Designing Innovative and Creative Online Math Discussion Boards

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Today's Agenda

- Framework for designing innovative online mathematics discussions

- AMATYC Impact Standards

- Examples of exemplar discussions that have been successfully utilized with students

- Assessing online discussions

Framework for Designing Discussions

1. Align
- How will this activity help students achieve course outcomes?
- How will this engage students with the course content throughout the week?

2. Sustain
- Best practices (Group work, Exploratory, Open Ended)
- Clear pathways for continuous *student* and *faculty* participation
- Sufficient support (outside materials, ways to ask for help, etc.)

3. Assess
- Clear pathways for continuous *faculty participation*
- Clear, fair, easy assessment

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OWnership
Engagement

Assess
- Clear pathways for continuous *faculty participation*
- Clear, fair, easy assessment

Student
Success

Online Discussion Board Strategies and Techniques

Real-World	Exploratory	Engaging	Motivating
Interesting	Fun	Successful	Retention

Examples of Exemplar Discussions

- Introductions

- MyMathLab Exploration

- Algebra

- Liberal Arts Math

- Statistics

Introductions

- For this introductory discussion, we will discuss your experiences with mathematics as well as your expectations for this course.
- Share some comments on your reasons for taking this course (besides it being a degree requirement).
- What knowledge do you hope to gain in this math course?
- What other math experiences have you had in the past? Were they positive or negative?

Introductions

- Do you have any amusing, encouraging or horrifying math tales to tell?

- Can you suggest any study tips for success in math?

- Reflect upon your personality. If you had to describe it as a geometric shape, what would it be? Be sure to defend your choice.

MyMathLab Exploration Discussion

MyMathLab, the website where you are completing your course assignments, has many great resources such as: an interactive eBook, videos, animations, PowerPoints, study plans, additional practice problems and a plethora of multimedia resources. When you login to our MyMathLab course, please click on "Multimedia Library" and take a few minutes to explore the various resources. These resources are designed to meet the different learning styles of students.

MyMathLab Exploration Discussion

- Please try out some of these resources and write a few lines telling us what you did on the site.

- What resources did you find to be personally beneficial and useful for your learning of College Algebra?

- How do you think you can use these resources throughout the course?

- Do you have any questions about them?

Exam Review Discussion

- Post exam review sheet containing 40-50 mathematical problems

- Students must solve 2-3 problems showing all work (depending on class size)

- First-come, first-serve basis

- Students may not post a solution to a problem that has already been solved

- Discussion thread management is important

Exam Review Discussion

DATE ▽	THREAD	AUTHOR	STATUS	UNREAD POSTS	REPLIES TO ME	TOTAL POSTS
10/7/18 7:24 PM	#1	Mark Marino	Published	0	0	1
10/7/18 7:24 PM	#2	Mark Marino	Published	0	0	1
10/7/18 7:24 PM	#3	Mark Marino	Published	0	0	1
10/7/18 7:24 PM	#4	Mark Marino	Published	0	0	1
10/7/18 7:24 PM	#5	Mark Marino	Published	0	0	1
10/7/18 7:24 PM	#6	Mark Marino	Published	0	0	1
10/7/18 7:24 PM	#7	Mark Marino	Published	0	0	1
10/7/18 7:24 PM	#8	Mark Marino	Published	0	0	1
10/7/18 7:24 PM	#9	Mark Marino	Published	0	0	1
10/7/18 7:24 PM	#10	Mark Marino	Published	0	0	1

MAT101: Mathematics for Everyday Life

- How old are you now? At what age do you hope to retire? How many years do you have until you retire?

- Based on how you want to live in retirement and any other sources of retirement income you have available, how much money do you think you will need to draw from this savings account each year during retirement?

MAT101: Mathematics for Everyday Life

You are about to set up a new retirement savings account that earns … You want to make monthly contributions to that account from now until you retire ….to save enough to be able to withdraw the money you need each month without depleting your principal (in reality, you will probably deplete your principal gradually). How much money do you need to contribute to the account each month?

MAT105: Essential Algebra and Statistics

Think about the following questions, and post your ideas or questions to the discussion forum. Make your first post by Tuesday:

1. Which do you think is larger, the mean number of siblings of people in this class, or the median number of siblings? Why do you think so?
2. How would you verify your answer to #1? What questions would you need to ask?
3. Why would the mean and median differ?
4. Under what circumstances would the mean be bigger? Under what circumstances would the median be bigger?

MAT105: Essential Algebra and Statistics

Meteorologists have tracked the total annual rainfall in the town of Spring Valley year after year, and found that it follows a normal distribution. The average annual rainfall is 18 inches, with a standard deviation of 6 inches. In one particular year, only 9 inches of rain fell. You work for the local newspaper, and your editor has asked you to write a story about the terrible drought the town is suffering from and how dire the situation is. Write a brief paragraph that you could use to explain the statistical facts to the newspaper readers. Include a comment on whether you agree that the situation is very abnormal. Make sure you use what you are learning about the normal distribution in your newspaper article.

Faculty support / participation

- Avoid simply evaluating

- Good questioning (Socrates Method)
  - Under what circumstances might the mean < median? Is "lots of students with zero siblings" the only possible way this might happen?
  - How might a reporter describe the rainfall situation without using statistically technical jargon?
  - I think <student> brings up an interesting point. How might we apply that observation?
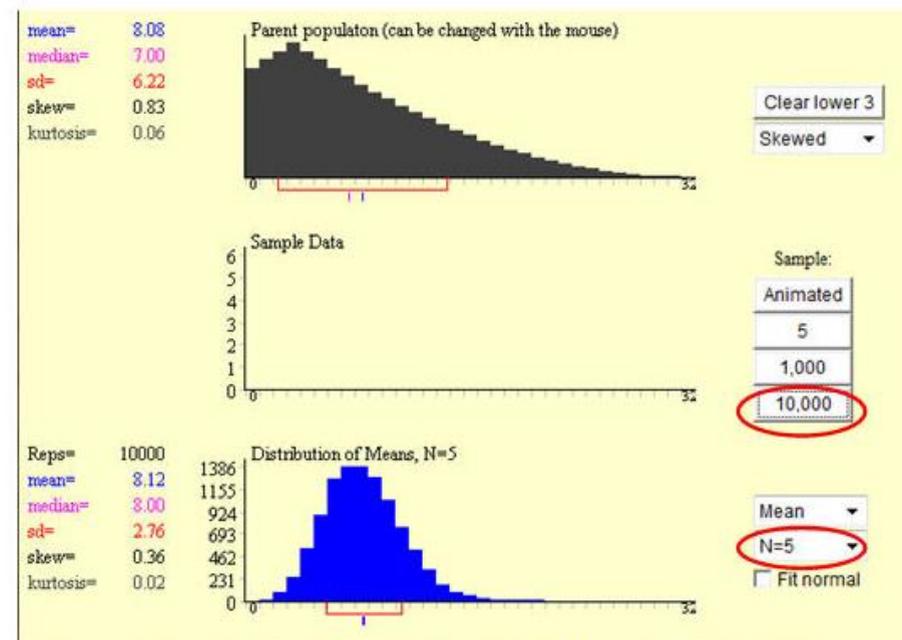
Faculty support / participation

- Provide support, *based on DB interaction*
  - Short videos
  - Direction to websites
  - Make sure students are aware of the resources provided
- Level of faculty engagement: how much is appropriate?

MAT201 Statistics
M5D1: Exploring Sampling Distributions

M5D1: Histogram Example 3

Histogram Example 3

mean=	8.08
median=	7.00
sd=	6.22
skew=	0.83
kurtosis=	0.06

Parent populaton (can be changed with the mouse)

Clear lower 3
Skewed

Sample Data

Sample:
Animated
5
1,000
10,000

Reps=	10000
mean=	8.12
median=	8.00
sd=	2.76
skew=	0.36
kurtosis=	0.02

Distribution of Means, N=5

Mean
N=5
Fit normal

Here's what can be observed: while the parent population is skewed right, the distribution of sample means tends more towards a bell shape with slight skewness on the right. The mean of the parent population is 8.08, and the mean of all 10,000 sample means is 8.12 – not far from the population mean. The standard deviation of the parent population is 6.22, while the standard deviation of all the sample means is much smaller at 2.76.

Student support

Hi Class

It appears that we are having interesting and somewhat different than usual discussion this week. But at least at the beginning we need to set up the simulation to work properly. That may require some patience.

Student support

Did you manage to run the simulation? I have downloaded new version of java to be able to run this applet on my computer. Did you download the reporting file? Did you watch the tutorial video?

If you have technical difficulties we can share these in this discussion. If you discover something new please share this too.

Student support

If you are done what is required and wish to explore further, please do so and share what you found. I will try to review all these extra efforts and make suggestions of my own.

MAT201 Statistics

Collect 50 or more *qualitative* data items ... Then, construct a 90% confidence interval for the population proportion, *p*.

View an [example](#) on how to use StatCrunch to compute confidence intervals ....

MAT201 Statistics

… Include your Statcrunch report…

- From your data, what is the *point estimate*, $\hat{p}$ of the population proportion?

- Write down the confidence interval that you obtained. Interpret the result.

- What is the *margin of error*?

MAT201 Statistics

- Using the same data, construct a 98% confidence interval for the population proportion. Then, answer the following three questions:

  - What happens to the length of the interval as the confidence level is increased?

  - How has the margin of error changed?

  - If the sample size is increased, what do you think will happen to the margin

MAT201 Statistics

...In your response to classmates, you may discuss one of the following:

- Ask your classmate a question about his/her result that is not clear to you.

- Share something that you see about your classmate's results that your classmate did not mention. You may also discuss specific details about the type of data. For example, if the confidence intervals are about weights of adults, then you may discuss unique details related to this type of data.

- Share what you have learned from your classmate's results.

Assessment

- Utilization of rubrics and make students aware of them upfront

- Quality

- Quantity

- Mathematics!

- Interaction with peers

Rubric (Instructions first)

To earn the **highest credit** for discussion participation, you must:

1. Participate 3-4 different days a week.
2. Create a new discussion thread with a solution attempt, an idea, or a question. **Your initial post is due by Tuesday at 11:59 PM EST. Your responses are due by Sunday at 11:59 PM EST.**
3. **Actively participate** in **three** discussion threads—the one that follows from your posted solution and at least two started by other students. You must post at least three times within **each** thread **in ways that move the discussion forward in solving or understanding the problem.**
4. Use correct grammar and spelling, and write in complete sentences where appropriate. **Do not use abbreviations common in texting.**

Guidance for Students

Students often ask "How can I participate in a discussion board about math?" Here are insights and suggestions to help you achieve an optimal grade:

At Excelsior College, the math discussion board is meant to enhance and enrich course terms, concepts, procedures, problems and solutions. The purpose of these boards are mathematical exchanges and they are specifically not chat rooms.

A math discussion board is aligned with the course outcomes and is a tool to share *specific* and *definite* mathematical exchanges. It is important to communicate *mathematically,* so be sure to **use mathematical terms** in each and every posting.

Guidance for Students

Here are some examples of math discussion board responses:

1. Solving and posting course mathematical problems and solutions
2. Sharing with your classmates mathematical procedures and clarifying understanding of these
3. Sharing mathematical websites and material

Using this as your guideline, proceed to do your best and remember using the discussion boards properly will benefit your grade. Have a great course!

School of Liberal Arts Math Discussion Board Rubric-2017

Criteria	F (0)	F (11)	D (13)	C (15)	B (17)	A (20)
Initial Post: Initial post is on time, coherent and relevant. All elements of the question are addressed. (Timeliness refers to during the week of the module)	Post is absent	Post is late, inaccurate, off topic and/or poorly composed.	Post is late, incomplete, marginally relevant and coherent.	Post is no more than one day late, mostly coherent and relevant, with some minor omissions. .	Initial post is on time, mostly coherent and relevant to the topic, addressing all elements of the question.	Initial post is on time, coherent and relevant. All elements of the question are addressed. When incomplete solutions are presented, questions about gaps are identified clearly.
Solution: Correct and complete solution is posted by the end of the discussion, accurately addressing all parts of the problem.	Solution is not attempted.	No parts of the problem are solved correctly.	Omissions or errors interfere with the successful completion of the problem.	Some parts of the problem solution are correct, with some important omissions or errors.	Most parts of the problem are addressed correctly by the end of the discussion.	Correct and complete solution is posted by the end of the discussion, accurately addressing all parts of the problem.
Responses: (to other students) are on time and sufficient in quantity and quality to support the discussion. (Timeliness refers to during the week of the module)	Responses to others are absent	Responses to others are too late and too few and do not support the discussion.	Responses to others are too late, too few, and/or fail to support the discussion adequately	Responses to others are late or not adequate in quantity and quality to support the discussion.	Responses to others are on time, and adequate in quantity and quality to support the discussion.	Responses to others are of significant quantity and quality, on time, and, support the discussion over time.
All Posts combined: involve reflection, critical analysis, and original ideas.	Posts are absent	Posts lack any reflection, critical analysis, or originality.	Posts have minimal reflection, critical analysis or originality.	Posts lack sufficient reflection, but demonstrate basic efforts at critical analysis with some degree of originality.	Posts contain some reflection and critical analysis, and contain original ideas	Posts contain significant reflection and critical analysis, and contain original ideas.
All Posts: conform to college-level writing conventions with correct grammar and spelling	Posts are absent	Posts exhibit extremely poor writing skills; incorrect spelling and grammar; limit the reader's ability to follow ideas or thoughts.	Posts are poorly composed or difficult to understand, or consistently contain poor spelling and grammar.	Posts are disorganized, making ideas difficult to follow. Minor spelling and grammar errors.	Posts are well organized and ideas are clearly communicated. Minor spelling and/or grammar errors.	Posts are well-organized and ideas are clearly communicated. No errors in spelling and grammar, including use of mathematical terms.

Credits:

- Dr. Abbe Herzig (MAT101 and MAT105 example)
- Dr. Jose Romero (MAT201 example)
- Dr. May Shaw (MAT201 student support example)

Thank You!

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