Testing is Learning
Re-assessing “Assessment” in Higher Education Today

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Background

* Assessments are normally employed as tools to assess learning (Roediger & Karpicke, 2006).

* The concept of assessment has a negative reputation (Foong, 2008; Wittmaier, 1972).

* The testing effect (e.g., Carrier & Pashler, 1992; Chan, McDermott, & Roediger, 2006; Wheeler & Roediger, 1992).
Background

* Repeated testing produces **more learning than** elaborative studying with concept mapping (Karpicke & Blunt, *Science*, 2011):
Study 1 (Lim et al., under review)

*Testing promotes learning of psychological research and statistical concepts*

• Four challenges to teaching and learning psychological research and statistical concepts (Connors et al., 1998):
  1) Lack of interest, curiosity, and motivation
  2) Math anxiety
  3) Large performance extremes
  4) Long-lasting learning

• Use of brief tests after statistics lectures boosted examination performance (Lyle & Crawford, 2011).
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Study 1 (Lim et al., under review)

• 65 undergraduate students
• 2 x 2 between-subjects design
Study 2 (Yong & Lim, invited revision)

*Testing promotes learning of video lectures*

• Online education is rapidly gaining grounds today.

• Online learning technologies have evolved to include: virtual learning environments, electronic books, virtual simulations, podcasts, webcasts, video media, online blogs, etc. (see, e.g., Kim & Bonk, 2006).
Study 2 (Yong & Lim, invited revision)

- 131 undergraduate students
- 3 x 2 between-subjects design
Study 3 (Ng & Lim, to submit)

*Testing promotes learning of non-verbatim educational materials*

• Many tests in contemporary education require students to not just recall verbatim material, but to also apply previously learned concepts to solve novel problems.
A hypothesis is a prediction intended to be tested in a research study. Suppose the following hypothesis-testing scenario:

**Does drinking coffee enable sportsmen to sprint faster?**

There are three main steps to take in hypothesis testing:

Step 1:
We restate the question as a research hypothesis and a null hypothesis about the populations.

The populations are defined as follows:

Population 1: Sportsmen who drank coffee.
Population 2: Sportsmen who didn’t drink coffee.

The goal is to discover whether the sprinting performance of sportsmen who consumed coffee is superior to the performance of sportsmen who did not consume coffee.

The research and null hypotheses, written in symbols, are as follows:

Research hypothesis: \( \mu_1 < \mu_2 \)
Null hypothesis: \( \mu_1 = \mu_2 \)

**Does drinking milk before one sleeps enhance sleep quality?**
Study 3 (Ng & Lim, to submit)

- 59 undergraduate students
- 2 x 2 between-subjects design
Discussion

*Testing is learning

- How may educators re-position assessments as learning opportunities?