



Creating models and simulations of real world phenomena by defining attributes for a phenomenon

Theodosia Prodromou *

University of New England, Australia – Theodosia.prodromou@une.edu.au

This paper highlights how students may develop new practices when using a variety of digital tools for creating models and simulations of real world phenomena by defining attributes for a phenomenon that can be measured. When applying a probability model to a real world situation, we conceive of that model as including a random process governed by a theoretical density distribution, and that data is sampled from this distribution. In this paper, the visualizations used when generating empirical sampling distributions of model parameters to assist model test and revision dynamically link the sampling process with the development of an empirical distribution. We present and discuss several examples along with conceptual and mathematical ideas that support the use of specific visualizations and aspects of modelling for fostering the development of students' robust knowledge of the logic of inference when using computer-based simulations to model and investigate connections between real contexts and data, and probability distributions. This paper further discusses how the big data era brings challenges and opportunities to the modelling and simulation field associated with big data.

Keywords: Models, simulations; data exploration; big data.