IT PAYS TO BE HIP!

Presented by:
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November 9, 2017
Agenda

- Hesitations for writing in math
- Research to support and implementations of writing in math
- Curriculum development utilizing (in)formal writing strategies
- Closing Activity
- Questions/Answers
Hesitations we face with incorporating writing in math

- Takes too much time to write in class.
- Takes a lot of effort to change already established curricula so that writing can be included.
- Students will not want to register for a writing intensive math course.
- Others?
“Revising courses, curricula, and support services to foster integrative learning gives students both the enthusiasm and the cognitive tools to persist and succeed” (D’Souza, M., Curran, K., Olsen, P., Nwogbaga, A., & Stotts, S., 2016, p.47).

- Integrative learning is the process of making connections among concepts and experiences so that information and skills can be applied to novel and complex issues or challenges.

“Students must develop the intellectual flexibility and adaptability to incorporate varied sources of information into their decision-making and understanding of the world” (Retrieved from http://www.ithaca.edu/icc/what_is_it/).

- Group designed, project-based research experiences in mathematics inspire student-learning, encourage self-affirmation, and deemphasize any cultural and gender stereotype threat (Bentley, 2012; Brophy, 2013).

- By using writing in a math course, students can engage with the subject matter and appreciate the relevance of the abstract concepts in math to their non-STEM fields.
Implementing Writing in Math

- Formal vs Informal
  - Active Learning Techniques
- Backwards design for the Probability unit in a Liberal Arts math course
- Student exemplars
  - Consumer Math Essay
  - Statistics Project
- Anecdotal Evidence
Curriculum Development

**Step 1** Choose

Choose math topic that students tend to struggle with or find confusing.

**Step 2** Consult

Examine active learning and problem cycle handouts to determine if any would prove useful in the redevelopment of your lesson plan.

**Step 3** Create

Develop a lesson that incorporates a writing activity to help you teach the selected topic.

**Step 4** Share

Discuss your plan with a colleague at your table to earn some constructive feedback.

AMATYC 11/9/2017
CLOSING REFLECTION ACTIVITY

Please include your email addresses on this form so that we can provide help with any writing activities you may have in mind.
QUESTIONS?

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<thead>
<tr>
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<tbody>
<tr>
<td>Dusting Off the Cobwebs</td>
<td>Write down what you recall from last class and then go over with classmates</td>
<td>➢ Can help to jog memory</td>
<td>➢ Can use as feedback, attendance, or as a cheat sheet for tests</td>
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<td>➢ People remember difference concepts and can share with one another</td>
<td>➢ Allows the instructor to determine what is missing from the students’ comprehension and</td>
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<td>One-minute paper</td>
<td>Students would get the chance to write down as much as (s)he can about given words/topics</td>
<td>➢ To get students recalling as much information as possible</td>
<td>➢ Allows the instructor to determine how familiar students are with the topic</td>
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<td>➢ Allows students to see how much they know or don’t know about a topic</td>
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<td>Guided Questions</td>
<td>Can use two-column format where one side lists questions and the other side has space for responses</td>
<td>➢ Allows students to develop own notes based on what they regard as most important</td>
<td>➢ The instructor can use this technique when watching a video inside/outside class. Students can get all the pertinent information especially since they are being guided by questions.</td>
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<td>➢ Engages students by nudging them to look for and think about answers</td>
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## Active Learning Techniques

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| 4.   | Pause and Predict | Play a video and pause at various segments to ask probing questions about what the students expect to happen next | - Gets students predicting and expressing opinions.  
- Gives students a chance to reflect | During interactive lecture |
| 5.   | Role-playing | Allows students to demonstrate applications/concepts | - Another way for students to remember class topics  
- Allows for a visual that students can associate with the applications or concepts  
- Opportunity to include movement and imagination | To teach a particularly difficult concept  
To incorporate a different kind of engagement, spark student learning |
| 6.   | No Tech/Low tech Clickers | Students are given a sheet of paper with A,B,C,D in each of the 4 quadrants. They will fold the sheet into 4 and hold up their answer to the questions being asked | - Encourages full participation and communication  
- Can aid in identifying those who may be struggling | Students can answer multiple choice questions (trivia game) and see how many points they earn  
During interactive lecture  
Before/at the end of class to check prior learning or learning from that day |
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| 7. Think-Pair-Square-Share | Students will independently think about the topic, pair up and discuss their findings, then search for another pair and further discuss. | ➢ Students have an opportunity to share ideas and gain confidence in the topic being discussed  
➤ Students take the responsibility for learning and engage with each other | ➢ During interactive lecture  
➤ During review lessons/units |
| 8. Reorder Steps   | Place steps of a process on separate cards and have students place them in the right order | ➢ Assess student understanding of the ordering of topics  
➤ Engage students in creating order and checking their own understanding as well as collaborate | ➢ Once students order the steps of a process correctly, they can then be asked to apply those steps to a problem  
➤ During interactive lecture  
➤ For review  
➤ For evaluation (no paper/pencil/computer test, nothing to take home to grade!) |
| 9. Fix the Mistake | Give students diagrams or statements and have them fix the mistake seen | ➢ Allows students an opportunity to see the various mistakes that could be made and to figure out why it is incorrect  
➤ Requires close reading or observation | ➢ In a math class, students can be given a series of math problems with mistakes on them. The students would be charged with identifying the errors, explaining why they’re wrong, and then showing the work to correct them. |
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<td>10. Stoplight</td>
<td>Use as end of class survey to see what students Learned (green light), Questioned (yellow light), or Did not learn (red light)</td>
<td>➢ Another source of feedback to determine if the lesson was successful</td>
<td>➢ At the end of class or at the end of a part of a lesson/lecture</td>
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<td>11. Brainstorming</td>
<td>Process for generating creative ideas and solutions through intensive and freewheeling group discussion</td>
<td>➢ Allows students to collaborate with one another and can be considered class participation</td>
<td>➢ The students can come up with ideas when introducing a new topic to the class (ex. The instructor is teaching probability but wants students to first brainstorm where they see probability being used in real-life.)</td>
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<td>12. Brain Dump</td>
<td>Used to allow students to quickly write down everything they can remember about a specific topic in a short period of time</td>
<td>➢ It is a way to find out if students are actually retaining the learned material from previous class sessions</td>
<td>➢ Students can be asked to brain dump at the beginning of class as a way for the instructor to gauge how much information was retained/processed or lack thereof.</td>
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<td>13. Exit Ticket</td>
<td>A strategy that requires students to write responses to questions posed at the end of class. Helps students reflect on what they have learned and any questions they may have. This is generally a 2-3 minute activity.</td>
<td>➢ This is a way for students to write down any questions they may have regarding the material or write down what they actually learned from class.</td>
<td>➢ This is a way to give students an opportunity to express their concerns or show their understanding. Especially helpful for students who tend to keep their thoughts to themselves due to a fear of public speaking.</td>
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<td>14. Reflection</td>
<td>A longer activity dedicated to metacognition.</td>
<td>➢ To allow students to reflect on their thinking processes as well as to provide feedback to the instructor about the materials presented.</td>
<td>➢ This can be done in a journal, or an assignment to be turned in, asking students to reflect on their classroom experience, ways to improve their grades, etc.</td>
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