



Google Earth and ArcGIS Explorer in Geographical Education

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Introduction

- The technologies in education are increasing in their importance.
- The Web and Virtual Globes (VG) offers new possibilities for working in spatial competences.
- These aim deals with lifelong learning competences.



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Key Competences	VGs Chances	Teaching&Learning Process
Communication in the mother tongue and communication in foreign languages.	Change the language of the interface. Screen viewer.	Express concepts&ideas.
Mathematical competence and basic competences in science and technology.	Make measures.	Necessary for reflection and developing spatial awareness.
Digital competence.	VGs deal with ICT.	Critical use of information and as a basic skill for making the tool useful.
Learning to learn.	Information provided by the VGs.	Problem-based learning in which students can work with recent data on real world problems, share them and organize their own learning.
Social and civic competences.	Share our results.	Encourage discussion, enable participation and engagement. Working individually and collectively in an interpersonal and intercultural environment.
Sense of initiative and entrepreneurship.	New spatial knowledge.	Turning ideas into action that come from the new spatial knowledge (spatial changes, location, relations, models...) make us to act in different ways with new objectives.
Cultural awareness and expression.	VGs language.	Allows us to express spatial ideas, experiences and emotions about different places on the Earth.



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Using programmes

- ArcGIS Explorer
- Google Earth
- Some others:

<http://www.herodot.net/virtual.html>

<http://geography2.blogspot.com/2005/10/more-virtual-globes-enumeration.html>

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The interface

For visualization	For navigation	For the task /functionality
The screen	The navigation controls, the keyboard and the mouse	Toolbars: topbar, sidebar or console.

Google Earth	ArcGIS Explorer
<p>Diagram illustrating the navigation controls for Google Earth. The interface includes a central joystick for navigation, a 'North up reset button' (marked with 'N'), a 'Tilt' control, and a 'Zoom' control (marked with '+').</p>	<p>Diagram illustrating the navigation controls for ArcGIS Explorer. The interface includes a central joystick, a 'North up reset button' (marked with a triangle), a 'Zoom' control (marked with '+'), a 'Tilt' control, a 'Reset tilt button' (marked with a triangle), and another 'North up reset button' (marked with a globe icon and 'Full Extent').</p>

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Learning Geography concepts

■ Learning process:

- Observation
- Experimentation
- Description
- Explanation
- Researching with other sources



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Spatial knowledge from VG

- Earth observation.
- Images Analysis
- Study a concrete problem
- Orientation & scale
- Make measures



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Making a virtual trip

- Virtual trips can be very useful in methodologies with collaborative learning and for the Learning Based in Problems (LBP).
- They are a different way of learning.
- The organization can be different for a local, regional, national or international field trip.



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Making a virtual trip: steps

- It may create an itinerary according to the goals of the trip.
- It may include some key questions to learn and made reflections about this space. It is necessary to collect the proper geoinformation data (images, statistical data, layers...) some of them available on the web.
- Make a final report about a researching in any digital way (word processor, presentation, flash, web page, etc.)
- It may have an evaluation in order to determine if the objectives have been fulfilled in the learning and/or research process.



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VG tools for creating a virtual trip

Virtual Trip	Google Earth	ArcGIS Explorer
<i>Itinerary:</i>	Sidebar: Search: Fly to	Task: Find a place
Add placemark Add path Add place to a route Play tour	Add, Placemark Add, Path Tools, Play tour (Ctrl+Alt+P) Sidebar: Places, Play tour	Task: Create a note Send to, Multi stop route Fly along Fly to; Move to
Speed	Tools, Options, Touring	Tools, Options, Fly characteristics
<i>Key questions:</i>	Placemark properties	Popup Window
<i>Add other information</i>	Files: KML, shapefiles Links: Wikipedia, Add photo,	File, Open (Import an Esri or KML files). Task: Wikipedia search Add link, for associate a file with a route or a place. Connect to server: File, Open, servers
<i>How to go to an address/ place</i>	Sidebar: Search: Directions	Get driving direction
<i>Save results</i>	Save as... (*.kmz file) File, save	Export results (*.nmf file)



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An example:

Lavapiés neighbourhood (Madrid)

- We made an itinerary taken from the [images of goolzoom](#) then added statistical information and GI from the local papers, we then made a [virtual trip in Google Earth](#) and then a discussion in class and come to conclusions.
- Students use the information and communication technologies (ICT) and can learn some geographical concepts. Internet gave them the possibility of see all the different cultures in the neighbourhood after been studding with Internet materials.
- Finally we had the opportunity to visit the place (Lazaro, 2007). If we would not visit the place we would missed some [social aspects](#).
- The exchange of the virtual trips can be a very good practice in order to learn from different geographical places. The learning experience would be even more enriching if the virtual trip became a real trip.

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- The GI and the Internet are very good tools for explaining geographical concepts.
- Some skills such as making maps, graphs, virtual trips and to analyze images allow us to visit and learn from places that we have never visited.
- It would be a good practice in the European Space of Superior Education. We had seen that our students usually are fond of these ICT tools and we expect the same for the future.
- Collaborative learning and Learning Based in Problems (LBP) can be practiced in our lessons with the Internet materials.

(Lázaro, ML; Ruiz, ME & González, MJ (2007b): “Excursiones virtuales, migraciones e interculturalidad” in Las competencias geográficas para la educación ciudadana Eds. Marrón, MJ; Salom, J; Souto, XM) Valencia, pp. 371-386).

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Virtual Globes @ GIS

- The territorial and environmental problems can be shown through VGs (urban sprawl, the different landscapes, the vegetation, the urbanization, etc.)
- Some GIS work and some GIS thinking can have a new dimension for studying if recent images are available.
- You can enrich VGs basic screen viewer by importing layers from servers and overlaying them. It can be done in different formats, mainly KML and shapefile for Google Earth and ArcGIS Explorer.



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- You can do measures on them.
- If you need a global perspective of a problem, then this resource will be very valuable.
- We have never seen before the ice, the water, the earth ... all together and at the same time in a globe.
- We have had this chance since 2005.

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- Connecting data is very important because we can use VGs for serving data to other users in a research project, in workshops and demonstrations, in Geography and in other disciplines.
- We have a new and big way for interchanging information.
- We will not need to repeat a research that has been already done if we share results with others after making the necessary maps for answering geographical questions.

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Conclusions

- VGs give us wider possibilities for learning, teaching and researching.
- We have the challenge of converting the use of VGs in good practices.
- We can share material, geoinformation and experiences which enrich the VGs uses.
- One should choose one or other VGs according with the objectives of the goals and the aims of their work.



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There are positives and negatives in using VG

Positives	Negatives
Easy to use and very intuitive.	Interfaces today aren't very flexible.
Free use.	Not enough support because the interface is continuously improving.
Attach other information: multimedia links, connect to a server...	Difficulties in making some overlay, some format files are not supported.
It seems a GIS and can be improve by a GIS tool.	It is not a proper GIS today.
Big possibilities of learning, teaching and researching.	You need a modern computer for avoiding difficulties with streaming.



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References

- Butler, D. (2006) The web-wide world. *Nature*. 439(7078):776-778.
- Donert, K. and Charzynski, P. (ed.) (2005). *Changing Horizons in Geography Education*. Ars Docendi Publishing House, A Herodot/Eurogeo Publication, Toruń.
- Donert, K. (2007) *Aspects of the State of Geography in European higher education*. TUNING Geography: a report of findings and outcomes. HERODOT Network.
- Donert (Ed) (2007) *EUC'07 HERODOT Proceedings, ESRI European User Conference 2007: Stockholm, Sweden, 25-27 September 2007*
- European Parliament and the Council (2006) *Recommendation of the European Parliament and of the Council on key competences for lifelong learning of 18 December 2006 (2006/962/EC) Official Journal of the European Union 30.12.2006.*
- Jekel, T., Pree, J. & Kraxberger, V. (2007), *Kollaborative Lernumgebungen mit digitalen Globen. Eine explorative Evaluation.* – In: Jekel, T., Koller, A. & Strobl, J., *Lernen mit Geoinformation II.* – Heidelberg: Wichmann, 116-126.
- Jekel, T. (in print), "What you all want is GIS 2.0!" - Collaborative GI based learning environments for spatial planning and education.
- Lázaro, ML and González, MJ (2007a) *Spain on the Web: A GIS way of teaching*, in Karl Donert; Premyslaw Charzynsky y Zbigniew Podgorski (Eds) *Teaching in and about Europe. Geography in European Higher Education*. Universidad de Toruń and HERODOT. pp. 36-43.
- Lázaro, ML and González, MJ (2007b) *Learning about Spain through GIS Webs*, in K. Donert (Ed.), *EUC'07 HERODOT Proceedings, ESRI European User Conference 2007: Stockholm, Sweden, 25-27 September 2007*, ESRI-HERODOT Publications.
- Mishra, P., & Koehler, M. J. (2006). [Technological Pedagogical Content Knowledge: A new framework for teacher knowledge](#). *Teachers College Record* 108 (6), 1017-1054.
- Strobl, J. (2007a) *Geographic Learning*. In *Geoconnexion Vol 6 Issues 5 and 6* (p. 42-43)
- Strobl, J. (2007b) *Geographic Learning in Social Web Environments*. In: *Changing Geographies: Innovative Curricula* (eds. S. Catling and L. Taylor), pp.327-332. IGU Commission for Geographical Education and Oxford Brookes University, Oxford.

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Some useful URL

(last accessed 31st of January 2008)

■ Google Earth:

- http://en.wikipedia.org/wiki/Google_Earth
- User guide: http://www.earth.google.com/userguide/v4/google_earth_user_guide.pdf
- User community: <http://bbs.keyhole.com/ubb/ubbthreads.php/Cat/0>
- Download the programme: <http://earth.google.com/intl/en/download-earth.html>

■ ArcGIS Explorer:

- http://en.wikipedia.org/wiki/ArcGIS_Explorer
- User guide: <http://arcgisonline.esri.com/download/ArcGISExplorerInstallGuide.htm>
- User foro: <http://forums.esri.com/Forums.asp?c=184>
- Download the programme:
- http://resources.esri.com/arcgisexplorer/index.cfm?fa=download&C_FID=259712&CFTOKEN=77649212&jsessionid=c130f25ce38328586470

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■ **Thank you very much for your attention**

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