

Teaching from the Whole to the Part

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Invited Presentation

“Working from the whole to the part” is a fundamental principle in surveying and an oft-repeated mantra in surveying education. At Otago, we are using this principle to transform a first-year catch-all/catch-up Computational Methods for Surveyors into a paper on Geospatial Science that addresses the same diverse student needs in framework more closely aligned with our disciplinary ambitions.

Surveyors work from the whole to the part because refining inward from a well- defined control allows errors to be distributed in sensible ways. Teaching from the whole to the part has similar advantages. As a class, we move from what we know to what we need to learn in a way that is intended to provide rationale for new material. There are many entry points for students to bring their own past experience to the classroom activity. The approach also emphasizes organized work habits in a style that can be applied in a variety of settings.

We face two challenges in teaching this way. The first is to meet the needs of students who arrive with different high school preparation and who depart into different degree programmes within the School. The second is that our students arrive as masters of the parts. They can recollect great lists of formulae attached to specific problems, but struggle to pull out the right assortment to meet the needs of novel situations. “I just don’t know where to begin” is a common statement. There is good reason for the confusion—how can you know where to lay the foundation stones if you don’t first know how tall the pyramid must be? And how can you know that you need to start with the height if you don’t really understand what the tangent function says?

In this talk, our approach to first year Geospatial Science is presented by example and discussed in the context of our degree programmes.