

GEOSPATIAL DATA IN EDUCATIONAL PLANNING

Educational planners and managers have always relied on information to help them do their work, whether they are producing diagnoses of their education system or anticipating future scenarios. With the ever-growing availability of datasets and technologies that are capable of processing large amounts of information at very low cost, planners and managers are now rethinking their methods and practices.

The area of micro-planning is a good illustration of this. Micro-planning is a branch of educational planning and management that draws on tools and techniques such as school mapping and sub-national simulation models. These methods contribute to highly contextualized policies that will ensure:

- 1) greater equality in the distribution of educational opportunities,
- 2) better adaptation of these opportunities to the needs of local communities, and
- 3) more efficient use of all available resources.

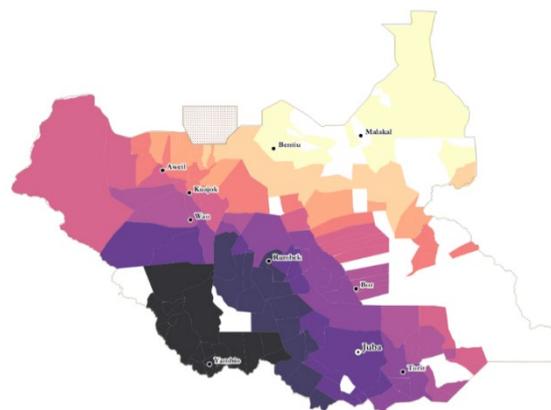
The first IIEP-UNESCO planners working on school mapping in the early 1970s were convinced that the best educational planning should take into account the characteristics of the smallest communities, which would then inform the national plan (Hallak, 1977). In those days, information on demography, educational standards, and infrastructure as well as on geographic, economic, political, and labour force factors were rarely disaggregated at the local level. When they were, the capacity to process these data in concert was very limited, due to the low prevalence of personal computers in ministries, their limited processing capacity, and the low number of people capable of running the analyses. Therefore, micro-planning and school mapping effectively relied on two main types of data: population census data and education statistics from administrative sources.

The situation has evolved over the last forty years, as data processing, analysis, and dissemination have become more mainstreamed in ministries of education. In 2020, IIEP-UNESCO is launching a development project to explore new ways to improve micro-planning still further, with techniques and evidence that can provide insights that were inaccessible before.

Project objectives

The **general objective** of this project is to explore how the surge of micro-level georeferenced data, combined with increased technological capabilities, represents an opportunity for improving current micro-planning techniques and the insights that can be drawn from them. The project also aims to achieve the following **specific objectives**:

1. Identify which stages of the planning cycle and of educational management can benefit from incorporating geospatial data in their processes.
2. Study countries' experiences of school mapping and their use of geographical information, and how their relationship has evolved over the last 40 years.



Map 1. Example of a methodology used to identify correlations between educational and contextual variables

3. Determine which spatial econometric techniques can be used to improve policy design and interventions.
4. Establish the operational steps needed to implement said techniques at the different stages of the planning cycle and in the day-to-day management of the education system.

Project questions

1. Which stages of the planning cycle can be improved by incorporating geospatial data analysis?
2. What are the current methods being used by ministries of education within the planning cycle, and how do they use, or not use, georeferenced information?
3. Which methodologies correspond with which stage of the planning cycle?
4. What operational steps need to be taken to ensure that the methodologies help to improve the decision-making process without imposing excessive barriers to entry?

The first question aims to determine how each of the different stages in the planning cycle (diagnosis, policy formulation, projections, programming and project analysis, costing of the educational plans, and monitoring and evaluation) are touched by geospatial data, and the way current practices and methodologies can be improved.

The second question will look into the procedures and methods currently making use of geographic information in countries' planning processes, particularly those for which IIEP-UNESCO conducted case studies.

The third question will identify which existing geospatial analysis methodologies can be paired to each stage of the planning cycle to improve procedures and policy formulation.

The fourth question will determine how the chosen methodologies can be operationalized in the context of developing countries, using free, open-source means to facilitate their adoption.

Scope

Geographical scope: Recognizing that any tool or methodology needs to be adapted to the context where it is used, the project's geographical scope is global. The tools and methods developed will be global public goods, shared in free, open-source programmes with accompanying documentation. Two national case studies will be developed, inspired by previous IIEP-UNESCO work (see Hallak, 1977 and Attfield et al., 2002).

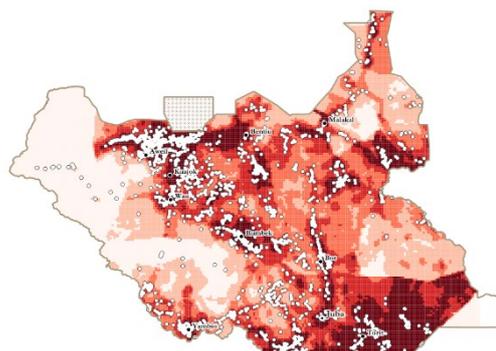
Sources of data: While the methodologies are built to handle disaggregated EMIS, FEMIS, and TMIS data, the tools will also rely heavily on open-source databases, particularly those from national statistical offices, ministries of education, and international agencies. Interviews and focus group discussions may also be used.

Tools and programmes: As part of the aim to make all products global public goods, all programmes used to make calculations or to create reports and products will be free and open source. The geospatial processing programme used will be Quantum GIS (QGIS), and coding platforms like Python, RStat, and Jupyter Notebooks will be used.

Methodology

IIEP-UNESCO will conduct a series of detailed case studies in two countries that are using school mapping and micro-planning as part of their planning approach.

Expert papers will be commissioned, in order to determine ways in which advanced geospatial methodologies can be included in the planning cycle to improve policy formulation and implementation, and technical notes will document key intermediate elements, so that the different stepping-stones of this initiative can quickly be made public.



Map 2. Example of a methodology to identify the population that is not within reach of public services

There will also be an expert meeting which will bring together spatial econometrics practitioners from fields beyond education. These experts will help define guidance for IIEP-UNESCO to give to countries seeking models for designing informed interventions that take into account the broader context.

In summary, the project will use a variety of strategies, given the nature of the work to be carried out. IIEP-UNESCO will collaborate with experts (academics or practitioners) to define and design methodologies. Then these methodologies will be transformed into practical tools, through collaboration with data scientists and developers. All products delivered by this project will be based on free, open-source software, and will use data already available at the ministry of education level or through platforms such as the Humanitarian Data Exchange.

References

- Attfield, I.; Tamiru, M.; Parolin, B.; & de Grauwe, A. 2002. [Improving micro-planning in education through a geographical information system: Studies on Ethiopia and Palestine](#). Paris: IIEP-UNESCO.
- Caillods, F.; Casselli, J.; Ta Ngoc, C.; & Porte, G. 1983. [School mapping and micro-planning in education](#). Paris: IIEP-UNESCO.
- Hallak, J. 1977. [Planning the location of schools: An instrument of educational policy](#). Paris: IIEP-UNESCO.
- Mendelsohn, J.M. 1996. [Education planning and management and the use of geographical information systems \[GIS\]](#). Paris: IIEP-UNESCO.

Contacts

Hugues Moussy
Team Leader
Research and Development
Tel.: +33 1 45 03 77 45
h.moussy@iiep.unesco.org

Amelie A. Gagnon
Senior Programme
Specialist
Tel. : +33 1 45 03 77 49
a.gagnon@iiep.unesco.org

Germán Vargas
Assistant Programme
Specialist
Tel.: +33 1 45 03 77 00
g.vargas@iiep.unesco.org

IIEP-UNESCO, 7–9 rue Eugène Delacroix, 75116 Paris, France

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of UNESCO or IIEP concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.