# Research Rigor:

## Conducting Pedagogy Research (in the Online Environment)

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Table 1
*Summary of Exemplars of Gold Standards in SoTL Research*

| Gold standard | Main characteristic | Exemplar |
|---|---|---|
| Theory based | Bases work on developed theories and past research. | Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013; Troisi (2015) |
| Longitudinal design | Measures participants over time with good response rates and tracks change scores. | Buch & Spaulding (2011); Kernahan & Davis (2010) |
| True experimental design | Random assignment with double-blind procedures. | Balch (2012); Legg & Wilson (2009); Poonati & Amadio (2010) |
| Large sample sizes | Has high statistical power. | Thompson & Fisher-Thompson (2013); Troisi (2014); Warren (2006) |
| Diverse samples | Samples taken from more than one institution with some diversity. | Gurung, Daniel, & Landrum (2012); Homa et al. (2013); Howell, Collisson, & King (2014); Troisi, Leder, Stiegler-Balfour, Fleck, & Good (2015) |
| Advanced statistical techniques | Proper data screening; appropriate advanced (often multivariate) statistical analyses. | Preckel et al. (2013); Renken, McMahan, & Nitkova (2015); Rogers (2015) |
| High standard of ethics | Students not coerced into participating, confidentially maintained; just access to benefits to all participants. | Franz & Spitzer (2006); Funk & Dickson (2011); Ocker & Yaverbaum (1999) |
| Mixed-method approach | Using both qualitative and quantitative data analyzed appropriately. | Bridges, Harnish, & Sillman (2012); Knott, Mak, & Neill (2013); Martin (2015) |

*Note.* The list of gold standards is from Wilson-Doenges and Gurung (2013). SoTL = scholarship of teaching and learning.

*Source*: Wilson-Doenges, G., Troisi, J. D., & Bartsch, R. A. (2016). Exemplars of the gold standard in SoTL for psychology. *Scholarship of Teaching and Learning in Psychology, 2*(1), 1–12. https://doi.org/10.1037/stl0000050

# Common roadblocks in pedagogy research and possible solutions… from our experiences

1. IRB
2. Ethics
3. Data Collection
4. Design
5. Measurement
6. Dissemination

# IRB Roadblocks + Solutions

# The Roadblock

Based on prior lab work demonstrating that learning can increase motivation to learn (Ditta et al., 2020), Dr. Ditta wants to see if a similar effect happens in an actual classroom. She plans to collect data on motivation to learn from students in her Intro Psych course. She needs to obtain IRB approval for the study before the quarter begins in order to collect pre-course motivation data on Day 1 of the class.

Students in your class may feel coerced into participating in your study if you are the person acquiring their informed consent AND the one in charge of their grade in the class--how to prevent this?

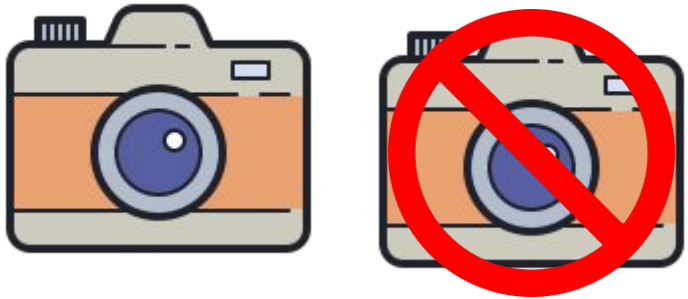
# Possible Solution: Double Up

- Ask an RA/graduate student from your lab to come to your class & introduce the study/consent participants
  - You can leave the room while this happens
  - Assistant can hold onto the consent forms until after the course is over
- Can also ask a TA to consent the participants
- Reiterate (multiple times) that participating will have no negative impact on your grade

# The Roadblock

Drs. Ditta (UCR), Soares (Mississippi State) & Storm (UCSC) are interested in the effect of taking photos of lecture slides on memory for content presented in the lecture. They create an online “lab” study to simulate a lecture, but maintain control over which slides participants take photos of.

How does one obtain IRB approval for this cross-university collaboration?



# Potential Solution: Know Your IRB Options

- Local IRB: Each institution has its own IRB protocol

- Reliant IRB: Can have 1 IRB from 1 institution & the other institutions are “reliant” on that IRB, which covers procedures for data collection at all locations
  - UCOP info on types of reliance can be found HERE
  - UC Reliance Registry can be found HERE

# The Roadblock

Dr. Albada studies the reasons why people share autobiographical stories in everyday life (Bluck & Alea, 2011). As part of her Adult Development and Aging course in Spring 2020, students were required to use online discussion forums to link course material (e.g., age-related changes in attention) with older adults' everyday life (e.g., driving regulations). As she was reading these weekly posts, she noticed that students were *spontaneously* sharing personal stories, and now she wanted to use the data to code for the functions of autobiographical stories in the students' posts.

The data for the project emerged during the course. Thus, she did not obtain IRB approval before the course began.

**Student A**
*I also really like the aging and diversity statistics that you found! It gave me hope for a better future for those of us who are minorities and for our older elders who are being forgotten. I wanted to share a story myself to see if anyone else can relate as well! I feel like there is a huge lack of resources for our minority groups, especially for those who are elderly. My grandmother always needs my siblings or I to go with her to any doctor's appointment/ check-ups because most of the physicians are white and do not speak her native language thus a translator is needed. The language barrier is something that I don't hear talked about often and I feel that this is something that this generation can fix for the future....*

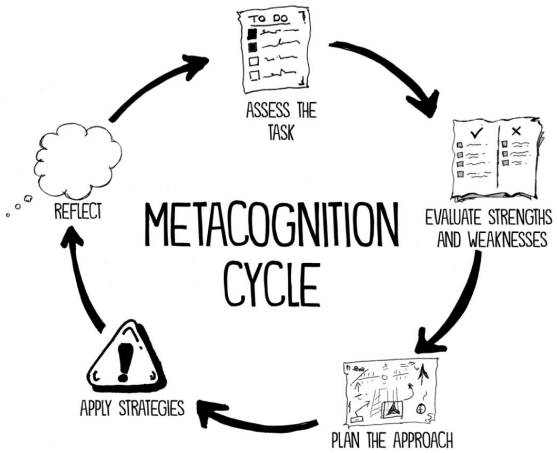
# Possible Solution: Post-hoc IRB Approval

- You can get IRB approval to use course-related data after-the-fact
  - Easier to do if the data are anonymous

# Ethical Roadblocks + Solutions

# The Roadblock

In Dr. Saundra McGuire's book, *Teach Students How to Learn* (2015), she talks about the importance of teaching students metacognitive study skills. Her book outlines several anecdotal examples of students turning around their failing early exam scores into great successes (e.g., mid-to-high A's)! Dr. Ditta plans to teach these concepts to her PSYC 001 class this year & wants to measure the impact.

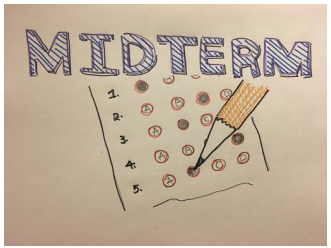



If such large jumps in course grades are expected from a teaching intervention, it may be unethical to utilize a no-treatment control-group design, since students without the treatment (teaching intervention) might end up with lower grades.

# Possible Solution: Timing of Intervention

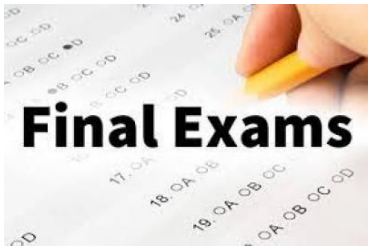
- Give the treatment to everyone in the class, but be strategic about when in the course you implement it

Pretest




Intervention

Posttest



# Possible Solution: Control Constructs

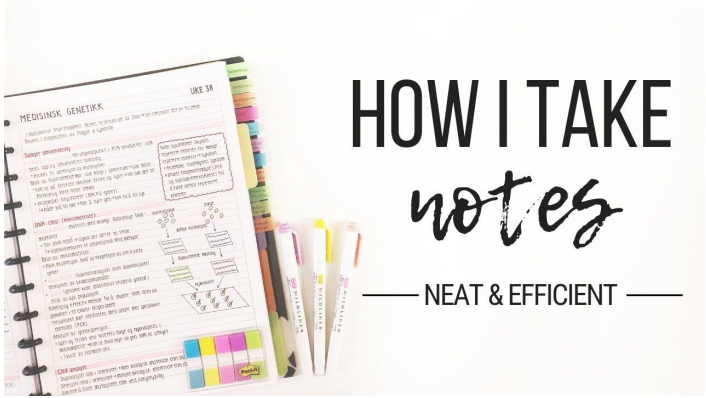
- Control constructs in a pretest/posttest design (McKillup, 1992)
  - Administer the teaching intervention to everyone in the class, but measure 2 outcome variables: 1 you expect to change because of the intervention and 1 you do not
    - e.g., final exam grade vs. extrinsic motivation


# Data Collection Roadblocks + Solutions

# The Roadblocks

Dr. Ditta's postbac student, Jaron, wants to understand ways to effectively help students learn from video lectures. He designs a video lesson and provides half of the participants with evidence-based, explicit instruction regarding how best to interact with the lecture video, while the other half receives no such instruction. All participants then take a test on the video content. Dr. Ditta does not have funds to pay participants on mTurk, so Jaron has to use the campus participant pool (SONA).

- How can we ensure that identifying information remains protected when we have to link participants across multiple websites in order to credit them?
- How can we collect high-quality data without bringing participants into the lab?



# Potential Solution: Automate & De-identify

- Can set up your SONA study to link with Qualtrics automatically: Instructions HERE
  - Will automatically grant credit upon completion

- Can list participants by a unique identifier so you never even have to know who your participants are

- But beware of Qualtrics collecting IP addresses

# Potential Solution: Restrict & Prompt

- Without running them synchronously online & sharing screens, you can't really be sure that they're doing the task properly

- If running your study totally asynchronously, you can…

    - Restrict their ability to advance through the slides until a certain amount of time has passed

    - Add in "check" questions
        - e.g., "Did you use anything to help you take the final test other than your brain?"

# Design Roadblocks + Solutions

# The Roadblock

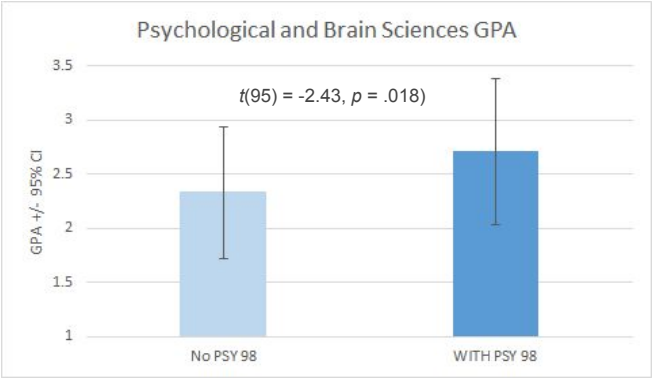
Dr. Woods designed a course for transfer students (PSY 98). The purpose was to increase transfer students' confidence and efficacy regarding reading and writing about primary literature in Psychology, and thus presumably enhance their academic outcomes (e.g., GPA). She wanted to know whether the course served its intended purpose.

Students cannot be randomly assigned to courses, so if we implement a teaching strategy at the course level, how can we know if it was successful?

# Possible Solution: Propensity Score Matching (Austin, 2011)

- Form a matched set of “untreated” participants who share a similar value on a ***propensity score***, which is the probability of treatment assignment depending on baseline covariates

  - In Dr. Wood’s case, the “treatment” was taking the transfer student course, and the propensity score was the probability (1:1) that students would enroll in her transfer student course based on covariates, such as first year GPA, first generation status, gender, race, cohort year, etc.
  - The matched control group was created using all other transfer students in the the major who had the propensity to take the course based on the covariates, but did not




Thanks to Steven Velasco (UCSB IR) for conducting analyses

You can get access to institutional data, with IRB approval

# Measurement Roadblock + Solution

# The Roadblock

Dr. Geller is planning to investigate the effect of placing knowledge-check questions at different points in video lectures (e.g., before vs. after the video) on learning of the course material. To measure learning, she plans to examine final grades in the course as one of her measures.

Final grades can be very difficult to move, as they are affected by many factors aside from your intervention. Also, final grades tend to be inflated in online courses.

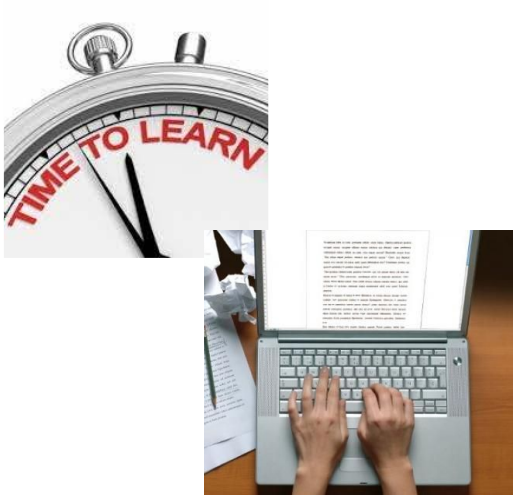
# Possible Solution: Proximal Measures

- Add measures that are more directly related to your teaching intervention
  - e.g., quizzes on material covered in the lecture video rather than (or in addition to) final grade (which Dr. Geller plans to do!)


- Can still include more distal measurements, but make sure you have proximal ones as well

# Possible Solution: Sensitive Measures

- Use measures that tend to be more sensitive
    - University's Learning Management Systems (e.g., Moodle, Blackboard, Canvas) might have a number of *time* variables (e.g., seconds left before an assignment was turned in, time it took to finish a quiz, etc.)
    - Use narrative or qualitative analyses of students' written work as outcome variables (e.g., Linguistic Inquiry Word Count)

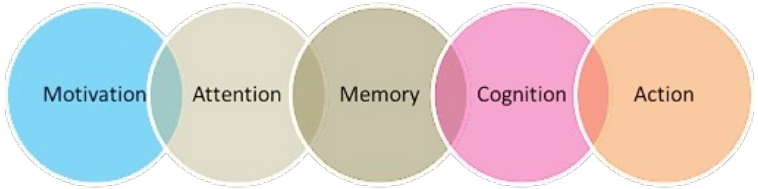


# Dissemination Roadblocks + Solutions

# The Roadblock

When all of the aforementioned work is completed… we need to submit it for publication!

Should it be submitted to a discipline-specific outlet or a Scholarship of Teaching & Learning (SoTL) outlet?

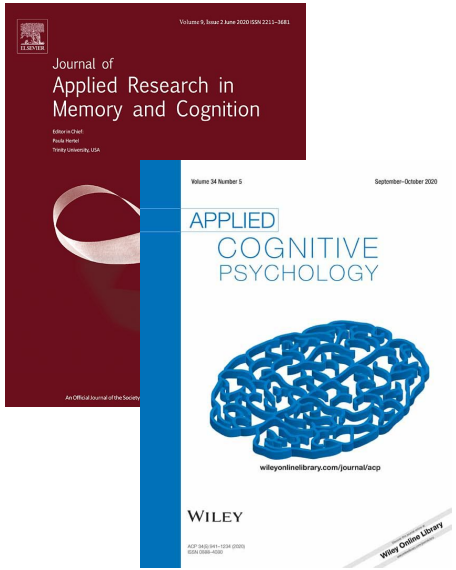



# Potential Considerations for Your Solution

- Might depend on the rigorousness your methodology (e.g., control group, multiple studies, multiple institutions)
- Who is your intended audience, or who might find the work most useful?
- Consider the potential for your work to start a new line of thinking in an area (i.e., can you be the expert?)
- Are you aiming to directly impact student learning, SoTL theory, discipline-specific theory?
- Does it matter for your career? (e.g., impact factor of journals)
- Where was research you cited published?
- What have these journals published in the past?
- Is this time-sensitive?

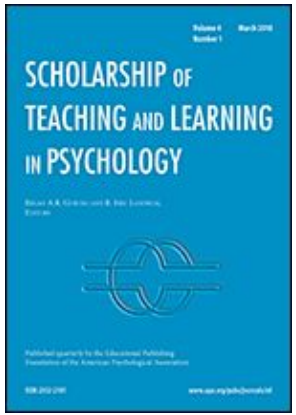
# Possible Journals

## Discipline-specific





## SoTL-specific





List of SoTL Journals by Discipline

# Possible Conferences

## Discipline-specific

61st Annual Meeting • November 19-21, 2020
VIRTUAL PSYCHONOMICS


AERA
FOUNDED 1916
AMERICAN EDUCATIONAL RESEARCH ASSOCIATION

## SoTL-specific

nitop
NATIONAL INSTITUTE ON THE TEACHING OF PSYCHOLOGY

SOCIETY FOR THE TEACHING OF PSYCHOLOGY
Division Two of the American Psychological Association
STP's 19th Annual Conference on Teaching (ACT)

# In sum: (Online)Pedagogy/SoTL research can be challenging...

## but it is a worthy endeavor!

1. IRB - double up, IRB options, post-hoc IRB approval
2. Ethics - timing of intervention, control constructs
3. Data Collection - automate & de-identify, restrict & prompt
4. Design - propensity score with institutional data
5. Measurement - proximal measures, sensitive measures
6. Dissemination - discipline-specific and SoTL outlets

Any Questions, Roadblocks, Solutions?

# References & Resources


Austin, P. C. (2011). An introduction to propensity score methods for reducing the effects of confounding in observational studies. *Multivariate Behavioral Research*, *46*, 399–424. doi: 10.1080/00273171.2011.568786

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Ditta, A. S., Strickland-Hughes, C. M., Cheung, C., & Wu, R. (2020). Exposure to information increases motivation to learn more. *Learning and Motivation*, *72*, 101668.

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McKillup, J. (1992). Research without control groups: A control construct design. In F. B. Bryant, J. Edwards, R. S. Tindale, E. J. Posavac, L. Heath, E. Henderson-King, & Y. Suarez-Balcazar (Eds.), *Methodological issues in applied social psychology* (pp. 159-175). Springer Science & Business Media.

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IRB Information:
https://www.ucop.edu/research-policy-analysis-coordination/policies-guidance/human-subjects/single-irb-reliance.html
https://irbreliance.ucop.edu/

How to Link Qualtrics + SONA to Automatically Grant Credit:
https://www.sona-systems.com/help/qualtrics.aspx

# Poster Session Q & A Guidelines

- There will be 7 minutes for each presenter to answer questions about their work (they will not be summarizing the work--check it out on Piazza!)

- **For Attendees:** If you are interested in asking a presenter a question, but did not post it ahead of time to Piazza, submit it to the Zoom Q&A during that specific presentation

- **For Presenters:** Annie & Nicole will moderate the Q&A
  - We will read questions aloud to you
  - We will unmute the presenter so that they can answer the question
  - You will be seen while answering questions, so please enable video or put up a picture of yourself