



Scientia Education Investment Fund Grants Final Report

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**Developing new GIS micro-credentials courses to support the
planning and design of rapidly urbanising cities**

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[The completed report should be 8 pages in length]

1. Executive Summary

This project aimed to develop micro credentials Geographical Information System (GIS) courses which align to four post-graduate programs in the Faculty of Built Environment (City Analytics, City Planning, Landscape Architecture and Urban Development and Design). The underpinning content has been developed in a blended manner, so content is available or accessible to both face-to-face and self-pace online courses. In line with the UNSW 2025 Strategy: A2: Educational excellence – the UNSW Scientia educational experience, and as a result of this funding, the course offered improvement in the following aspects:

- Increased students use of open source tools (QGIS) which therefore enable to be offered to a wider audience;
- Increased and encouraged students to open source GIS data;
- Improved student attitudes towards blended vs online learning;
- Created new opportunities offering new geospatial and educational content to our planning students and beyond;
- Created new revenue streams for the faculty by offering this course as a short CPD course (this is still in process), targeting students from Industry and government sectors.

Other impact which this project made were the use of the new content by other lecturer and course conveners. For example, the content was used by lecturer from the Planning Programme, landscape and design to support specific cases where GIS was required for a specific task either by students or lecturers. We believe that setting a course which is fully open source based on open source data makes it more accessible and therefore widely used. In addition, we made a progress in converting and offering this course as a CPD micro credentials workshop in collaboration with the Australian Institute of Planning. In the near future, we will also create a GeoHub, an online platform similar to this [example](#) where all the lectures, tutorials, data and our new content is hosted. This will substantially expand the use of our course content and positively increase our impact. Finally, we believe that the outcomes from this project met most of the objectives, or in advance progress to do so.

2. Outcomes and impact

This SEIF project aimed to develop an open source GIS course in which its content developed in a blended manner, so it is available or accessible to both face-to-face or self-pace online micro-credential courses etc. In line of the expected deliverables, the following GIS modules have been developed:

- Thirteen new tutorials / modules of QGIS (see also Table 1)

Table 1. List of new QGIS tutorials

Number	Topic of the tutorial
1	Introduction to QGIS (using Air B& B data)
2	Classification, layout design and mapping
3	Data manipulation (Part A) - Digitizing map data
4	Data manipulation (Part A)- Understanding spatial reference systems and working with projections
5	Data manipulation (Part A) - Reclassifying data
6	Data manipulation (Part A) - Working with terrain data
7	Data manipulation (part B) Georeferencing
8	Data manipulation (part B) - Performing spatial queries
9	Classification methods
10	Spatial cluster analysis and creating heat maps and spatial interaction
11	Point data pattern analysis and Interpolation
12	Geoprocessing and overlay analysis
13	Multi-criteria evaluation / Weighted overlay tool

- Six new videos (See also Figures 1 and 2) of short lectures and tutorials currently hosted in the **UNSW Box platform** which offer students supplementary content. The following is an

example of one of the introductory videos I have created for the course:

<https://thebox.unsw.edu.au/4E9C2EC0-872C-11E9-83D69ACCE0A4888F>

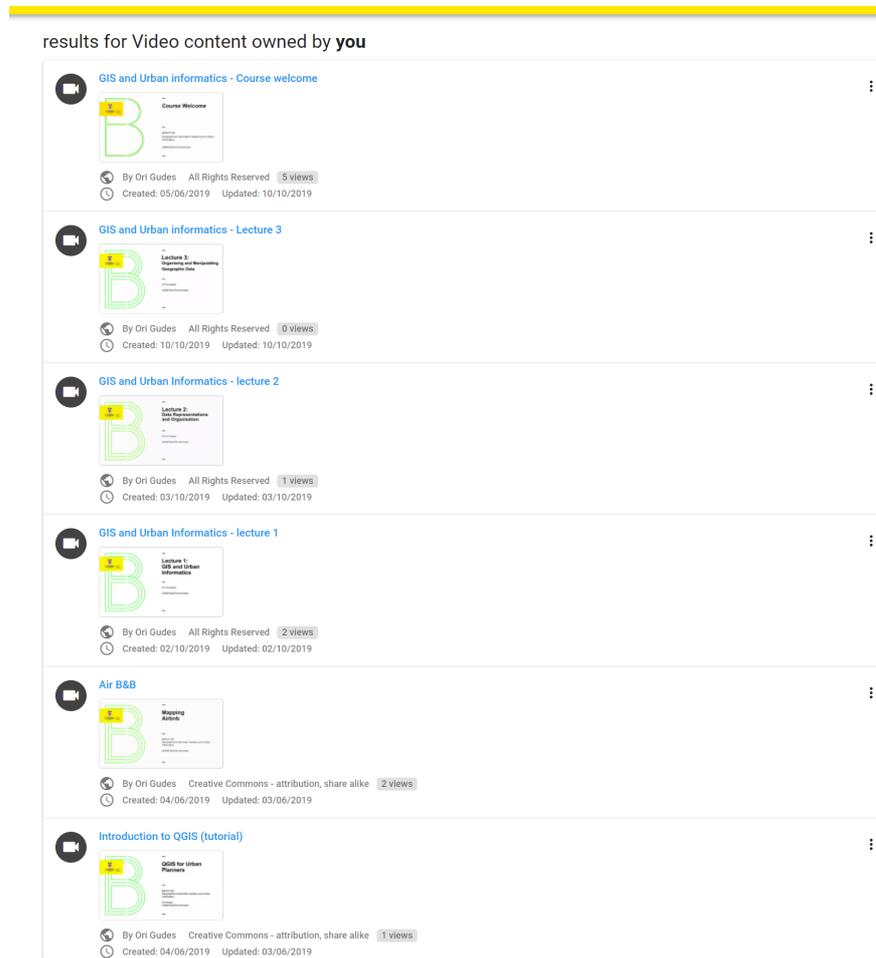


Figure 1. Example of the video's gallery developed in this project



Figure 2. Example of one of the videos which has been developed

- Evaluation survey which measured the impact made in this project.

To assess the impact of the SEIF project on students and learners, we have also developed an accompanied evaluation study (online survey) which was circulated to our students who used the new content. *New frontiers in learning GIS for urban planners in an open environment* (ethics approval reference: HC190701)

2. Dissemination strategies and outputs

Thus far, we relied on internally promotion activities within the Built Environment faculty. However, In the near future, this course will also be offered through peak industry bodies across Australia (Planning Institute of Australia, Australian Institute of Landscape Architects, and the Surveying Spatial Sciences Institute), and to prospective students during national and international open days. For example, UNSW International Opens days (e.g. in China, India, Indonesia) use lectures and short workshops as part of the recruitment process or promotion to this online course. Also, the course will be prompted through the PluS Alliance with collaboration of Arizona State University and City College, London. Specifically, discussions are underway with TEDI to offer the Airbnb module on GIS and disruptive technology as a module. Also, opportunities to offer online content into the India market is being explored through the MOU with the Pune Smart Cities Development Corporation. In all of these initiatives, outcomes from this project will play an important role.

3. Evaluation of project outcomes

In conclusion of the GIS and Urban Informatics course in 2019, in which content from this project was used, we have circulated an online survey to the students. The aim was to have better understanding about the impact made through this project on new learners and students. This study was titled: *New frontiers in learning GIS for urban planners in an open environment* (ethics approval reference: HC190701). The findings from this study showed the learning impact we have made (See also Table 2). The findings suggested that between 85% to 99% of students agreed or strongly agreed that the use of open source tools and dataset was very helpful and made the course more accessible. For example, with regards to the use of open source tools and data, some students expressed the following: *'interactive, easily accessible'* and *'It was very useful'*. *'This means everyone can do spatial design without the need to pay, I am using QGIS a lot now on my own'*. The online survey was valuable in providing evidence about the learning impact this project has made (See also Table 2).

Table 2. Online survey findings

	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE	TOTAL	WEIGHTED AVERAGE
The online interactive tools were useful to my understanding of the material taught in class.	42.86% 6	35.71% 5	21.43% 3	0.00% 0	0.00% 0	14	1.79
The online interactive tools helped me to engage in class.	35.71% 5	42.86% 6	21.43% 3	0.00% 0	0.00% 0	14	1.86
The online interactive tools increased my motivation in the subject.	42.86% 6	42.86% 6	14.29% 2	0.00% 0	0.00% 0	14	1.71
The online interactive tools increase my motivation to learn in class.	42.86% 6	35.71% 5	21.43% 3	0.00% 0	0.00% 0	14	1.79
Using open source tool in class (QGIS), was very helpful	64.29% 9	35.71% 5	0.00% 0	0.00% 0	0.00% 0	14	1.36
Using open source GIS data in class made the tutorials more accessible.	57.14% 8	28.57% 4	14.29% 2	0.00% 0	0.00% 0	14	1.57

In summary, by making use of online content, including the creation of tailored short video lectures and creating new tutorials we were able to provide students with flexible, accessible and relevant content and learning environment. Also, we have expanded the potential of GIS teaching and the faculty streams of revenue by creating new GIS course which is based on open source tools ([QGIS](#)), open data and can be offered in the near future as a short CPD course targeting students from other sectors. This not only engages students in the nations level, but it has the potential to engage the global community posing Built Environment faculty and the University as a leader in this field. Also, in the future, this course can be an exemplary and can be replicated across range of other courses offered in the Built Environment discipline.