

# “Developing a learning line on GIScience in education” (GI-Learner) (2015-1-BE02-KA201-012306)

**GI Learner: A project to develop geospatial thinking learning lines in secondary schools.** The project was a three year Erasmus+ KA2 strategic partnership project, aimed at integrating geospatial literacy, geospatial thinking and GIScience into schools. Although spatial (geo)thinking is seen as one of the most important sectors in the economy it is seldom really taught in secondary schools.

## Key research question: Is it possible to teach and learn by developing a learning line and using GIScience?

Space and location make spatial thinking a distinct, basic and essential skill that can and should be learned in school education, alongside other skills like language, mathematics and science. Keeping this in mind as the objective not only is teacher training and availability of user friendly software, ICT equipment in schools necessary but a community of learners and learning materials created by the project and available on the website: <http://www.gilearner.ugent.be> are also essential.

Bednarz y Schee, 2006 point out that GIS:

- Is not a compulsory item in teacher training
- Is taught by non-specialists
- Is not included on the curriculum
- Requires availability of data and easy-to-use software

And attitudes of teachers are difficult to persuade

## Methodology (main steps)

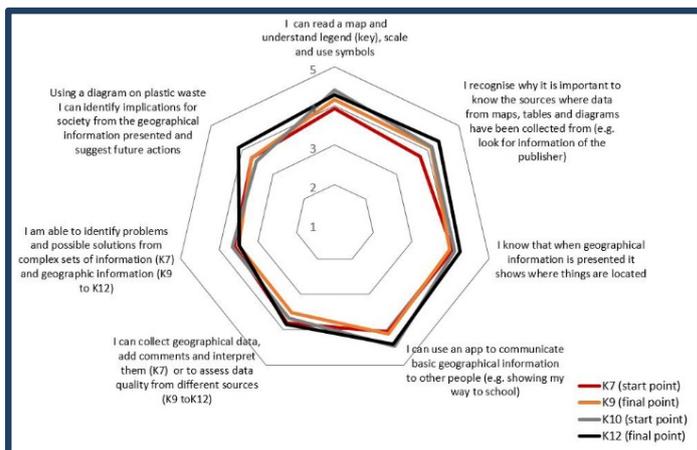
1. Summarize the most important literature on learning lines and spatial thinking to have a solid scientific base
2. Distillate a distinct and essential set of geospatial thinking competencies from the previous steps
3. Scan the curricula of partner countries to identify opportunities to introduce spatial thinking and GIScience
4. Develop an evaluative tool to analyse the impact of the learning lines on geospatial thinking
5. Create learning lines translating the competencies into learning objectives, teaching and learning materials for the whole curriculum (K7 to K12)

## Students participation in self-assessment tests

Level	Austria (AT)	Belgium (BE)	Romania (RO)	Spain (ES)	United Kingdom (UK)	Total No
K7	-	18	9	32	10	69
K9	-	13	19	7	20	59
K10	36	45	13	13	27	134
K12	9	20	12	8	-	49
<b>Total</b>	<b>45</b>	<b>96</b>	<b>53</b>	<b>60</b>	<b>57</b>	<b>311</b>



- The ten GI Learner competencies for the learning line progression:
- 1 Critically read, interpret cartographic and other visualisations in different media (Read and interpret);
  - 2 Be aware of geographic information and its representation through GI and GIS.(Understand)
  - 3 Visually communicate geographic information (Communicate/ transmit)
  - 4 Describe and use examples of GI applications in daily life and in society (Describe)
  - 5 Use (freely available) GI interfaces (Apply)
  - 6 Carry out own (primary) data capture (Gather and select)
  - 7 Be able to identify and evaluate (secondary) data (Evaluate)
  - 8 Examine interrelationships (Relate / analyse)
  - 9 Extract new insight from analysis (Summarise)
  - 10 Reflect and act with knowledge (Make decisions/ take proper actions)



**Self assessment tests results, at the beginning and at the end of the learning stage**

## Conclusions

The project has tried to help teachers to implement learning progression lines for spatial thinking in secondary schools, using GIScience.

The implementation of the official curriculum is essential to promote the construction of critical spatial thinking using GI. Technology and its usability, initial and ongoing teacher training, and also, self-training, is not enough. A change in teaching methodologies related to geography is necessary, as well creating a model the student can use to communicate, beyond the traditional exam, what they have learned using geographic information.

The materials adapted to the classrooms or examples of good practices developed, and the sequence in a line of learning, fulfil all these objectives.

## References

- Buzo, I., Lázaro, M.L. y De Miguel (in press) Pensamiento espacial y aprendizaje inteligente en la enseñanza de la geografía en secundaria: geoinformación y SIGWeb (Spatial thinking and SMART learning in geography: geoinformation and WebGIS in secondary schools)
- Buzo, I., De Lázaro, M.L. and Zwartjes, L. (in press) GI Learner. Creating a learning line on geospatial thinking in education. Springer.
- Donert, K.; Desmidt, F.; Lázaro, M.; González, R.; Lindner-Fally, M.; Parkinson, A.; Prodan, D.; Woloszynska-Wisniewska, E.; Zwartjes, L. (2016). The GI-Learner Approach. GI Forum – Journal for Geographic Information Science, 2, 134-146, DOI: 10.1553/giscience2016\_02\_s134.
- Lázaro, M.L. de; Buzo, I. and De Miguel, R. (2018). El proyecto GI Learner: Retos para integrar la Geoinformación en la enseñanza de la Geografía. en Perspectivas multidisciplinares en la sociedad del conocimiento, Valencia, pp. 772-782.
- Zwartjes, L. (2014). The need for a learning line for spatial thinking using GIS in education. In R. de Miguel and K. Donert, (Eds.), Innovative Learning Geography. New challenges for the 21st Century (pp. 39-63). Newcastle-upon-Tyne: Cambridge Scholars Publishing. Zwartjes, L., Lázaro, M.L., De Donert, K., Buzo, I., De Miguel, R., & Woloszynska-Wisniewska, E. (2016). Literature review on spatial thinking. GI-Learner project.
- Zwartjes, L. (2017). "GI Learner, een project om georuimtelijk denken via leerlijnen in te voeren in het onderwijs" in "De Aardrijkskunde", journal of the Flemish Geography Teachers Association. Available on: <http://www.gilearner.ugent.be/wp-content/uploads/GI-Learner.pdf>

**Acknowledgements:** We would like to thank all the partners involved in the GI Learner Project "Developing a learning line on GIScience in education" (2015-1-BE02-KA201-012306) funded by the European Commission and Erasmus+ KA2 and coordinated by Luc Zwartjes.

