



# Some considerations on geospatial thinking



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Agencia Nacional de Minería - Colombia

LAGF 2019, Mexico City, october 9 - 10

City management: Mobility, utilities

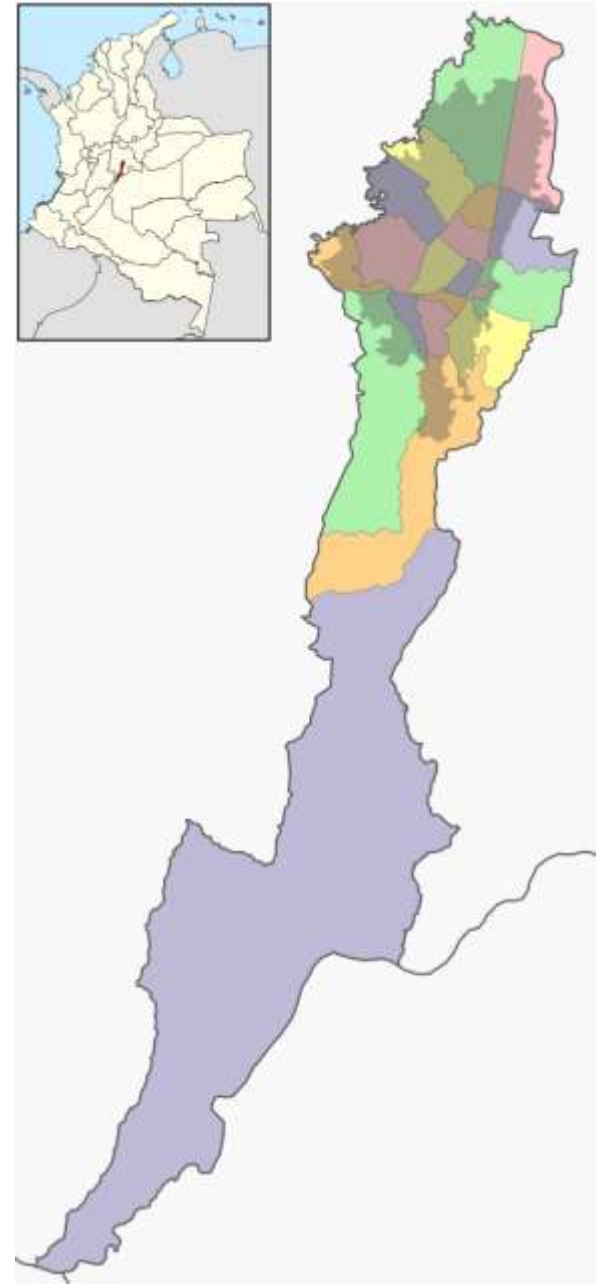
# Bogotá



# Bogotá

Area: 1 775 km<sup>2</sup>

Population: 7.181 millones (2018)



[https://upload.wikimedia.org/wikipedia/commons/thumb/1/1e/Colombia\\_Distrito\\_Capital\\_location\\_map\\_%28adm\\_colored%29.svg/525px-Colombia\\_Distrito\\_Capital\\_location\\_map\\_%28adm\\_colored%29.svg.png](https://upload.wikimedia.org/wikipedia/commons/thumb/1/1e/Colombia_Distrito_Capital_location_map_%28adm_colored%29.svg/525px-Colombia_Distrito_Capital_location_map_%28adm_colored%29.svg.png)

# Relevance

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Geoinformation Evolution

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AI, ML, Data Science

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Changes in programs, number of programs

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Age group coverage

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Discipline Coverage

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Decision making

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“However, there is still a lack of awareness, understanding and uptake of the vital and integrative role of geospatial information, particularly in developing countries” (IGIF, 2018).



# Primary School evaluation

- TERCE is a large-scale study of learning achievement, which was implemented in 2013.
- Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru and Uruguay), as well as the Mexican state of Nuevo León (Mexico).



# Primary School evaluation

- This study assessed the performance of pupils in third and sixth grades primary school in **Mathematics**, **Reading and Writing** (Language), plus **Natural Sciences** in the case of sixth grade.
- Its main goal was to provide information for the discussion on education quality in the region. It also aimed to orient decision making in educational public policies.
- PERCE 2007, SERCE 2006, TERCE 2013 y ERCE2019

TERCE (2013) Coverage



United Nations  
Educational, Scientific and  
Cultural Organization

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- PISA is the OECD's Programme for International Student Assessment.
- Every three years it tests 15-year-old students from all over the world in **reading, mathematics and science**.
- The tests are designed to gauge how well the students master key subjects in order to be prepared for real-life situations in the adult world.

Map of PISA countries and economies



OECD countries	Partner countries and economies in PISA 2015	Partner countries and economies in previous cycles
Australia	Albania	Azerbaijan
Austria	Algeria	Himachal Pradesh-India
Belgium	Argentina	Kyrgyzstan
Canada	Brazil	Liechtenstein
Chile	B-S-I-G (China)*	Mauritius
Czech Republic	Bulgaria	Miranda-Venezuela
Denmark	Colombia	Panama
Estonia	Costa Rica	Serbia
Finland	Croatia	Tamil Nadu-India
France	Cyprus <sup>1</sup>	
Germany	Dominican Republic	
Greece	Former Yugoslav Republic of Macedonia	
Hungary	Georgia	
Iceland	Hong Kong (China)	
Ireland	Indonesia	
Israel	Jordan	
Italy	Kazakhstan	
Japan	Kosovo	
	Lebanon	
	Lithuania	
	Macao (China)	
	Malaysia	
	Malta	
	Moldova	
	Montenegro	
	Peru	
	Qatar	
	Romania	
	Russian Federation	
	Singapore	
	Chinese Taipei	
	Thailand	
	Trinidad and Tobago	
	Tunisia	
	United Arab Emirates	
	Uruguay	
	Viet Nam	

\* B-S-I-G (China) refers to the four PISA participating China provinces: Beijing, Shanghai, Jiangsu, Guangdong.

1. Note by Turkey: The information in this document with reference to « Cyprus » relates to the southern part of the island. There is no single authority representing both Turkish and Greek Cypriot people on the island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the « Cyprus issue ».

Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

Organisation for Economic Co-operation and Development (OECD)

Country	Geography Departments
Brazil	83
Argentina	30
Chile	14
Mexico	14
Colombia	10
Costa Rica	4
Ecuador	4
Peru	4
Dominican Republic	3
Venezuela	3
Bolivia	2
Jamaica	2
Panama	2
Uruguay	2
Belize	1
Cuba	1
Guyana	1
Honduras	1
Nicaragua	1
Paraguay	1
Puerto Rico	1
Trinidad and Tobago	1

**185**

## Geography Departments Latin America (2013)



University  
level: Latin  
America



State	Geography Departments	State	Geography Departments
California	82	New Jersey	6
Texas	40	Oklahoma	6
Illinois	25	Oregon	6
New York	23	Utah	6
Pennsylvania	22	Arizona	5
Massachusetts	17	Iowa	5
Michigan	15	Kansas	5
Ohio	15	New Hampshire	5
Wisconsin	15	South Carolina	5
Minnesota	14	Connecticut	4
Georgia	12	District of Columbia	4
Maryland	12	Hawaii	4
Colorado	11	Idaho	4
Florida	11	Mississippi	4
North Carolina	11	Montana	4
Washington	11	Alaska	3
Tennessee	10	Arkansas	3
Alabama	9	Maine	3
Indiana	9	Vermont	3
Louisiana	9	West Virginia	3
Virginia	9	North Dakota	2
Kentucky	8	Rhode Island	2
Missouri	8	Wyoming	2
New Mexico	7	Delaware	1
Nebraska	6	South Dakota	1

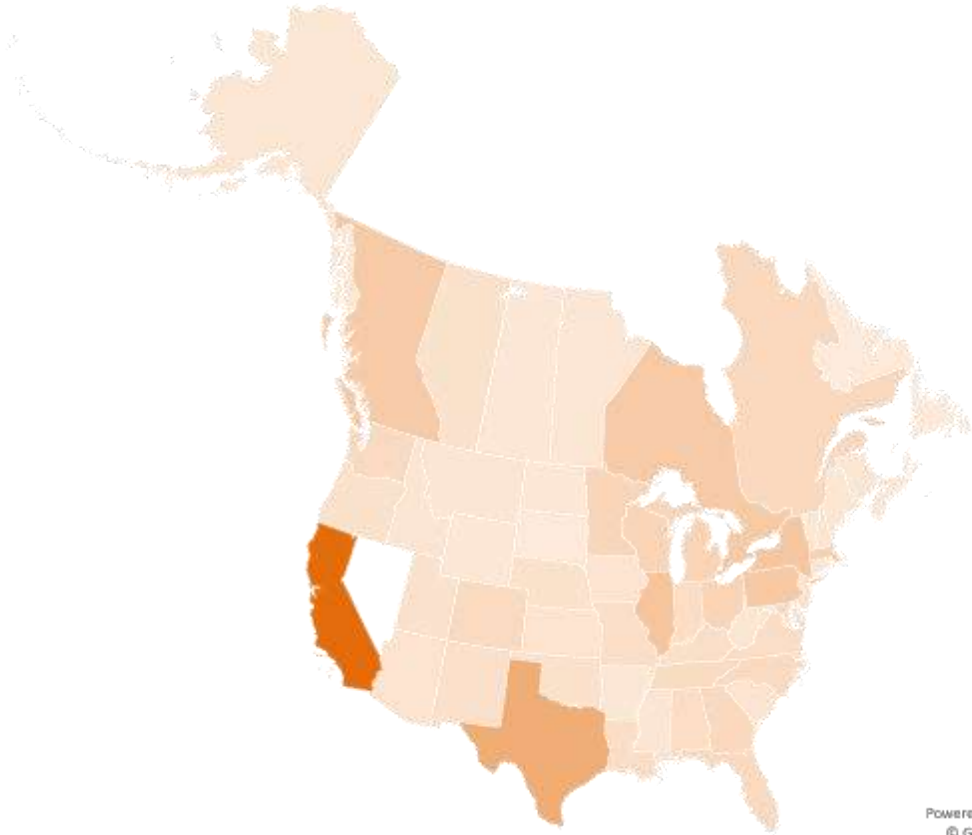
507

<http://www.aag.org/cs/geogdepts>

Province	Geography Departments
British Columbia	21
Ontario	21
Québec	12
Alberta	6
Manitoba	3
New Brunswick	3
Nova Scotia	2
Saskatchewan	2
Newfoundland	1

71

Geography Departments USA and Canada (2013)



# University level: USA and Canada

Geography  
related  
journals (in  
or about  
Latin  
America)  
Urquijo, P. S.  
and Bocco,  
G. UNAM,  
2015

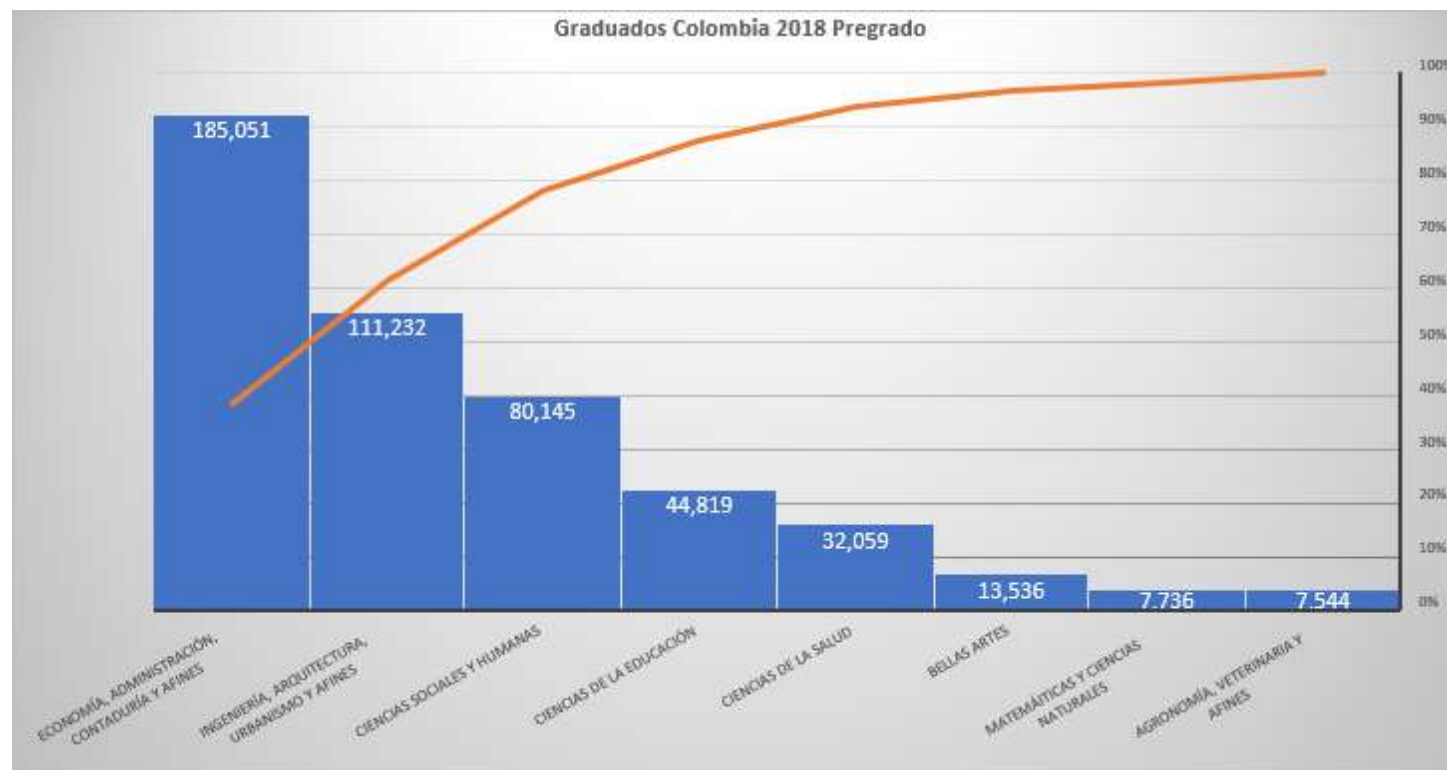
Tabla 1. Revistas de geografía latinoamericana o de temática latinoamericana que incluyen temas geográficos consultadas.

Nombre de la revista	Temática	País u organismo
<i>Anuario de Geografía*</i>	Geografía	México
<i>Boletín de la Asociación de Geógrafos Españoles**</i>	Geografía	España
<i>Canadian Journal of Latin American and Caribbean Studies</i>	Latinoamérica	Canadá
<i>CONFINS, revista franco-brasileña</i>	Geografía	Brasil
<i>Cuadernos Americanos</i>	Latinoamérica	México
<i>Cuadernos de Geografía</i>	Geografía	Colombia
<i>Diálogos Latinoamericanos</i>	Latinoamérica	Dinamarca
<i>Economía, Sociedad y Territorio</i>	Geografía	México
<i>Espaço e Geografia</i>	Geografía	Brasil
<i>Estudios migratorios latinoamericanos</i>	Latinoamérica	Argentina
<i>Eure</i>	Geografía	Chile
<i>European Review of Latin American and Caribbean Studies</i>	Latinoamérica	Países Bajos
<i>Geocrítica**</i>	Geografía	España
<i>Geoenseñanza*</i>	Geografía	Venezuela
<i>Geografía y Desarrollo*</i>	Geografía	México
<i>Geotrópico</i>	Geografía	Colombia
<i>Geosul</i>	Geografía	Brasil
<i>GEOUSP</i>	Geografía	Brasil
<i>Investigaciones Geográficas</i>	Geografía	México
<i>Journal of Latin American and Caribbean Anthropology</i>	Latinoamérica	Estados Unidos
<i>Journal of Latin American Geography</i>	Geografía	Estados Unidos
<i>Geocalli</i>	Geografía	México

Tabla 1. Continuación

Nombre de la revista	Temática	País u organismo
<i>Latin American Perspectives</i>	Latinoamérica	Estados Unidos
<i>Latinoamérica, revista de estudios latinoamericanos</i>	Latinoamérica	México
<i>Mercator</i>	Geografía	Brasil
<i>Párrafos geográficos</i>	Geografía	Argentina
<i>Perspectiva Geográfica</i>	Geografía	Colombia
<i>Polis. Revista Latinoamericana</i>	Latinoamérica	Chile
<i>Revista Brasileira de Geografia</i>	Geografía	Brasil
<i>Revista de Geografía Norte Grande</i>	Geografía	Chile
<i>Revista Geográfica</i>	Geografía	IPGH-OEA***
<i>Revista Geográfica de América Central</i>	Geografía	Costa Rica
<i>Revista de historia de la educación latinoamericana</i>	Latinoamérica	Colombia
<i>Terra Nueva Etapa</i>	Geografía	Venezuela
<i>Utopía y Praxis Latinoamericana</i>	Latinoamérica	Venezuela

# Graduates, Colombia 2018



<http://hecaa.mineducacion.gov.co/consultaspublicas/content/poblacional/index.jsf>

# Some ideas...

“All this leads us to the need to advance in the construction of a powerful geographic knowledge – powerful knowledge- (LAMBERT et al., 2015) based on the reinforcement of **creativity** and **innovation** of Geography professors when designing project curricula that **go beyond the rigidity of normative frameworks or textbooks**.

Thus, together with the acquisition of structured geographic knowledge in the branches of the referent discipline (physical geography, human geography, regional geography), the use of geoinformation technology allows the understanding of knowledge based on the multiscale contradiction of today's world (from the local to the global), but especially to acquire a geographical knowledge of the contemporary era through projects that analyze the main socio-spatial challenges facing humanity today”. (DE MIGUEL, 2014)

# Some issues

‘Thinking geographically is a uniquely powerful way of seeing the world.

While it does not provide a blueprint ... thinking geographically does provide a language – a set of concepts and ideas – that can help us see the connections between places and scales that others frequently miss.

That is why we should focus on geography’s grammar as well as on its endless vocabulary. That is the power of thinking geographically.’

Peter Jackson, Professor of Human Geography



# To consider... GI learner

[http://www.gilearner.ugent.be/wp-content/uploads/GI-Learner-O7\\_EN.pdf](http://www.gilearner.ugent.be/wp-content/uploads/GI-Learner-O7_EN.pdf)



GI Learner

Creating a learning line on spatial thinking

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## THE NEED FOR GEOSPATIAL THINKING IN EDUCATION

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A manual for implementing  
geospatial thinking competencies  
in the curriculum

## To consider... A manifesto

# a different view

**a manifesto from the Geographical Association**

## summary

The Geographical Association's vision for geography is developed from the following elements:

- Geography underpins a lifelong 'conversation' about the earth as the home of humankind. Geography therefore contributes to a balanced education for all young people in schools, colleges and other settings.
- An essential educational outcome of learning geography is to be able to apply knowledge and conceptual understanding to new settings: that is, to 'think geographically' about the changing world.
- Geography in schools, colleges and other educational settings is concerned with perceptive and deep description of the real world. It seeks explanations about how the world works and helps us think about alternative futures; it is 'Living Geography'.
- Young people themselves, working with their teachers and drawing from their own experiences and curiosity, should be encouraged to help shape the geography curriculum.
- The GA believes in geographical enquiry: that is, students are active participants and investigators, not just the passive recipients of knowledge.
- Fieldwork – that is, learning directly in the untidy real world outside the classroom – is an essential component of geography education.
- The GA believes that teachers should be accountable, but also that they are autonomous professionals driven by educational goals and purposes: they are the curriculum makers and the subject leaders.

Rafael de Miguel González and Karl Donert

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Teaching geography  
in and about Europe

EXTENDING THE EFFECTS OF CONTEMPORARY INTERNATIONAL STUDIES TO AFRICANIZATION STUDIES  
 JOURNAL OF THE AFRICAN STUDIES ASSOCIATION

### REPORT ON RESEARCH COURSE

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Journal of Internal Medicine 247: 105–112

**Abstract.** An experimental investigation of the influence of the frequency of the external force on the resonance of a system of two coupled pendulums is described. It is shown that the resonance frequency of the system depends on the frequency of the external force. The results of the experiment are compared with the results of the theoretical calculations.

**Abstract:** In order to facilitate the development of a more effective and efficient management system, the authors have developed a methodology for the analysis of the management system of a company. The methodology is based on the analysis of the management system of a company, taking into account the internal and external environment of the company. The methodology is based on the analysis of the management system of a company, taking into account the internal and external environment of the company. The methodology is based on the analysis of the management system of a company, taking into account the internal and external environment of the company.

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Este artículo comienza a explorar el rol del  
de la música en el proceso de construcción de la  
identidad lingüística, cultural, o ideológica de  
la comunidad, considerando que se han producido  
cambios en los últimos años. Será abordado por

diversi altri attributi ecologici generali: la ricchezza spaziotemporale e la abbondanza di comunità gregarie. Tuttavia, rispetto a particolari gruppi di animali, per esempio, una semplice considerazione, che tutte le specie di pesci, crostacei, molluschi, anfibi, rettili e uccelli, e piante acquatiche dipendono tutti da tratti spaziotemporali e all'interno delle comunità

## European Geography Education: The Challenges of a New Era



Edited By Niklas Landerholm, and Maria Rallón



**Pensamientos geográficos en América Latina: retrospectiva y balances generales**

Revisado: 4 de diciembre de 2014. Aceptado en forma final: 17 de agosto de 2015.  
Traslado online (open access): 17 de agosto de 2015.

Robert H. Taylor, President  
Columbia River Trust

[illegible]

**Tabella 10.** *Indicatore di qualità: qualità della vita*

Geographic thought in Latin America  
A tentative and general balance

**Abstract.** In this paper we review results of a thorough biogeographic review of published geographic research and in the works of geographic historians and current authors in Latin America. The paper focuses on the recognition of environmental influence and global processes on patterns. We argue that this type of biogeographic analysis allows the understanding of the evolution of the biota in Latin America.

With an understanding of the role of culture in the success of the social programs that, in the 1980s, triggered geographic change and influenced theoretical advances in the theory of life and in other behavioral sciences, the field will be able to face the new problems in geographic research that internationalization is bringing. To conclude, we suggest the following research agenda:

[illegible]

Muchas gracias