

## USING PADLETS AND ONLINE JOURNALS TO ENHANCE STUDENT LEARNING

**Katrina Palmer**  
**Appalachian State University**  
**121 Bodenheimer Dr., Boone NC 28608**  
**palmerk@appstate.edu**

**Abstract:** In this paper I share how I used journals and padlets in Calculus and Linear Algebra to enhance student learning. The purpose of the journal assignments was to increase student awareness of how differently people learn, while the padlets were used in two ways: to see how differently students approach problems and to help students organize their notes.

**Background:** As an educator, I continually try new ideas in my classroom to help my students. Until recently my focus while teaching math has been solely on the mathematics. Last May I was revitalized with a new added focus. Through participation in a course redesign workshop modeled after Dee Fink's course (2016), I was forced to think about what I really want my students to gain from my class: Do I want them to know how to use the chain rule in 5 years? Do I want them to remember the idea of a derivative in 5 years? Do I want them to become a better thinker? Do I want them to learn how to interact within a group?

Because of the workshop, I made many (probably too many) changes to my calculus and linear algebra courses. Three learning goals that I added to both Calculus and Linear Algebra are:

**Human Dimension:** Identify areas of math and of the learning of math they have strengths and areas that need improvement.

**Caring:** Describe the importance of mathematics in their chosen field (biology, chemistry, physics, chemistry).

**How to Continue Learning:** Develop strategies and resources for continual learning.

One common theme from the workshop was "if it's in your learning goals, you need to assess it." I decided to use journals to address the human dimension and how to continue learning. I assigned an application project and an interview for the caring goal, but will not talk about those assignments here.

My calculus courses typically have 32 students who intend to major in Computer Science, Biology, Chemistry, Geology, Physics or Math; all of which require Calculus I for their major. The class meets 4 days per week for 50 minutes. One day a week is spent as an interactive lecture, one day is spent answering questions from homework, the third day is group work practice and the final day is a group quiz. My Linear Algebra student's backgrounds are quite similar with about 34 students. This class meets 2 days

per week; the first is an interactive lecture and the second day is a group-work day that emphasizes either deeper understandings or applications.

**Journals:** In this section I briefly describe some of the assigned journals with their purpose. The first journal prompt was assigned before the first day of class. It reads, "What one word comes to mind when you hear 'calculus'? Why? Why do you think Calculus is required for you intended major?" The purpose for this question is two-fold: to have students think about why they are taking this class (to remind them it's not just a box to check on their major check sheet) and second to educate me on what the students' assumption are before the course starts.

The second journal prompt I assigned asked, "Have you ever said, 'I'm just a bad test taker,' or something similar. Read this blog: <http://www.vox.com/2016/1/8/10728958/sat-tutor-expensive>. Give a brief summary of what the author is saying and provide your reaction." For years I've heard students say that they know the material, but they do poorly on tests. This article helped them realize they may not be studying appropriately for tests. The article also suggests students often don't learn the material well enough for tests. For example, students may be able to do all the homework problems, but they don't know it well enough to apply the same concept to another problem.

Another journal prompt questioned their views of intelligence: "Briefly describe the difference between Entity view of intelligence and Incremental view of intelligence (site your sources/links). Do you see yourself in either category? Explain. How can you use what you learned about entity and incremental views of intelligence to help you (individually and in groups)?" Carol Dweck (1999) describes the difference between students who hold an entity view versus an incremental view of their intelligence. Those who follow the entity theory view intelligence as being fix while those who believe the incremental theory believe they can change their intelligence through hard work. The purpose with this question is to help them realize people think differently.

Another entry titled "Do you talk to think or think to talk?" asks students to read an article (<http://www.fastcompany.com/919234/do-you-talk-think-or-think-talk>) about whether they like to think before contributing or do they learn by talking through a problem. The article not only helps them reflect on which type they are, but also provides suggestions when working collaboratively depending on what type they are. For example, a talk-to-think person might start by saying, "I'm just thinking out loud," while a think-to-talk person might ask, "Let me think about that for a minute." The purpose here is also to expose them to how differently people learn.

The final journal of the semester is for the student to pick two of the learning goals of the course and talk about whether they met those goals using concrete examples. Then they are to look back at their first journal entry when there were asked what calculus was and ask how they would change their answer now. The intention here is obvious: to remind them how far they have come in this course.

Because of the modifications I made, I asked my students and two other classes to complete a survey. One of the survey questions asks, "How did journals contribute to the course?" I was overwhelmed by the positive responses - there were no negative ones. Here are some selected student responses:

- Helps me think about what I need to do to succeed
- It allowed for me to think about how calculus is relevant, and how I can benefit my learning abilities
- I understood what kind of student I was as a result of these journals, which was something I had never really thought about before
- It made me realize I want my education to matter
- The journals helped me be more open minded to other people's challenges. The journals made you think about the learning style of those around you. Then in class you really have to pick and choose between when to speak and when to listen to maximize your learning opportunity.
- The journals helped me understand myself as a math major, and a student.
- The journals made me analyze myself as a student. They didn't have much to do with math in a sense, but I gained more of an open mind to learning about math after doing the journals.
- They got me thinking about education and how we learn. They helped me try new ways of looking at the material.
- They helped remind me of the importance of the course as well as keeping me focused and thinking about the future.

As I mentioned earlier, I tried several alternative assessments, and I am overwhelmed at the positive reaction to the journals. The only con to journals is the grading time, which I feel the pros far outweigh. Not only have students learned more about learning which positively effects their other courses, I think the journals have strengthen my report with students; especially with quieter students. I have continued to use journals about learning in all of my classes.

**Padlets:** A padlet is a free online bulletin board from padlet.com. I used padlets primarily as a way to share solutions and notes. In this section, I share examples of padlets from both Calculus and Linear Algebra.

*Padlets in Calculus:* The primary purpose of using padlets in Calculus was to demonstrate the multiple answers to certain questions. For example, when students learned about functions with different properties, students posted answers to questions such as "Give an example of a continuous function that is not differentiable at  $x=3$ " (see Figure 1). Padlets worked well because students could see the variety of answers: some students posted a picture of their graph while others wrote a formula. This led to a great review discussion about the different ways to represent functions, and discussions about why their function worked.

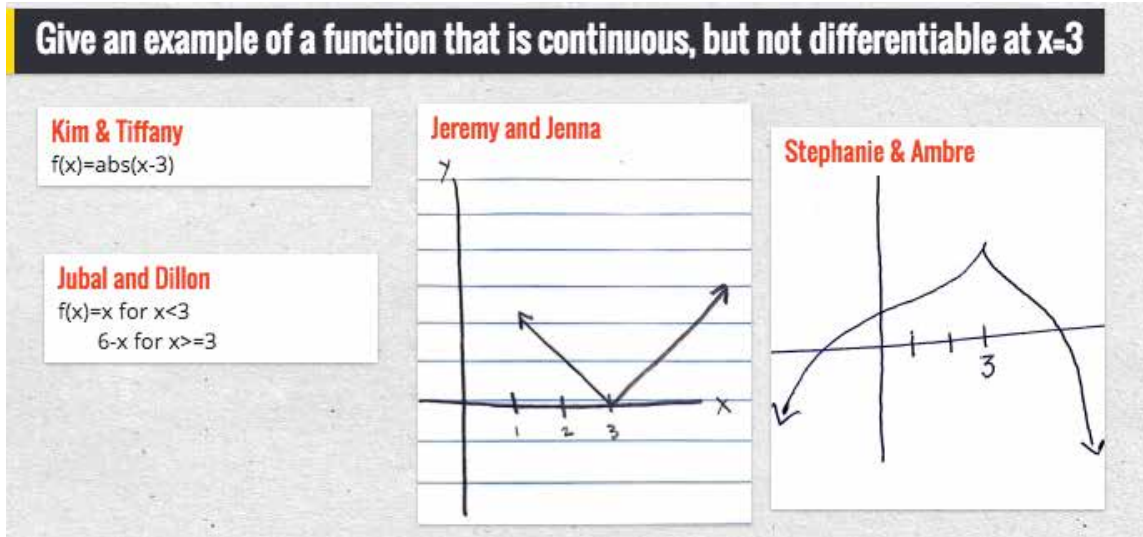
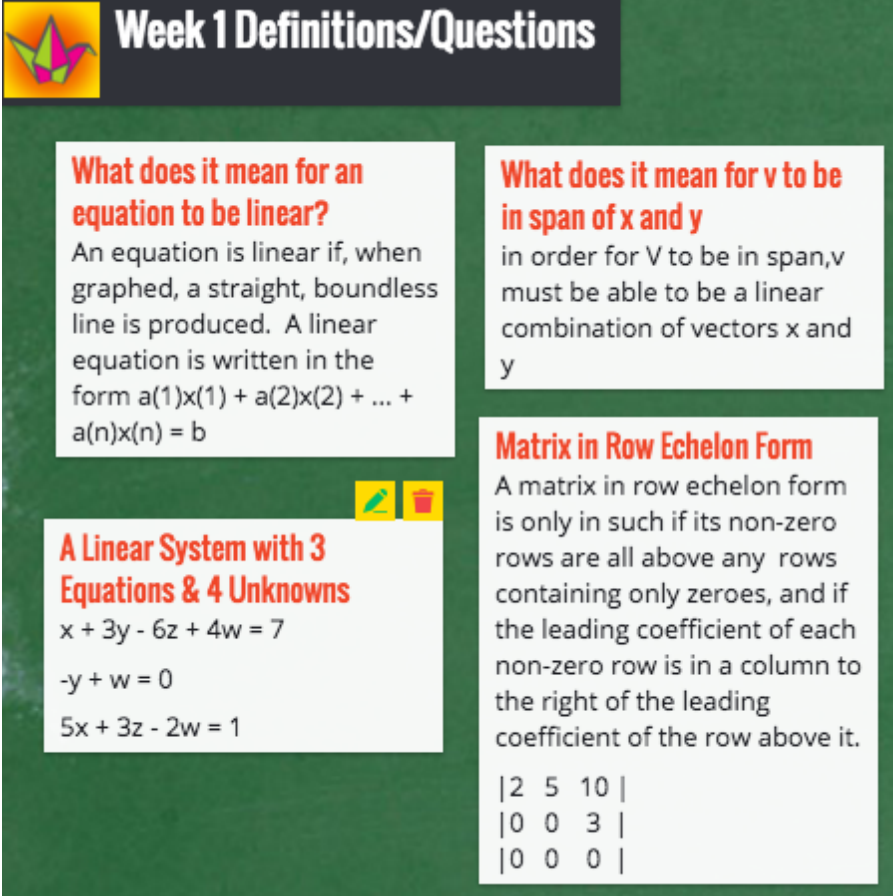


Figure 1: Screen shot of a padlet from Calculus

*Padlets in Linear Algebra:* The other way to use padlets was to help both the students and me prepare for class. Before each lecture day I assigned questions that were due before class started. These questions related to definitions so I could spend more class time on ideas rather than providing definitions. For example, for the first week I had students describe what it means for an equation to be linear and to provide an example of linear system of equations with 3 equations and 4 unknowns (see Figure (2)). While I expected each student to complete all the questions every week, I only assigned two students to each question every week. Thus, throughout the semester, each student posted about 5 answers on the padlets. However, every student used these completed padlets to help them study for the exams or in case they missed class. These also helped me prepare for class by allowing me to see student misunderstandings or confusion about certain definitions before the lecture.

The first few times I used padlets in class, students had difficulties getting their posts up in a timely manner, however, once we discovered the CamScanner application on the phone it was much easier. CamScanner is an application that takes a nice picture of your work and creates a pdf file, which is then easily posted to a padlet.

**Conclusions:** The purpose of this paper is to share how I used padlets and journals to enhance student learning. Using padlets to post answers to questions before lecture helped the class go more smoothly and made lecture more interactive, while using them during class led to some great discussion that I hadn't intended. I think both of these uses have enhanced student learning, however, I have no proof. I do have evidence via student feedback that the journals about learning have not only enhanced student learning in my class, but also in the students' other classes. I know that I will assign journals in all my classes.



**Week 1 Definitions/Questions**

**What does it mean for an equation to be linear?**  
An equation is linear if, when graphed, a straight, boundless line is produced. A linear equation is written in the form  $a(1)x(1) + a(2)x(2) + \dots + a(n)x(n) = b$

**What does it mean for  $v$  to be in span of  $x$  and  $y$**   
in order for  $V$  to be in span,  $v$  must be able to be a linear combination of vectors  $x$  and  $y$

**A Linear System with 3 Equations & 4 Unknowns**  
 $x + 3y - 6z + 4w = 7$   
 $-y + w = 0$   
 $5x + 3z - 2w = 1$

**Matrix in Row Echelon Form**  
A matrix in row echelon form is only in such if its non-zero rows are all above any rows containing only zeroes, and if the leading coefficient of each non-zero row is in a column to the right of the leading coefficient of the row above it.

$$\begin{array}{ccc|c} 2 & 5 & 10 & \\ 0 & 0 & 3 & \\ 0 & 0 & 0 & \end{array}$$

Figure 2: Screen shot of a padlet from Linear Algebra

**Works Cited:**

Dee Fink & Associates: Designing Courses for Significant Learning. (2016, April 13)  
Retrieved from <https://www.deefinkandassociates.com/>

Do You Talk to Think or Think to Talk? (2016, April 13) Retrieved from  
<http://www.fastcompany.com/919234/do-you-talk-think-or-think-talk>

Dweck, C.S. (1999). Self-Theories: Their Role in Motivation, Personality, and Development. Philadelphia: Psychology Press.