

Research and data handling skills differentiated by level

Skills/Level	Basic	Intermediate	Proficient	Advanced
Critical thinking	Students understand basic concepts of critical thinking	Students can use data to verify information from the media	Students can analyse phenomena from their region using data and write reports critically analysing solutions	Students are able to develop and present complex evidence-based arguments in key academic formats
Data analysis skills	Students can analyse data using quantitative and qualitative methods	Students gain experience in using popular software for data analysis such as SPSS or NVivo	Students use proficiently software for data analysis which are relevant for their own disciplines	Students can present complex reports based upon data analysis in the form of research papers or posters
Data curation skills	Students can organise datasets in simple folders	Students can identify different sources of datasets and organise them in databases	Students can use electronic tools for data curation and share it with others	Students can develop databases and automate the process to organise and merge datasets, and embed metadata into the files to facilitate access to the resources
Data information management skills	Students can identify datasets from different sources	Students can select datasets from different portals in different formats	Students can extract, filter and compare data from different data sources creating a single dataset	Students can filter and format data in different formats analyse it creating complex datasets
Data mining skills	Students can locate CSV files on the internet	Students can extract datasets from PDFs	Students can extract datasets from different sources	Students can use complex methods for developing datasets
Data visualization skills	Students can create graphics and charts	Students can use online software to develop simple infographics	Students can use graphic design software to develop infographics	Students can use data visualisation techniques to present their findings using complex statistical modelling
Research skills	Students understand the scientific method and are familiar with the concepts of quantitative and qualitative methods	Students can structure their research and apply different techniques to obtain results	Students can replicate experiments and studies following research methods explained in the literature	Students can compare data and information from different data sources and research papers and replicate experiments and studies to produce new research findings
Statistical skills	Students can perform basic statistical operation including averages, media and median	Students can perform statistical operations using clusters, standard deviations, significance, chi square, correlation or regression analysis	Students can use data modeling techniques for different statistical methods such as forecasting to predict future events	Students can write queries in order to perform complex statistical analysis functions and create models and complex graphs and visualisations

Adapted from: Atenas, Havemann and Priego. (2015) Open Data as Open Educational Resources: Towards transversal skills and global citizenship. Open Praxis, vol. 7 issue 4, October–December 2015, pp. 377–389. <http://www.openpraxis.org/index.php/OpenPraxis/article/view/233>