion titles. Canada and Japan have 70 million and nearly 200 million respectively. Asia ranks higher but its population is also high, so per capita indicators would be lower than Latin America. The difference in number of libraries or library service points, the prime centers to keep the public recorded knowledge, is also dramatic. The public library gap of service points follows the trend of holdings (See Table 10). Library figures reflect information gaps among the hemispheres and regions, because the statistics are valid in the developed and developing world, unlike websites of other high-technology related information media that are mainly concentrated in the Northern hemisphere.

Table 10

Public Library Collections (UNESCO [11])		
Country	Unit	Volumes
Africa	358	6,271
Latin America	2,060	18,231
Asia	22,741	597,394
Europe	127,271	2,568,421
Canada	(2) 1 045	70,077
Japan	2 172	195,390

The creation of home pages, portals and websites is the latest indicator to identify the current information gaps of the world. The Internet, the electronic information highway, has become the most powerful world information repository. It amalgamates the production, packaging, storage and distribution of the information cycle. However, Internet is predominantly a Northern asset. Ninety percent of Internet demand comes from developed countries, and 70% of computer servers are located in those countries. In addition, English is the lingua franca for Internet material: between 60 and 80% of the Internet records are in this language, a major information barrier for non-Anglo-Saxon societies. The enormous Internet gap between North and South is dramatic because the Internet is such an important tool for socio-economic and information development. The Internet comprises all the advantages that a nation requires to foster social progress. The differences between the Internet have's and the Internet have not's are higher than in any other information indicator (See Table 11).

Table 11

INTERNET (www.blues.uab.es [12])	
USA, Canada, Japan, and West Europe	
90%	Demand
70%	Computer servers
English Language	
60-80%	Internet content
60%	English speaking users
8%	English speakers in total world population

Information use/demand. Number of researchers can be used as a proxy of information demand, an indicator that was explained at the beginning of this section. As stated, there are striking differences in the number of researchers between the North and the South, the first has figures that look astronomically large compared to the low number of people engaged in research in developing nations. Number of graduates could also be another good indicator of information demand but are not included in this document (See RICYT statistics [9]). Internet use is also another excellent indicator of how a country can access international information repositories. English native speakers, mainly citizens of the wealthy regions of the world, account for 8.3% of the total world population, but they represent nearly 60% of the Internet demand. The number of indicators used to describe international information demand was small, but they do depict information use gaps among countries.

The international trends in the cycle of production, packaging, storage/distribution, and use/demand of information/knowledge illustrate, in general, the information and knowledge gaps among the two hemispheres. The ranking of countries in this cycle is closely related to the information competencies of a society, because when people can identify their information needs and know how to satisfy them, they can perform better in the different stages of the information/knowledge cycle. Countries with greater information demand and supply of knowledge-recorded products are nations with greater information development. These nations are basically located in the Northern part of the world, and they are, by analogy, the knowledge nations who lead in information competencies.

THE KNOWLEDGE BRIDGE

Knowledge is the product of a cognitive process, where information becomes the key ingredient to enhance human perception, understanding, awareness, thinking, intelligence, and memory. Each of these cognitive stages relies or spins around information. An individual will obviously have/create better knowledge if he/she has relevant information. Knowledge is part of the information spectrum where facts or events become data when described using ordered symbols. Data is, in turn, transformed into information when it is organized, classified and interpreted. Information, on the other hand, becomes knowledge when it is experienced in context by an individual who can transform it into wisdom using a set of values [3]. Here, in this paper, information and knowledge are used as synonymous terms also given specific meanings.

Knowledge is also an asset and product of individuals. Consequently, it is a key factor in the creation of a country's economic development and welfare. It creates the foundation not only for complex new scientific and technological developments that can be transformed into goods by the productive sector, but also for the simple, day-to-day decisions people make about their nutrition, health, and personal welfare. Additionally, knowledge is more efficiently transmitted when it is recorded, such as in printed media. A country that is able to foster the cycle of creation, storage, distribution and demand of knowledge in recorded information products can certainly achieve development faster and play a more strategic role in the world economy.

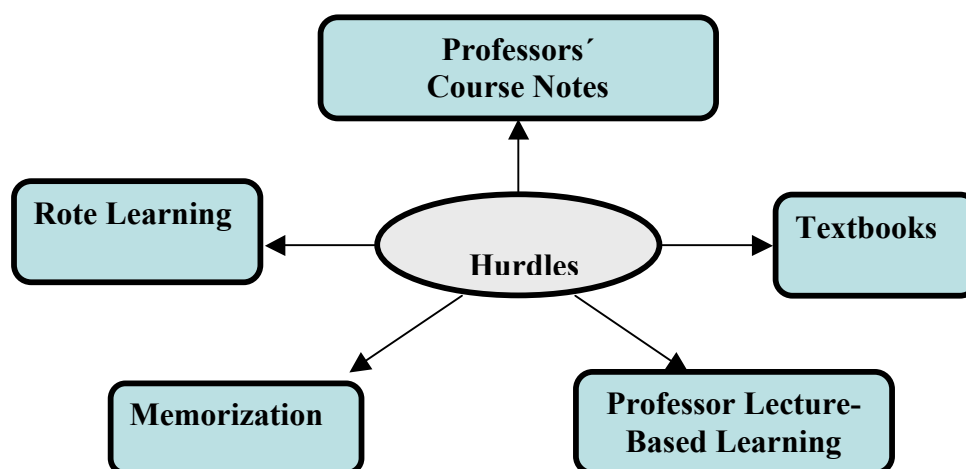
The competencies of searching, retrieving, and using recorded knowledge, i.e., information, are vital for individual and collective socio-economic development. These information competencies are mainly fostered by education, although parents and the work-environment also play key roles. Information literacy is needed by all citizens to benefit and be actors in the knowledge cycle. For example, an information-literate worker who can learn constantly is able to adapt to short-term jobs that predominate in the current economy, including those from the upper-industrialized and service-oriented *stratas* of less-developed countries,

sectors that share similar characteristics with more advanced economies. The workplace is moving from routine to rich-thinking activities; information literacy enables workers to respond to the life-long learning environment currently present in manufacturing and service industries. Unfortunately, the education of students in Southern countries seems to fail to develop information competencies, if the international information development discussed in the previous section of this paper is taken into account.

Since its creation UNESCO has been engaged in the promotion of literacy, the ability to read and write at the basic level, for all members of society. The literacy gains around the world have been excellent, with some exceptions in Africa and South Asia. Literacy has doubled in the last 50 years. Now, about 80% of the world's population aged 15 and over is literate, including more women than ever before. Higher education has also been expanded and has progressed in most countries. This steady progress demonstrates the efforts of committed governments to provide education to their citizens. However, better literacy rates and the increase in higher education enrollment do not appear to have had an impact on information development in less developed countries.

Education is an important process in an individual's personal and professional growth. However, learning varies according to the pedagogy, the method or the means to facilitate the education process. Educational pedagogical models can be roughly grouped into teacher-centered or student-oriented education. Teaching-oriented learning is normally based on the teacher/professor lecture, course notes, textbooks, and the use of rote learning and memorization (See Table 12).

Table 12
Information Literacy Hurdles



Teacher-centered instruction is a hurdle to information literacy because learning is limited to the professor's lecture, course notes, and textbooks that encapsulate the full subject. These class resources become a barrier, because professors

often fail to require students to go beyond them. Rote learning and memorization prevails in less developed societies, limiting people's creativity and reducing the development of information competencies (See Table 14). Students are seldom exposed to ideas and concepts outside the chosen textbook or class notes [6].

Table 13

Education – Development
<ul style="list-style-type: none"> • Education enables people to be better citizens • It helps economic mobility of individuals • It determines national progress • Education access is a challenge • Education quality is even a greater challenge • Information development is related to education • Education fosters information competencies

The student-centered pedagogical method is, unlike the other model, based on more independent learning, where the education process is competencies-oriented. The professor plays the role of the learning facilitator in students' learning. Learning-oriented education is generally based on a pedagogy that spins around the use of information records: resources that are essential to access knowledge or the recorded experience of humankind [2, 6]. This educational method contributes to develop information skills in learners, a necessary process that begins with elementary education to enable children to learn how to learn in the earlier stages of life. Constructivist education, the theoretical base for student-centered learning, has gained momentum in the international literature and has been promoted by UNESCO in the last decade [11].

Learner-oriented education creates, consequently, more independent students, and more citizens capable of making their own decisions with less dependence from their teachers/professors. Student-centered education also fosters creativity and innovation that in turn makes society more competitive and adaptable in today's highly-competitive world economy. Additionally, this type of learning helps graduates/students cope with the speed and permanent change of our contemporary society (See Table 16).

Table 14

Teacher-Centered Education
<ul style="list-style-type: none"> • Equips students with static knowledge • Teaches to the test • Reproduces texts • Students are classroom-bound • Makes students professor-dependant • Predominates in developing countries

Current scientific, technological and economic demands the development of competencies, including information skills, so that citizens are fully capable of contributing to and benefiting from socio-economic progress (See Table 15). Unfortunately, as stated, educational systems tend to use non-constructivist pedagogy (Teacher-centered instruction) in most developing countries. Even nations with middle development like Mexico are no exception. With more than one third of the current population attending school, Mexico has nearly a 90% literacy rate, and higher education enrolls 30% of potential candidates [7]. However, not even Mexican college graduates seem to have developed information competencies. Although students in Mexican higher education receive a significant amount of knowledge, they seldom develop the proper competencies, including information skills. This mayor limitation impacts Mexico's information development. Most graduates seldom learn how to use information sources such as journals and rarely go beyond the library's reserve collection. They normally complete higher education and spend their entire professional careers without writing an article or publishing a book.

Table 15

Information Literacy: A Must for Socio-Economic Development
<ul style="list-style-type: none"> • Jobs are short-term; workers need to learn constantly • The workplace is moving from routine to rich-thinking activities • Education for future citizens is focusing on learning how to learn in information-rich environments • New education models are based on inquiry approach to learning rather than on transmission approach to teaching • Education's new paradigm is to prepare students to learn and to act • Information competencies are a critical life skill

If education is assumed to be closely related to information demand, then it can be assumed that information development in countries with middle development levels is the result of teacher-centered learning. Educational processes at different levels need to be reformed or changed to facilitate the adequate education of citizens, so they can learn in information-rich environments using the inquiry approach rather than relying entirely on the transmission approach that characterizes teacher-centered education [6]. Although it is difficult to fully prove in this paper that developing countries should adopt competency-based educational systems to develop their information infra-structure, it is clear that new generations need to be empowered to learn and to act in ways that can enhance their lives (See Table 15).

Table 16

Learner-Oriented Education fosters:
<ul style="list-style-type: none"> • Information competencies • Knowledge construction by learners • Life long learning • Independent students • Creativity and innovation • Open-horizontal management • Contributes to create a base for democracy

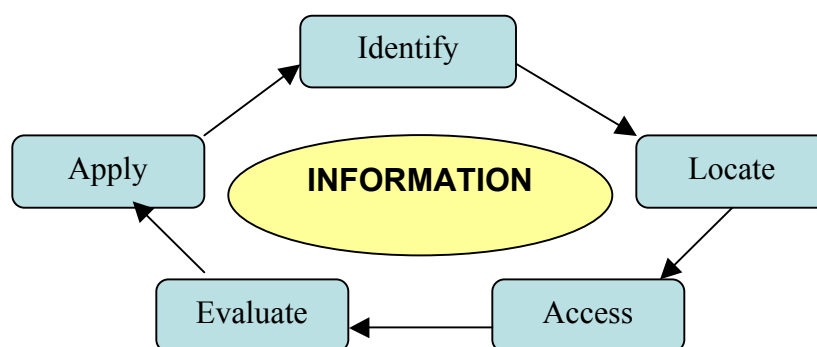
In summary, developing countries' educational systems need to prepare students to learn and to be able to do/develop competencies. It should prepare learners to succeed in the information age characterized by instability and uncertainty created by the continual state of innovation and development. National educational systems need to adapt to the abundance of information resources, where the predigested information in textbooks is becoming outdated. If this change were to take place, information development in less developed countries would gain momentum because constructivist education models place/foster information competencies at the core of the learning processes.

INFORMATION COMPETENCIES

Competencies or skills have different meanings. Authors like Paul Attewell [1], quoted in Evers' work, define competencies as the ability to do something, giving a dimension of increasing ability. Skill is synonymous with "expertise, mastery and excellency" [4]. Competence is, in a particular skill, how well actions are performed and sequenced to obtain a goal [4]. Evers defines competence as a set of related skills closely associated with knowledge and values that in turn reinforce one another. According to a long and well-designed study on

competencies by this author and her team of researchers professional competencies required by graduates can be grouped into four skills composites: 1) managing self, 2) communicating, 3) managing people and tasks, and 4) managing innovation and change. The purpose of the study was to identify the key professional competencies of university graduates; therefore, the four composites represent an aggregation of a large set of skills. The categories of competencies are useful to identify the relevance of information skills that were generally imbedded into the four composites. However, the two composites that explicitly include more information competencies in their definitions are communication and managing innovation and change. Communication is defined as “*interacting effectively with a variety of individuals and groups to facilitate the gathering, integrating, and conveying of information in many forms*”; while managing innovation and change is stated as “*conceptualizing as well as setting in motion ways of initiating and managing change that involve significant departures from the current mode*”. Ability to conceptualize is defined as the “*ability to combine relevant information from a number of sources, integrate information into more general contexts, and apply information to new or broader contexts [7]*.” In general, both composites and the study place the relevance of information competencies in the work-environment and define them with similar focus as the connotations given by the different information literacy standards, such as those published in the USA, the UK, Australia, and Mexico. All information competencies standards promote the core competencies of identification, location, access, evaluation, and application of information (See Table 17).

Table 17
Information Literacy Competencies



As with most of the important repositories of quality knowledge that is packaged and managed by information professionals, libraries can play a key role in the creation of information literacy programs. With the shift of libraries to the new paradigm of preparing users to learn and to act on their knowledge, library professionals perform the important role of promoting change in education. Libraries should continue to lead in focusing on learning in schools and academic environments to become information literacy centers where the learning approach should be the preferred strategy. Libraries should be an extension of

the classroom, should be an integral part of the curriculum, and should be a place to provide opportunities and resources to students to pursue their own lines of inquiry and to construct their own meanings (See Table 18).

Table 18

Libraries' Role in Information Literacy
<ul style="list-style-type: none"> • Libraries' new paradigm is to prepare users to learn and to act on their knowledge • Libraries have the leading position in focusing on learning • Libraries are knowledge repositories and offer a wealth of information • Libraries should be learning-centered institutions • Libraries are or ought to be information literacy centers • Libraries ought to be: <ul style="list-style-type: none"> ○ An extension of the classroom ○ Integrated into the curriculum ○ Providing opportunities and resources to students' inquiry process

Librarians and other information professionals can provide essential expertise in information literacy because they are highly qualified to access and select the best information. They are service-oriented, and have quality long-standing reference experience that makes them capable information literacy facilitators in their schools or academic communities (See Table 19). However, the full benefit of librarians learning facilitation work is in educational institutions where pedagogical strategies encourage the use of information.

Table 19

The Librarians' Role
<ul style="list-style-type: none"> • Librarians provide essential expertise: <ul style="list-style-type: none"> ○ Access to information ○ Selection of information resources, and ○ Facilitating the use of information in learning process • Librarians and information specialists' new roles: <ul style="list-style-type: none"> ○ Knowledge facilitator ○ Instructional facilitators

To summarize, developing countries could narrow the knowledge gap and achieve better information development if they change their educational systems. It could be argued that reduced budgets are a barrier, but the limitation of economic resources make the change in education a must because better

education would yield higher learning outcomes for students when based on the development of competencies that, in turn, include the core information skills needed to access knowledge.

CONCLUSIONS

The educational model followed by schools in developing countries influences the development of information competencies in students, and, consequently impacts the type and amount of information that is generated, stored, distributed, and used by the population. Information is generally used by people who possess the information skills to search, locate, retrieve, evaluate and use it.

If information competencies are assumed to be the base of national information development, countries from the South need to change their educational systems to eliminate rote learning and memorizing to adopt a learning-oriented, constructivist-type education. If less developed countries fail to invest in changing their pedagogy their future is at risk because the knowledge gap will increase.

Socio-economic and political development is best advanced by people who recognize their need for information. Information is important to any citizen involved in the economic production chain because good decisions are based on information. Therefore, information skills become even more important as individuals climb the social, economic and political ladder, because their work impacts more individuals, such as government officials whose actions in international trade negotiations could dramatically impact the future of a nation. As information experts, librarians, along with other education actors, can advocate information development in Southern countries by taking an active role in the provision of information literacy programs. Thus, the increase of information literacy in less developed countries can narrow the North-South gap.

REFERENCES

1. Attewell, P. "What Is Skill?" *Work and Occupations*, Volume 17, 1990. In: Evers, F. T.; Rush, J. C.; and B., Iris. *The Bases of Competence: Skills for Lifelong Learning and Employability*. San Francisco: Jossey-Bass, 1998.
2. Aznar Minguet, P. [Coord.] Et al. *Teoría de la educación: un enfoque constructivista*. Valencia, España: Tirant lo Blanch, 1999.
3. Debons, Anthony, Esther Horne; and Scott Cronenweth. *Information Science: An Integrated View*. USA: Hall & Co., 1988.
4. Evers, F. T.; Rush, J. C.; and B., Iris. *The Bases of Competence: Skills for Lifelong Learning and Employability*. San Francisco: Jossey-Bass, 1998.
5. ISSN. "ISSN Statistics." *International Standard Serial Number* (2002). Paris. <http://www.issn.org:8080/English/pub/tools/statistics> (September 2, 2003).

6. Kuhlthau, C. "Implementing a Process Approach to Information Skills: A study Identifying Indicators of Success in Library Media Programs." *School Library Media Quarterly*, 21, No. 1, 1993.
7. Observatorio Ciudadano de la Educación y Red de Investigadores sobre la Educación Superior (RISUE). "Estadística Educativa en el 2do. Informe de Gobierno del Presidente Fox." *Estadísticas, indicadores, bases de datos, encuestas y estudios de la educación en México* (2002). México.
<http://www.observatorio.org/estadisticas.html> (September 2, 2003).
8. Porter, Michael E. *La ventaja competitiva de las naciones*. Buenos Aires: Vergara, 1991.
9. RICYT. "Indicadores." *Red Iberoamericana de Indicadores de Ciencia y Tecnología* (1990-2001). Buenos Aires.
<http://www.ricyt.org/Indicadores/Comparativos/18.xls> (September 2, 2003).
10. Stripling, Barbara K. *Learning and Libraries in an Information Age: Principles and Practice*. Englewood, CO: Libraries Unlimited, 1999.
11. UNESCO. *UNESCO Institute for Statistics*. (Diferent years: 1996,1997, 1999). Québec, Canada.
http://www.uis.unesco.org/ev_en.php?ID=2867_201&ID2=DO_TOPIC (August 29, 2003).
12. Universitat Autònoma de Barcelona. "Importancia (y desigualdades) de los niveles de acceso a Internet." *Hacia 2004: estudios interculturales, textos básicos para el forum 2004* (October, 1997 - August, 1998). Barcelona
<http://www.blues.uab.es/incom/2004/cas/morcas1-3.html> (September 2, 2003).
13. World Intellectual Property Organization (WIPO). "10% Increase in International Patent Applications Filings in 2002." *Press release PR/2003/338* (2002). Geneva
http://www.wipo.int/edocs/prdocs/es/2003/wipo_pr_2003_338.html (November 19, 2003).
14. World Bank. "World Bank Development Indicators". *The World Bank Group* (2002). Washington. www.worldbank.org (September 5, 2003).