

**EDUCATIONAL IMPLICATIONS OF INFORMATION DEVELOPMENT**

Paper presented to  
the Education and Training Section's Session,  
which took part during the IFLA General Conference.  
Paris, France; 19-26 August, 1989.

by

**JESUS LAU, PhD**

Instituto Tecnológico de Durango,  
Blvd. F. Pescador 1830 Ote.  
Durango, Dgo., Mexico  
Tel. 52(181)8-41-16  
Fax 52(181)2-20-47  
Telex 066311

**K E Y W O R D S:**

Education  
Social development  
Developed countries  
Information development  
Less developed countries

**EDUCATIONAL IMPLICATIONS OF INFORMATION DEVELOPMENT**

by

**JESUS LAU, PhD**

**ABSTRACT**

Information development determines the type of information needs of a nation. In this paper, it was assessed using library and publishing indicators of 31 countries over an 18 year period. Some of the conclusions reached in the study were that less developed countries (LDCs) seem to be one cluster of nations when their information development is compared with highly developed countries (HDCs). Information development seems to speed up, until countries have met the satisfaction of basic human needs of the population. Libraries were, on the other hand, declining in HDCs during the period under study.

The results of the study can be taken as indicators of the type of information education required by countries of different levels of development. HDCs' educational needs are likely to be better defined than those of LDCs whose development is highly polarised. In other words, HDCs can train information specialists with less varied programs, while LDCs require polarised information-education to provide services that range from basic information needs to high technology sophisticated needs

## **EDUCATIONAL IMPLICATIONS OF INFORMATION DEVELOPMENT**

by

**JESUS LAU, PhD**

### **1. DEMAND OF INFORMATION SPECIALISTS**

Modern society is a world of complexities that requires a myriad of professionals. The structural differentiation of society has produced an extensive division of labour. Among professions that modern society demands are information specialists. As societies become more complex, information becomes an element that pervades human activity, creating the need for this kind of professional. Industrialised countries have a stronger demand for information specialists. Their economies are already engaged in the so-called service-oriented economy, which bases economic activity on the efficient use of information. Developing nations have also a demand for information professionals, but this demand depends on the level of information development which is, in turn, a product of socio-economic development reached by countries.

Information development sets a pace and dictates the type of information needs of a nation. Any educational program to train information specialists succeeds according to the relevance it may have to national level of information activities. Therefore, the study of information development is a key element in the planning of educational programs, especially in countries where economic resources are scarce.

### **2. ASSESSMENT OF INFORMATION DEVELOPMENT**

In this study,\* information development was studied along with social development. The number of countries studied was 31 (see Table 1). The population included countries of different levels of socio-economic development, that is, low, middle, and highly developed nations. The period assessed was between 1960 and 1977, when the world reached the peak of economic growth of this century.

Information and social development phenomena were studied under the assumption that:

2.1. Between 1960 and 1977 highly developed countries (HDCs) improved their

economies at a high rate.

2.2. This process was characterised by an increased use and awareness of information activities.

2.3. During the same period less developed countries (LDCs) also improved their economic performance.

2.4. If LDCs improved their economic performance then, presumably, their economies relied more on recorded information.

2.5. Since LDC economies improved, living standards also improved correspondingly.

2.6. If living standards or basic needs satisfaction were improved then, LDC populations should have also increased their demand for recorded information.

\*This study was conducted as part of a PhD research.

These hypothetical assumptions led to this investigation, where information development was narrowed to three printed information components: (1) centres storing information, (2) stocks of information accumulated by countries, and (3) recording of information. The first two components were characterised by ten library indicators and the third factor was represented by five publishing variables. Socio-economic development was, on the other hand, limited to five social components: health, education, food, water supply, and sanitation. These social components were represented by five indicators of basic human needs [2]. For a complete list of indicators of each component, see the Appendix.

International time-series data were gathered from secondary sources [10,11] and missing data were calculated using regression techniques [7]. The same regression results were used to analyse type and amount of change of information and social indicators. Countries were also studied with clustering analysis which is a classificatory statistical technique [8,9]. They were classified using different combinations of indicators. Finally, bivariate and multiple regression analyses were applied to study the relationship between social and information development of countries with time-series, and with cross-sectional data [7].

### **3. INFORMATION AND SOCIAL DEVELOPMENT ARE CLOSELY LINKED**

In this section some of the main results obtained with the statistical

analysis of the data are summarised. For a complete version of the results see [5,6].

3.1. Social and information indicators were cluster analysed independently. Basic needs indicators of 1977 grouped countries into three clusters, which agrees with the known division of countries of low, middle and highly developed nations (see Table 1). However, the classification obtained showed that countries grouped differently from what they would do if GNP per capita were taken into account, e.g. Kuwait with a high income fused with nations of lower social development.

3.2. The classification of countries using library and publishing indicators fused most nations in two groups: those with high values and those with low values. These results reflected that LDCs lack significant information differences between them, despite the fact that some were middle income countries (MICs) nations, and others were low income countries (LICs). Therefore, information differences were greater than those of social aspects. See, as an example, Table 2 which was obtained testing the surrogate indicators of library and publishing activities, that is total national number of volumes and newsprint consumption per 100,000 inhabitants.

3.3. Growth/decrease in library and publishing indicators was studied in the five groups of nations formed in the cluster analysis of 1977 basic needs indicators. The regression models fitted to the variables and their resulting slope coefficients were used to determine change, that is growth/decrease. Information change in the five groups had the following characteristics:

3.3.1. Group one. The 13 countries that formed this HDC group showed, in general, that libraries were declining, but volumes were increasing. However, number of libraries were increasing in new developed countries, like Spain and Hong Kong. In social aspects, most nations experienced little change, meaning that they had already reached the satisfaction of basic needs of the population by 1960. Countries like Spain achieved high gains in this period, reflecting that its social development was recently achieved.

3.3.2. Group two. This group which falls between HDCs and MICs showed varied information change. Yugoslavia and Cyprus had similar growth to that of group one nations, however Kuwait and Yugoslavia had a low change which did not match their HDC social development. The four countries were, on the other hand, characterised by having high social gains.

3.3.3. Group three. The group of eight cases included in this group are regarded as middle income countries. Their social and information development was with a constant, linear rate of change. Cases like South Korea and Mexico had substantial increases in number of libraries and volume stocks, as well as in the meeting of basic needs of the population.

3.3.4. Group four. This low income group formed by Sri Lanka,

**TABLE 1**

COUNTRIES GROUPED ACCORDING TO THEIR 1977 SOCIAL DEVELOPMENT		
Classification obtained with cluster analysis		
GROUP 1	GROUP 2	GROUP 4
Austria	Cyprus	Sri Lanka
Bulgaria	Kuwait	Thailand
Finland	Portugal	Western Samoa
Hong Kong	Yugoslavia	
Hungary		
Ireland		
Japan	GROUP 3	GROUP 5
Norway	Bahamas	Comoros
Poland	Colombia	Gambia
Rumania	Fiji Isls	Malawi
Spain	South Korea	
USA	Mexico	
USSR	Panama	
	Trinidad and Tobago	
	Venezuela	

**TABLE 2**

FUSION OF COUNTRIES USING 1977 INFORMATION INDICATORS**			
Classification obtained with cluster analysis			
GROUP ONE (HDCs)		GROUP TWO (LDCs)	
Austria	Japan	Colombia	Portugal
Bahamas*	Norway	Cyprus	Spain
Bulgaria	Poland	Fiji Isls	Sri Lanka
Finland	Rumania	Gambia	South Korea
Hong Kong	Trinidad and T.*	Kuwait	Thailand
Hungary	USA	Malawi	Venezuela

Lau

Ireland	USSR	Mexico	Western Samoa	
		Panama	Yugoslavia	
* Fusion in this group may be due to missing values				
**number of volumes and newsprint consumption				
per 1000 inhabitants 1977 values				
***Comoros was excluded due to lack of data in one variable				

---

Thailand and Western Samoa had an erratic social and information development. Change was high in some variables, but low in others, showing that development was not even.

3.3.5. Group five. Comoros, Malawi and Gambia were included in this LIC group. Some of their social and information gains were the highest, but some others were of the lowest among all groups. This was because of the low starting point of development of these countries in 1960. In a few words, their development was polarised and uneven.

#### **4. CONCLUSIONS: EDUCATIONAL IMPLICATIONS OF INFORMATION DEVELOPMENT**

Education as part of the socialisation process offered by the state becomes more complex in societies which are undergoing the process of early development. Therefore, developing countries, whose development includes backwardness and modernity at all levels of activity, have more problems to educate or train information specialists. These countries require more than one kind of information specialists to meet needs generated by an also polarised information development.

According to the results of this study, countries information differences were greater than social ones. HDCs' libraries were declining between 1960 and 1977, a fact that may have shown early HDC reliance on non-printed information. Moreover, countries that had not met the satisfaction of social needs, even if they had a MIC economy, did not show an overall information development. These results are an indication that:

4.1. **HDCs** nations (groups 1 and 2) have an easier task in the training of information specialists, despite the fact that they are undergoing the transition from industrial society to information society. Their information needs are better defined, therefore educational programs can be oriented towards the needs of the information technology era.

4.2. **MICs** (group 4) require a dualistic approach in the education of information specialists. Their social development implies that they have large groups within the society with basic information needs, but also groups with high level information needs. Therefore, MICs need to train information specialists that can cater to traditional information services, but also to information technology services if MICs are to compete in the international economy.

4.3. **LICs**, with the lowest income in the population studied (groups 4 and 5), are likely to require educational programs which are more oriented towards the traditional information needs of the population, which are mainly orally satisfied. Their limited need for IT specialists is likely to be met more cheaply by training personnel abroad.

**REFERENCES**

- [1] Hagen, E. E.  
**The economics of development** / E. E. Hagen.- Homewood, ILL.: Richard D. Irwin.  
412 p.
- [2] Hicks, N. and Streeten, P.  
"Indicators of development: the search for a basic needs yardstick" / N. Hicks  
and P. Streeten.- **World Development**, Vol, 7, 567-580.
- [3] Lau, J.  
**A study of selected social factors influencing information development in low,  
middle, and highly developed countries: an assessment for the period 1960-1977**  
/ Jesus Lau.- A PhD thesis presented to the Department of Information Studies,  
University of Sheffield. Sheffield, England; 1988, 383 p.
- [4] Lau, J.  
"Cluster analysis of international information and social development" / Jesus  
Lau.- Accepted for publication in **Journal of Information Processing and  
Management**.
- [5] Lewis-Beck, M. S.  
**Applied regression: an introduction** / M. S. Lewis-Beck.- Beverly Hills, CA:  
Sage Publications. 79 p.
- [6] Masser, I. and Wilson, T. D.  
"Information management training for urban and regional planning" / Ian Masser  
and T. D. Wilson.- **Regional Development Dialogue**, Vol. 8, No. 2, 1987 141-174.
- [7] McGarry, K.  
"Progress in documentation; education for librarianship and information  
science: a retrospect and revaluation" / Kevin  
McGarry.- **Journal of Documentation**, Vol. 39, No. 2, 1983, 95- 122.
- [8] Milligan, G. W. and Cooper, M.  
"An examination for determining the number of clusters in a data set" / G. W.  
Milligan and M. Cooper.- **Psychometrika**, Vol. 50, No. 2, 159-179.
- [9] Mojena, R. and Wishart, D.  
"Hierarchical grouping methods and stopping rules: an evaluation" / R. Mojena  
and D. Wishart.- **The Computer Journal**, Vol. 20, No. 4, 359-362.
- [10] Unesco.  
**Statistical Yearbook** / United Nations Educational, Scientific and Cultural  
Organisation.- Paris: Unesco. Several Vols.
- [11] World Bank.  
**World tables: from the data files of the World Bank** / World Bank.- Baltimore:  
John Hopkins University Press. 2 Vols.

**APPENDIX**

<b>LIST OF INDICATORS ASSESSED IN THE STUDY</b>	
Number in brackets indicate data sources	
LIBRARY INDICATORS [10]:	PUBLISHING INDICATORS [10]:
National number of libraries:	Total number
National	Book titles and pamphlets
University	Daily newspaper circulation
School	Newsprint paper consumption
Special	Non-daily newspaper circul.
Public	Other periodical titles
National number of volumes:	BASIC NEEDS INDICATORS [11]:
National	Food consumption in calories
University	Life expectancy at birth
School	Infant mortality rate
Special	Adjusted enrollment rate in
Public	primary schools
	Adult literacy rate

## EDUCATIONAL IMPLICATIONS OF INFORMATION DEVELOPMENT

If information development takes place when a country has met the satisfaction of social needs of the population, any educational program to train information specialists must take into account this factor if it is doomed to succeed. Countries with characteristics similar to group 2 to 5 are countries which are likely to have uneven levels of information development. In other words education will have to cater for polarised information needs, at one extreme basic information needs and at the other extreme high technology needs of information.

Nations with characteristics of group one, are countries which have even information development. Their information needs are not polarised as in countries of lower social development. Therefore, education of information specialist becomes easier since they have to cater for less varied information needs.

LDCs, which fall in groups four and five, are likely to have greater problems in forming cadres of information professionals. They are engaged in meeting basic needs of the population, while they are in need of information to speed up socio-economic growth.

-----  
countries that have dualistic or polarised economies, where tribal and industrial organisations are present, have an unsurmountable task in education.

The results discussed in the previous section give some orientation to the kind of educational policies that countries could follow to train information specialists. They are summarised again in order to draw conclusions in regard to education policies.

-----  
Information gap between HDCs and LDCs is greater than that in social aspects.

Less developed countries look as one cluster of nations when information development is compared with HDCs.

Libraries are declining in HDCs, but growing in LDCs between 1960 and 1977.

Countries that reached social development lately have just started to achieve information development.

Middle income countries made advances in meeting social needs but their information progress was inferior during the period under study.

Low income countries made uneven progress in social and information development during the 18 year assessed.