Putting the Philosophy of Modeling to Work for Learning Analytics

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Why Are We Here Today? (1/1)
To build awareness about a scientifically catalytic link.

1. Establish a productive link between learning analytics and philosophy

Outline recent questions and developments around the philosophy of modeling and simulation

3. Suggest ways that learning analytics research can be enhanced by and also contribute to philosophical debates going forward
Why Now? (1/3)
Because of increased learning datafication & digitization.
Why Now? (2/3)
Because learning analytics are coming under scrutiny.

**Algorithmic Bias + Scale = Good Society?**
(O’Neill, 2016)

**Datafication + Digitization = Good Governance?**
(Williamson, 2017)

**Machines + Complexity = Good Science?**
(Luckin, 2018)
Why Now? (3/3)
Because learning scientists are actively reflecting.

Why Theory Matters More than Ever in the Age of Big Data
Alyssa Friend Wise
Simon Fraser University, Canada
alyssa.wise@sfu.ca
David Williamson Shaffer
University of Wisconsin, Madison, USA
(Wise & Shaffer, 2015)

Complex Systems in Education: Scientific and Educational Importance and Implications for the Learning Sciences
Michael J. Jacobson & Uri Wilensky
(Jacobson & Wilensky, 2006)

Envisioning a Learning Analytics for the Learning Sciences
Alyssa Friend Wise, New York University, alyssa.wise@nyu.edu
Yi Cui, New York University, yc65@nyu.edu
(Wise & Cui, 2018)

Does “learning” exist?
Ray McDermott*
(McDermott, 2015)

Ontological Innovation and the Role of Theory in Design Experiments
Andrea A. diSessa & Paul Cobb
(disessa & Cobb, 2004)
Why Look To Philosophy? (1/3)
Because learning technologies embody philosophies.

(Sandoval & Reiser, 2004)

(Sandoval, 2004)
Why Look To Philosophy? (2/3)
Because learning analytics embody philosophies.

(Knight, Shibani, & Buckingham Shum, 2018)
Why Look To Philosophy? (3/3)
Because learning research/studies embody philosophies.

researching, facilitating, capturing learning inherently requires philosophical stances

(Knight, Buckingham Shum, & Littleton, 2014)
(Boaler, 2002)
They scrutinize language & practice, at times for scientists.

<table>
<thead>
<tr>
<th>Complex Phenomena</th>
<th>Computer Simulations</th>
<th>Non-Epistemic Values</th>
<th>Model-Based Simulations</th>
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</thead>
<tbody>
<tr>
<td><strong>How do we model and build science with them?</strong></td>
<td><strong>What is their epistemic nature and import?</strong></td>
<td><strong>How do they inform the modeling process?</strong></td>
<td><strong>How do scientists build and use them?</strong></td>
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What Is A Model? (1/2)
Model = (representational) structure + interpretation

(Weisberg, 2013)
How do we proceed when our target system is unobservable?
How do we proceed without consensus about the nature of our target system?
How do we proceed when we do not have a minimal viable simulation system?
How Do Scientists Build Models? (1/3)

Ideally, in a linear, proceed-and-check manner.

(Winsberg, 2010)
How Do Scientists Build Models? (2/3)
Actually, in an iterative, multi-dimensional manner.

(Winsberg, 2010)
How Do Scientists Build Models? (3/3)
Actually, in an iterative, multi-dimensional manner.

What is the equivalent of “physical intuition” for learning analytics?
Does this process match the modeling in current learning analytics?

(Winsberg, 2010)
“The philosophy of education is a source of the science of education, but one less often recognized as such. We are, I think, habituated to thinking of the sciences as feeders of philosophy rather than of philosophy as a source of science.”

(Dewey, 1929, p. 51)
What Kind of Future Do We Want To Build? (2/3)
Because we are all working with & within philosophy.

We Embody It

We Use It

We Change It

Because we are all working with & within philosophy.

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(Sandoval, 2004) (Knight, Buckingham Shum, & Littleton, 2014) (Muis & Duffy, 2013)
What Kind of Future Do We Want To Build? (3/3)
Because it is our choice to engage with philosophy.

1. Meet a philosopher of science or an epistemologist. You might be pleasantly surprised!

2. Converse with the philosophical critical analyses of computational modeling. You might be productively inspired!

Invent means to capture learning
Build technologies for research / learning
Conduct studies to find constructs
Suggest new ideas for practice

Precisify entangled terminology
Relate to questions of philosophy
Dis-entangle and create concepts
Suggest new ideas for practice

Because it is our choice to engage with philosophy.

Meet a philosopher of science or an epistemologist. You might be pleasantly surprised!

Converse with the philosophical critical analyses of computational modeling. You might be productively inspired!
Productive Science = Practice + Philosophy

Thank You

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References (1/1)

All those we are grateful for.


