Perusall in a Graduate Student TA-training & Professional Development Course

B. Toggerson

Perusall Exchange 2021

http://physedgroup.umasscreate.net/

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Perusall®

About Pricing Stories Research Blog Webinar Exchange Support Log in

Research & Patents

Publications about the Perusall Platform

- Miller, K., Lukoff, B., King, G., & Mazur, E. (2018). Use of a Social Annotation Platform for Pre-Class Reading Assignments in a Flipped Introductory Physics Class. *Frontiers in Education, 2018*(3).
- Biro, S. (2021). Reading in a Time of Crisis: Using Perusall to Facilitate Close Reading and Active Discussion in the Remote Philosophy Classroom. *Teaching Philosophy*.
- Adams, B. & Wilson, N. S. (2020). Building Community in Asynchronous Online Higher Education Courses Through Collaborative Annotation. *Journal of Educational Technology Systems 49*(2).
- Cecchinato, G., & Foschi, L. C. (2020). Perusall: University learning-teaching innovation employing social annotation and machine learning. *Qwerty: Open and Interdisciplinary Journal of Technology, Culture and Education, 15*(2).
- McFarlin, T. J. (2020). Using Open-Source, Collaborative Online Reading to Teach Property, *St. Louis University Law Journal, 64*(355).
- Woodward, J. & Neunaber, E. (2020). Perusall: Digital Active Annotation Tool in ESL Reading Classes. *Instructional Forum, 34*(1).
- Walker, A. S. (2019). Perusall: Harnessing AI Robo-Tools and Writing Analytics to Improve Student Learning and Increase Instructor Efficiency, *The Journal of Writing Analytics* Vol. 3.
- Clarke, A. (2019). Perusall: Social learning platform for reading and annotating (perusall LLC, perusall.com), *Journal of Political Science Education*, DOI: 10.1080/15512169.2019.1649151.
- Suhre, C.J.M., Winnips, J.C., de Boer, V., Valdivia, P., & Beldhuis, H.J.A. (2019). Students' experiences with the use of a social annotation tool to improve learning in flipped classrooms. *5th International Conference on Higher Education Advances (HEAd'19).*
- Lee, S.C. & Yeong, F.M. (2018). Fostering student engagement using online, collaborative reading assignments mediated by Perusall. *The Asia-Pacific Scholar, 3*(3).
- Liberatore, M. W. (2017). Annotations and Discussions of Textbooks and Papers Using a Web-based System. Paper presented at 2017 ASEE Annual Conference & Exposition, Columbus, Ohio.

We are interested in using Perusall not only for content, but also for the professional development *skill* of *how* to read scientific papers

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- Miller, K., Lukoff, B., King, G., & Mazur, E. (2018). Use of a Social Annotation Platform for Pre-Class Flipped Introductory Physics Class. *Frontiers in Education, 2018*(3).
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About the impact of Perusall in building community

Perusall used for helping to teach *content*.

About our 1-credit seminar for first-semester Ph.D. students

Professional Development

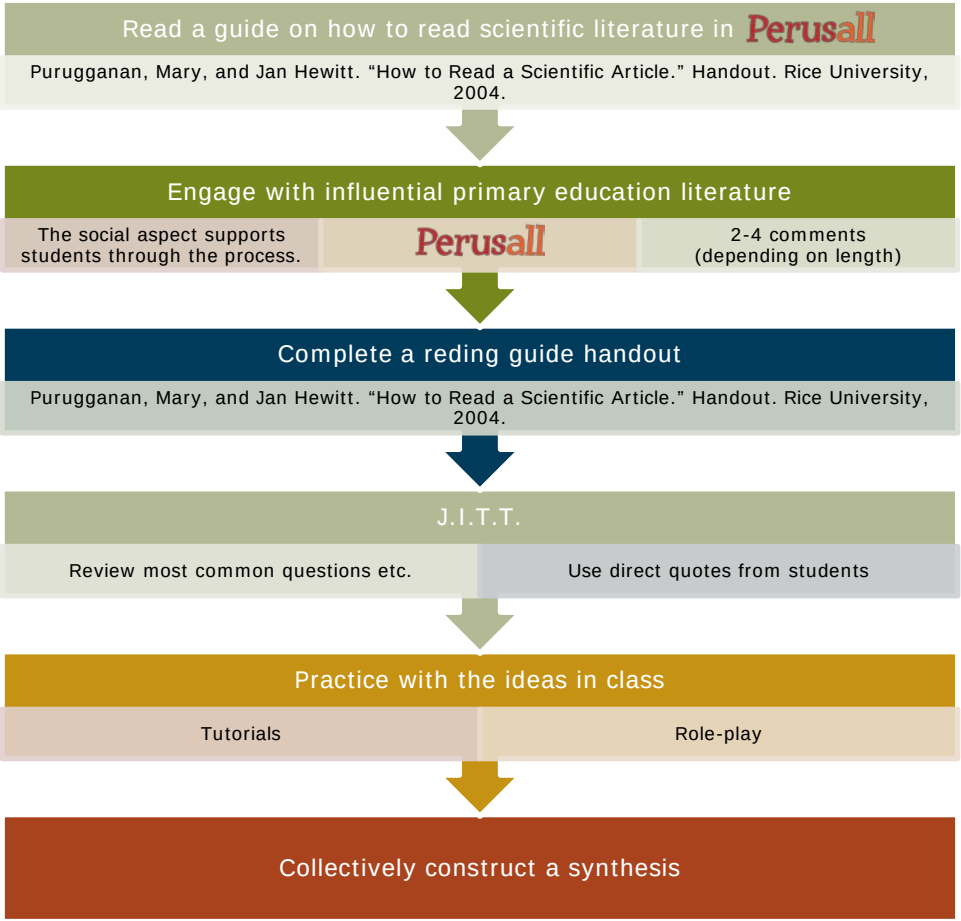
- Dealing with transitions in personal identity: from student to researcher/colleague/expert.
- Recognizing issues of power and diversity.
- Learning to read research.
- Developing an understanding of research-based teaching skills
- Cultivating presentation skills.

Professional Development through TA Training

- They have a new expert identity as TAs.
- Issues of diversity and equity are often salient in the classroom.
- Read papers on physics education.
- Teaching is all about presentation and provides an effective way to practice.

TA Training

Overview of how we achieve these goals



- Chi, Michelene T. H., Paul J. Feltovich, and Robert Glaser. "Categorization and Representation of Physics Problems by Experts and Novices*." *Cognitive Science* 5, no. 2 (April 1, 1981): 121–52. https://doi.org/10.1207/s15516709cog0502_2.
- Edward Prather. "Are You Really Teaching If No One Is Learning?" Colloquium presented at the Science, mathematics, and comptuer education colloquium, University of Nebraska, Lincoln, September 25, 2009. https://youtu.be/NCUyIh3PssI.
- H[illegible]
- Peter C. Brown, Henry L. Roediger III, and Mark A. McDaniel. *Make It Stick: The Science of Successful Learning*. Cambridge, MA: Bleknap Press, 2014.
- Tuminaro, Jonathan, and Edward F. Redish. "Elements of a Cognitive Model of Physics Problem Solving: Epistemic Games." *Physical Review Special Topics - Physics Education Research* 3, no. 2 (July 6, 2007): 020101. https://doi.org/10.1103/PhysRevSTPER.3.020101.

When to jump in and help students?

Reading in Perusall – Tuminaro and Redish

Perusall® > PHYS 691G Fall 2018 > Tuminaro and E. F. Redish, "Elements of a cognitive model of physics problem solving: Epistemic games," P... Page 8 All comments Help Brokk Toggerson

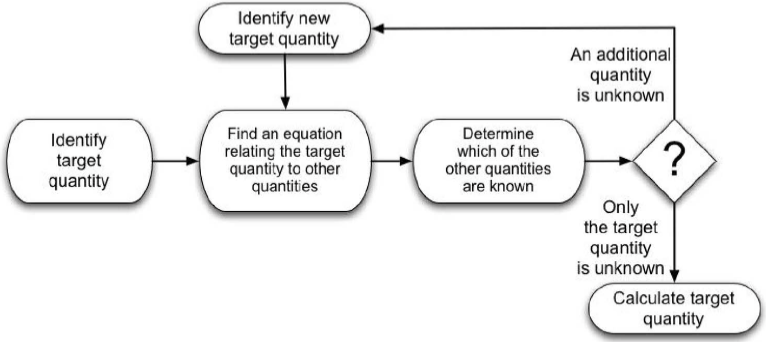


FIG. 5. Schematic diagram of some moves in the epistemic game Recursive Plug-and-Chug.

tive resources (such as intuitive mathematics knowledge, reasoning primitives, symbolic forms, and interpretive devices) are usually not active during this game.

The epistemic form in Recursive Plug-and-Chug is similar or even identical to that in Mapping Meaning to Mathematics and Mapping Mathematics to Meaning. Each game has physics equations as part of the epistemic form, but the resources that are active (i.e., knowledge base) are different. The rules and strategies that are employed in Recursive Plug-

Because students use the symbolism in this game without conceptual meaning, usually only resources associated with the syntactic structure of equations are active during this game. The solution pattern of the target example serves as the epistemic form for the Transliteration to Mathematics game.

The moves in this game are as follows: (1) identify a target quantity, (2) find a solution pattern that relates to the current problem situation, (3) map quantities in the current

Current conversation

Earlier (bottom of page 5, left hand column) they made the claim that it is not just important what moves are included in the game but also which moves are excluded, but didn't qualify that statement. I understand what they mean now. I also think this is important to consider when writing problems or when helping students with problems - by either creating problems such that using this e-game and the following one, Transliteration to Mathematics, is disincentivized or impossible, or by pointing out to students that they are following this path of thought without following the physics and subsequently helping them get back on track by following the moves of another e-game.

Oct 3 3:00 pm

This is something I personally struggle with in teaching 132 Labs - I find it very difficult to help students out of the "recursive plug and chug" e-game and into an e-game that invokes those higher-order cognitive resources. Just pointing it out doesn't work, and once they have "plugged-and-chugged" successfully, they (understandably) generally don't have too much incentive to re-engage with the problem. I suppose that could be mitigated by cleverer problem-writing, but there's only so much that can be done in some situations.

Oct 3 9:01 pm

I agree with [redacted] in that oftentimes, students learn throughout high school to plug and chug. Their entire science education might consist of them being handed a sheet of equations to use, and they just learn when to use which equation and don't learn much

Reading Guide - Purugganan, Mary, and Jan Hewitt. “How to Read a Scientific Article.” Handout. Rice University, 2004.

Template for Taking Notes on Research Articles:
Easy access for later use

Whenever you read an article, pertinent book chapter, or research on the web, use the following format (or something similar) to make an electronic record of your notes for later easy access. Put quotation marks around any exact wording you write down so that you can avoid accidental plagiarism when you later cite the article.

Complete citation. Author(s), Date of publication, Title (book or article), Journal, Volume #, Issue #, pages:

If web access: url; date accessed

Key Words:

General subject:

Specific subject:

Hypothesis:

Methodology:

Result(s):

Summary of key points:

Context (how this article relates to other work in the field; how it ties in with key issues and findings by others, including yourself):

Significance (to the field; in relation to your own work):

Important Figures and/or Tables (brief description; page number):

J.I.T.T. – Prather's Colloquium

X's Comment hit a Lot of the Common Themes

I am interested in what the possible drawbacks of this method are. The lecturer spoke of huge benefits from interactive learning, such as higher rates of improvement on before lecture versus after lecture test scores than for interactive lectures versus non-interactive lectures. It seems harder for the instructor. I personally would love it if courses had the professors ask more questions, have the students fill in the pauses that professors make, or institute voting, but I'd probably dislike team based learning as a student if my grade were dependent on the performance of my team. Dr. Prather said that interactive learning benefits strong students as much as not strong students, but I'm not convinced I would work well in team based learning. I understand that team based work is important for a job, but there's probably more pressure not to slack off in a professional team environment than in a class team environment.

I also am curious about another point. The students in interactive learning are answering questions or solving problems. If the students were doing the same problems outside of class and getting in class a more traditional lecture, would the same benefits be there? I am wondering whether it is just solving problems that's helpful, or whether doing the problems with others in class improves the learning enough to justify the different format.

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Case Studies

Problem

You are driving on the New Jersey Turnpike at 65 mi/hr. You pass a sign that says "Lane ends 500 feet." How much time do you have in order to change lanes?

Student Conversations

1. M: ...alright if I convert 65 mph to feet per second, which is the other thing that is given in feet... So then I got 95 feet per second is what you're moving, so in 500 feet like how long? So, I was trying to do a proportion, but that does not work. I was like 95 feet per second...oh wait...yeah in 500 feet, like, x would be like the time...that does not—I get like this huge number and that does not make any sense.
2. TA: So what if I said something like...if you're traveling 8 feet per second and you go 16 feet, how long would that take you?
3. M (immediately): 2 seconds
4. TA: So, how did you do that? Can you generalize that?
5. M: Well, like, OK. Divide—the total by like how fast you're moving. Or, like how far you went by your speed will give you the time.

Questions on Basic Kinematics Problem

1. What game is M initially playing in line 1?
2. What is the TA trying to do in line 2? Why?
3. What game is M playing afterwards?

Tuminaro, Jonathan, and Edward F. Redish. “Understading Students’ Poor Performance on Mathematical Problem Solving in Physics.” Accessed July 27, 2015.

Class-wide synthesis using post-it notes

Write one helpful tip

Write something that was counterproductive

Helpful

- Allowed thinking
- Focused on physics principle
- Positive feedback (even when on right track!)
- Supportive
- Identified when using wrong e-game.

Counterproductive

- Condescending
- Too involved
- Not involved at all
- Watching / making nervous

Feedback – Midterm Assessment Protocol hosted externally

- Presenting/having us read actual education research is both interesting and helpful.
- Enjoy learning about the psychology of teaching and how students learn. The reading has been interesting. (*all students agreed on this)
- Specifically, using Perusall has been helpful for learning/discussing outside of class. The discussion is useful since we have limited time in class.
- Revisiting papers a few weeks later is helpful.

Summary

- Perusall is a useful way to help new Ph.D. students learn, not only content, but also the professional development skills of learning how to read scientific literature.
- Education research serves a particularly useful field for these papers:
  - Exposes new Ph.D. students to education best practices.
  - Provides them the language to talk about teaching.
  - Is a sub-field that is “level” as effectively no one has prior experience.
- The topics introduced in the paper can then be practiced in seminar and then immediately applied in their teaching roles.

THANK YOU