

FLIPPING (ANY) MATHEMATICS CLASS USING INSTRUCTOR-CREATED QUESTIONS IN MYLAB™ MATH

Terry L. Barron

Georgia Gwinnett College
School of Science and Technology, Mathematics Discipline
1000 University Center Lane, Lawrenceville, GA 30043
tbarron@ggc.edu

Peggy M. Slavik

Baldwin Wallace University, Department of Mathematics
275 Eastland Road, Berea, OH 44017
pslavik@bw.edu

Abstract

The focus of this paper is to demonstrate how to create and implement basic instructor-created questions in MyLab™ Math to generate personalized class preparatory assignments for use in a Flipped Classroom setting. We also discuss different types of questions to include in class preparatory assignments, as well as how to use developmental counseling (Barron, 2017) to engage all students including the introverted learner (Barron & Gillespie, 2014; Cain, 2013).

Introduction

Inverting traditional teaching styles continue to be at the forefront of current pedagogical initiatives. In the inverted environment, such as the Flipped Classroom, students prepare for class by using resources such as online written or video lecture material (Bergmann & Sams, 2012; Bergmann & Sams, 2013). Class time is used for exercises and activities that are traditionally assigned as homework problems. Because students are required to prepare for active classroom learning activities, the instructor role changes from a lecturer to a facilitator who maximizes student engagement by providing personalized feedback, developmental counseling (Barron, 2017) and effective assessment.

As inverted teaching styles continue to progress and develop, so does the need for personalized instruction outside of the classroom, specifically with class preparation material. Educational technology and active learning, combined with effective progress and developmental feedback (Barron, 2017), are key components of effective inverted learning environments, where high student achievement standards guide expected outcomes. Increasingly more resources are available in textbooks, as well as more concept-vocabulary questions that cover foundational knowledge. However, many times there is a need for instructors to personalize existing questions or to create questions that directly reach their students. Using instructor-created questions in MyLab™ Math provides instructors the ability to create their own questions or modify existing questions in the MyLab™ Math database. Personalized instructor-created questions engage students in their preparedness, development, mastery and feedback phases of learning, thus contributing to overall success and mastery (Barron & Gillespie, 2014).

Background: Flipping Hybrid PreCalculus and Hybrid Calculus Courses

The initial impetus for creating instructor-created questions came from flipping Hybrid PreCalculus and Hybrid Calculus courses in fall 2015. The hybrid courses met once a week for a shortened class period; 2.5 hours a week. Historically and currently, at the end of drop/add week, typically almost 30 percent of the students across the hybrid classes are late registrants. Most of those late registrant students have less than a 2.5 grade point average and have not been successful in at least one previous mathematics course. Most students do not realize that a lot of work that is normally covered in class in a traditional format is their responsibility outside of class in the hybrid format. To be successful in our hybrid classes, students must prepare for class and have an understanding of foundational knowledge. Preparing for class can be accomplished through reviewing videos, learning definitions, working basic problems or animated examples and using a myriad of other applicable resources. We quickly realized, however, that if a grade is not tied to preparatory work, along with instructor follow-up, there is minimal accountability and the vast majority of the students simply do not complete the assignments. Therefore, we created Class Preparatory Quizzes (CPQs) comprised of simple instructor-created questions and also used concept-vocabulary questions from the textbook that were already created on MyLab™ Math. CPQs are due every day of the week, engaging students between classes and preparing them for the next class. They can work ahead and complete the CPQs early, but the CPQs are due throughout the week. We learned not to make all of the CPQs due the day before class from lessons learned during the first attempt using the flipped format with CPQs in fall 2013. We typically make CPQs worth 10-15% of the final grade.

Why Generate Instructor-Created Questions?

The textbooks we use have several concept-vocabulary questions already generated in MyLab™ Math, which are excellent resources for our Hybrid Flipped Classrooms. Also, there are MyLab™ Math videos that have imbedded questions, but there was no way to determine if the students answered the questions and if they answered the questions correctly. Since we also use other resources not associated with the textbook, we discovered the need to create questions to cover all of the resources. Therefore, our purpose for generating instructor-created questions was simply to help with accountability; to tie a grade to personalized class preparatory assignments.

Steps for Constructing Instructor-Created Questions in MyLab™ Math

As a reminder, and as presented at ICTCM-XXX, the procedure outlined below to develop instructor-created questions covers very basic question creations. The goal for the instructor-created questions is to develop questions that cover class preparatory resources, not to create algorithmic or other types of advanced questions.

- Open (or create and open) any course in MyLab™ Math.
- In the course home page, on the left-hand side of the page, click on **Course Tools** (Figure 1).

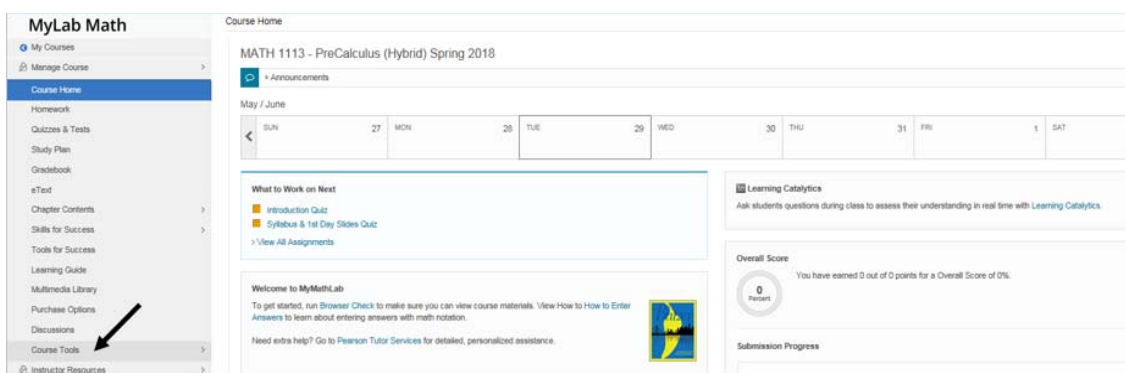


Figure 1. Screen Shot of Course Tools

- In the Course Tools Screen, click on **Assignment Manager**, then click on the **Create Assignment** drop down and choose an assignment to create. We chose to **Create Quiz** (Figure 2). **NOTE:** You can also create a custom question from the Create Assignments drop-down menu (marked with a red arrow in Figure 2), but if you are creating an assignment anyway, it takes less key strokes to create an assignment and put the question in the assignment instead of searching for newly created question later.

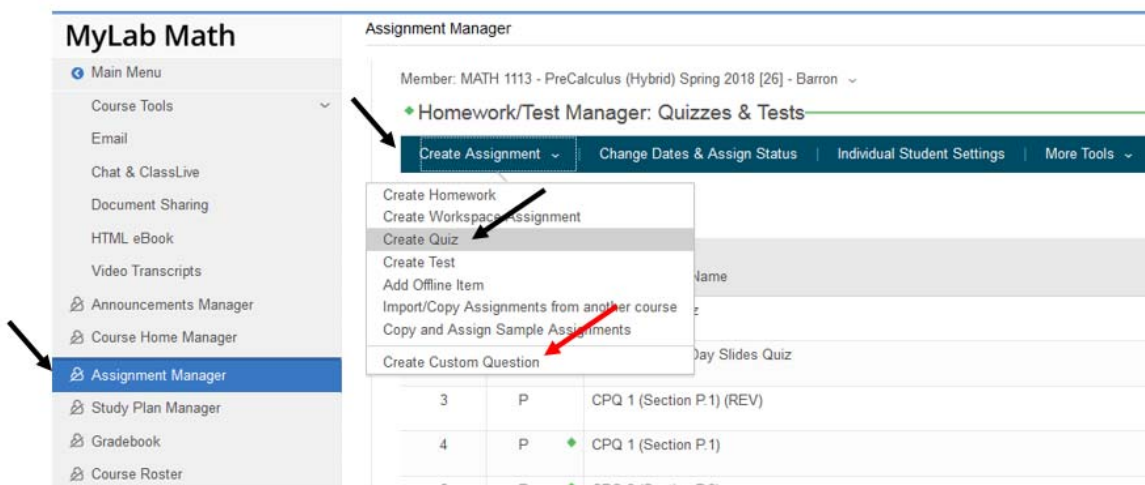


Figure 2. Navigate to Create a Quiz

- When you click on the **Create Quiz** (or any assignment you choose), you will name the assignment on the next page; then click **Next**. We named our quiz CPQ 5 (Figure 3).

◆ New Quiz

1 Start 2 Add/Remove Content 3 Choose Settings

Book: Blitzer: Algebra and Trigonometry, 6e

Gradebook Category: Quiz

Quiz Name: CPQ 5

Assign a companion Study Plan as a prerequisite for this quiz

Creating assignments for mobile use.

Cancel Next

Figure 3. Name an Assignment

- In your newly created assignment, before you chose **Create my own questions**, make sure you also check the **Show other custom questions** box or your newly-created question will not be visible in the Available Questions (Figure 4).

◆ New Quiz

1 Start 2 Add/Remove Content 3 Choose Settings

Name: CPQ 5

Book: Blitzer: Algebra and Trigonometry, 6e Change...

Chapter: O. Orientation Questions for Students

Section: All Sections

Objective: All Objectives

Availability: All questions

Question Source

Show publisher questions

Show additional test bank questions

Show custom questions (+) for this book

Show other custom questions Refine Selection ...

(+) Create my own questions

Available Questions (2248)

Question ID	Objective	Estimate
+ 1.6.1 - Com...		0
+ 1.6.1 - Com...		
+ 1.6.1 - Com...		

My Selections (0)

Choose questions on the left and click Add to include them in this assignment.

Cancel Next

Figure 4. Navigate to Create Your Own Custom Question

- In the Create Custom Question page, there are several template options to choose from to create your question. We chose **Start with an empty template**; then click **Next** (Figure 5).

◆ Create Custom Question

How would you like to create your question?

Copy and edit a question from your online course

Copy and edit a question from the sample question bank

Start with an empty template

Copy and edit a question from another instructor's account with this login: []

You can only copy questions marked "Allow other instructors to copy and edit this question" by the author.

⚠ If you choose to copy and edit a question from your online course and then add it to an assignment, the learning aids usually associated with that question will not be available. In addition, any multi-step questions will be unrolled and presented in one screen.

Cancel Next

Figure 5. Choose a Template

- You can also choose from three layouts (Figure 6). We chose **Full Screen**; then click **Next**.

NOTE: If you encounter a “Run Adobe Flash” error or screen, click the link (or picture) to run Adobe Flash or try a different browser. Firefox usually works without the error.

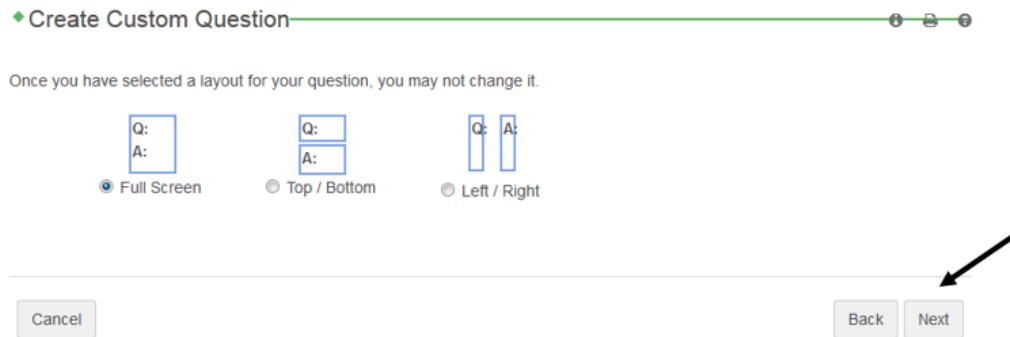


Figure 6. Choose a Layout

- Erase the statement on the Create Custom Question page and type your question; then choose the type of question. We chose **Short Answer** (Figure 7). **NOTE:** Press enter after the question so your answer appears attractively below the question.

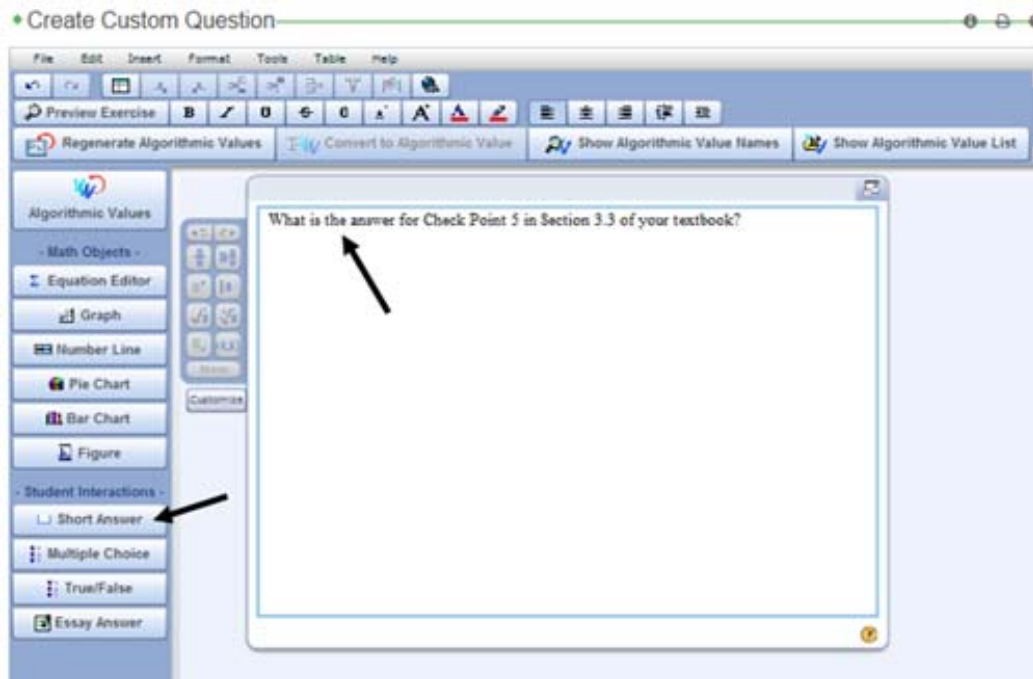


Figure 7. Type Your Question and Choose the Question Type.

- When you click on the **Short Answer** option, the screen in Figure 8 will appear. Click on **Step 2 Define Answers** and type the answer. Our answer was the number 42 as illustrated.

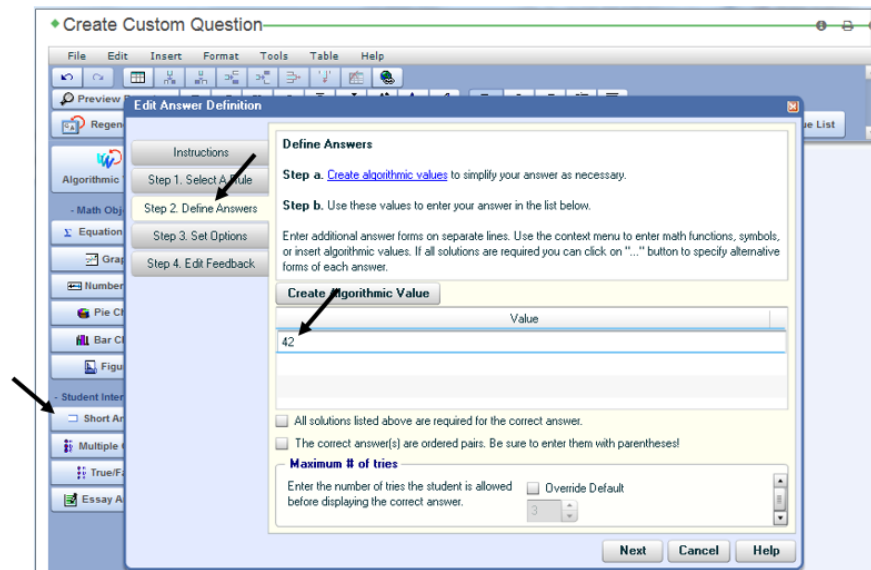


Figure 8. Type the Short Answer

- After you type your answer, click **Next**, then **Next** again and then **Save**. The answer will appear under the question (Figure 9). Click the **Save and Exit** button as illustrated.

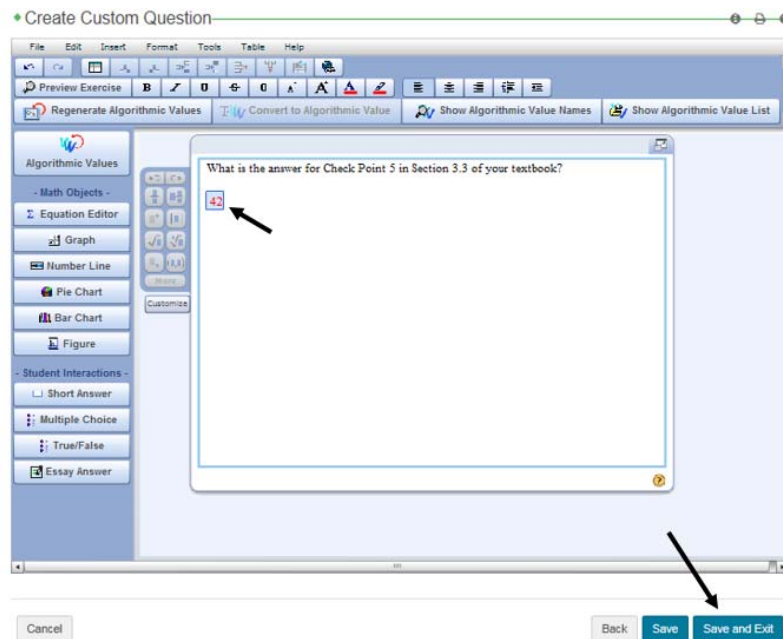


Figure 9. Create Your Personalized Answer under the Question

- Name the newly created question and click OK (Figure 10). **TIP:** Highlight and copy the name before you click OK so you can find it quickly in the Available Questions database as explained in the next steps.

◆ Choose Settings

Name x
(required)

Textbook Content Association (optional) [Add](#)

Textbook associations will cause this question to affect your students' Study Plans when it is used on a test and will help you search for the question when you are creating an assignment.

Current Associations None

Additional Properties (optional)

The information that you provide below will be used to organize your custom questions, and provide search criteria when you are creating an assignment.

Keywords None [Change...](#)

Author-defined difficulty

Type

Format

Other (optional)

Description

Sharing Allow other instructors to copy and edit this question

Cancel OK

Figure 10. Name the Newly Created Question

- After clicking OK, MyLab™ Math will take you back to your assignment so you can add your newly-created question. If you did not copy the name of your question on the previous page, you will have to search for the question in the data base listed under Available Questions on the Assignment Manager page. We found a much simpler way to find the new question. If you highlighted and copied the name of the question in the previous step, press the Ctrl and F buttons on your computer keyboard and paste the name of your newly-created question in the “Find: box” in your browser. The question will also highlight in the Available Questions; then click **Add** (Figure 11). The new question will appear in your assignment (Figure 12).

- When you are finished adding questions to your assignment, click **Next** and proceed with the Assignment Manager to save your assignment. The newly-created question(s) are stored in the MyLab™ Math question database for your account and can be used across courses.

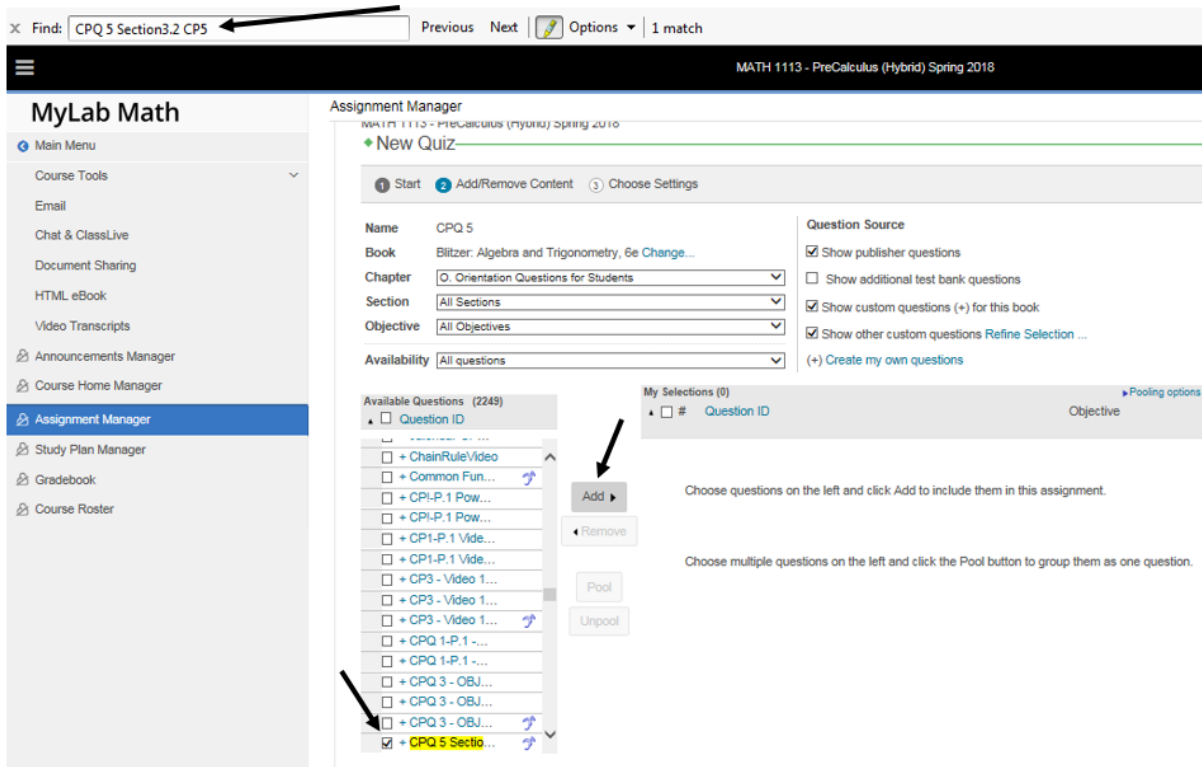


Figure 11. Add a Newly-Created Question using Ctrl F on your Computer Keyboard.

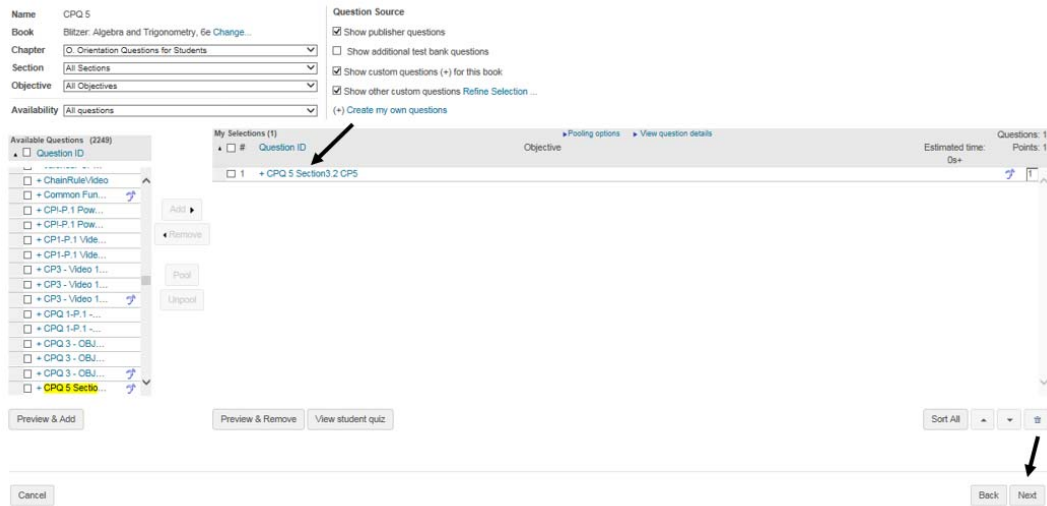


Figure 12. The Newly-Created Question in your Assignment

- **NOTE:** If you only have instructor-created question in your assignment, you will encounter the error as illustrated in Figure 13. You must include at least one question from the MyLab™ Math database in your assignment.

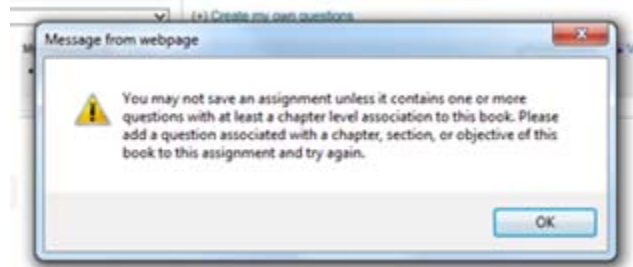


Figure 13. Error Message Encountered Without Adding at Least One Question from the MyLab™ Math Database

Even though our goal was to create simple and easy-to-create questions, sometimes it is necessary to use more advanced options for answers like fractions, square roots, Greek letters, or other options that are found in Equation Editor. Therefore in the next steps, we included the easiest way we discovered to include items from Equation Editor when creating your own questions.

- Create another question that requires a fraction for the answer.
- We typed the question and then chose **Equation Editor** as illustrated in Figure 14.

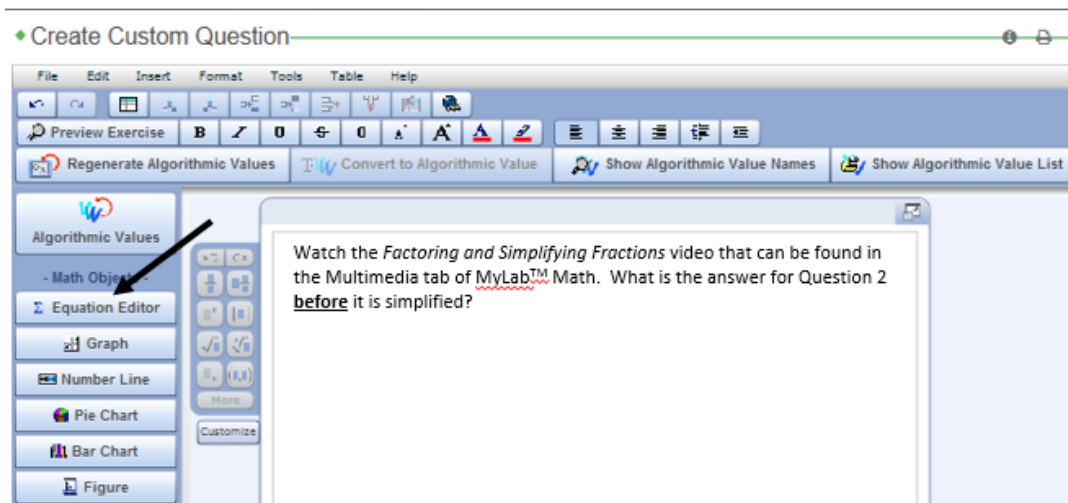


Figure 14. Using Questions that Require Equation Editor

- In Equation Editor, type a fraction and then highlight and copy the fraction (Figure 15). You do not want the fraction to appear in your question so click **Cancel**. The goal is to copy the fraction in Equation Editor, not paste the fraction in your question. Copying the fraction in Equation Editor will copy the code required for your answer.

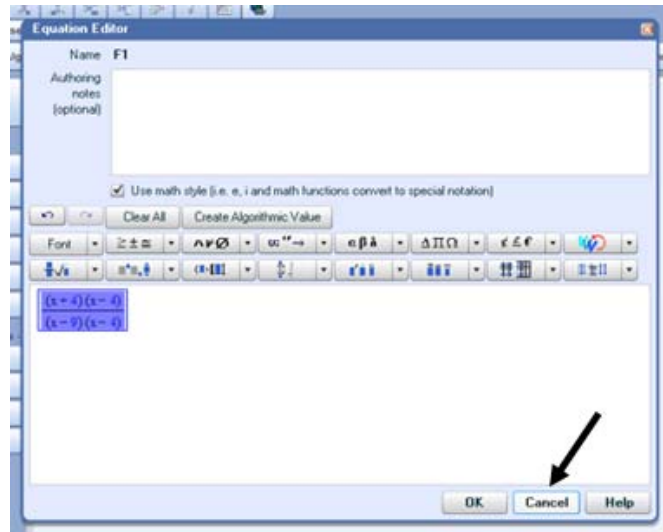


Figure 15. Create and Copy and Item in Equation Editor

- We chose **Short Answer** for the question type, but you can also insert the fraction in other question types. Proceed as you did above with **Step 2 Define Answers** in the short answer option and paste the code copied from Equation Editor in the first Value line (Figure 16).
- Then as you did above, click **Next, Next, Save** and the answer will appear in your question. Proceed as you did above with completing the assignment.

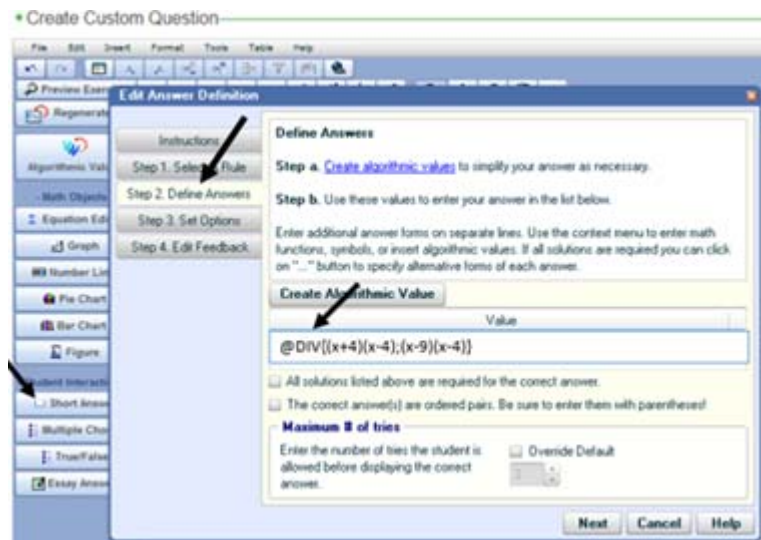


Figure 16. Adding Questions that Require Coding

Different Types of Instructor-Created Questions

If you proceeded through the steps above or are familiar with instructor-created questions, you know there are different question formats in MyLab™ Math, including multiple choice, short answer and essay questions. You can also personalize existing textbook questions without the effort of developing questions from scratch. However, the focus of different types of questions for our purposes refers to content/class preparatory questions versus progress counseling, mentoring and developmental counseling questions.

We use short answer and multiple choice questions to assess content knowledge and essay questions as part of our counseling initiative. Students realize that you are keeping up with them and their progress in the course when you ask progress counseling questions. Mentoring questions open a caring dialog between the instructor and the student and are effective for student engagement. Be prepared for answers that you may not expect! We also found that mentoring and developmental counseling questions effectively engage introverted learners (Barron & Gillespie, 2014; Barron, 2015a). For purposes of this paper, progress counseling is defined as counseling students with respect to how they are performing and succeeding in class, while developmental counseling adds a mentoring aspect that includes both academic and personal goals (Barron, 2015b; Barron, 2017; Barron & Lively, 2016). Developmental Counseling questions are a combination of progress and mentoring questions.

We give full credit for any answer students submit for these open-ended questions. Also, be cognizant that the grade for the question (and assignment) is not calculated for each student until you open the question for each student and submit a grade for the essay question. It takes a lot of time to go through the questions and give feedback but we feel that the benefits outweigh the time commitment. We give feedback via school email.

Examples of Progress Counseling Instructor-Created Questions

- What is your current in-class test average?
- What is your current grade in the class calculated with the weights found in the syllabus?
- What percentage of CPQs have you completed/submitted so far?

Examples of Mentoring Instructor-Created Questions

- How are you?
- What did you think about the last in-class exam?
- How do you like your other classes?
- Talk to me about your work obligations or other things you have going on outside of school.

Examples of Developmental Counseling Instructor-Created Questions

- How many absences have you had this semester and how do you think (if applicable) that is affecting your overall feelings about the class?
- How do you feel about the time you have to devote to this class and how much time you actually have to devote to the class?
- Talk to me about the CPQs and if they help you prepare for class or not. Be honest, I can handle it!

Instructor-Created Questions – Lessons Learned

- Creating open-ended questions is easy, but reviewing them and giving feedback takes a long time. However, both the students and the instructor really benefit from the questions and students typically open up in their answers; sometimes in unexpected ways! If you take the time to use the open-ended essay questions and give feedback, they will know you care.
- Check your instructor-created questions as a student. There is a difference between viewing a question on your MyLab™ Math as a student and actually logging in as a student and working the questions. Either work with your Pearson representative to obtain a student account or create a temporary 14-day student account so you can check your questions as a student.
- Undoubtedly, there will be some errors in the questions you create the first semester. Have a plan! We allow students to submit “MyLab™ Math Being Mean!” emails (Barron, 2014) to help us correct mistakes in the questions and answers. Students email us with the assignment name in the subject and applicable question numbers and errors in the body of the email.
- Allow students to submit “MyLab™ Math Being Mean!” Emails for small errors in their answers. We typically give credit back for typographical and other minor errors. For example, we give credit back if a student types a period instead of a comma or if they forget to superscript an exponent. Also, MyLab™ Math does not give partial credit if most of an answer is typed correctly. For instance, if an answer contains 7 terms and 6 of the terms are typed correctly, MyLab™ Math marks the whole answer as wrong, so we usually give partial credit back for the correct terms. Allowing students to submit “MyLab™ Math Being Mean!” emails rewards them for checking their answers by earning back partial or full credit. In our response back to their email, we also acknowledge that they cared enough to check their work.
- Do not get wrapped up with specific question formatting! If you find yourself fighting with an “error parsing” error, try to type the question a different way or make the question multiple choice. The goal for the instructor-created questions is to make students accountable for class preparatory work and it takes enough time without fighting for hours with errors.
- When creating an assignment with instructor-created questions, you must include at least one question from the database of pre-created MyLab™ Math questions or you will get an error as described above in the paragraph corresponding with Figure 13.
- MyLab™ Math inserts random parentheses and spaces in answers; especially in words. Students will write a “MyLab™ Math Being Mean!” email stating that the answer they typed was marked wrong because of random parentheses or spaces, but every time we reviewed the answer, students spelled the answer incorrectly.
- There is no spell check when creating your own questions. We usually type questions in a word document and then copy-paste into MyLab™ Math. It is almost certain that you will have a few misspellings or mistakes in the first semester you create your questions; that is why we are lenient when students have simple misspellings.

Summary

Using instructor-created questions in preparatory class assignments as part of a student accountability initiative in a flipped hybrid format works! Tying a grade to class preparatory assignments has proven to be an effective way to increase participation and engagement. Additionally, personally-created open-ended questions that focus on students' progress and overall holistic development increase student engagement (Barron 2015b; Barron & Lively, 2016), especially for introverted learners (Barron, 2015a; Barron & Gillespie, 2014). The time commitment dedicated to create effective personalized instructor-created questions is definitely worth the results associated with effective student accountability, active learning, assessment and student engagement.

References

- Barron, T. L. (2014, February). *Flipping a Hybrid PreCalculus Class: On-line with benefits*. Presentation at the 27th Annual Georgia Perimeter College Mathematics Conference, Atlanta, Georgia.
- Barron, T. L. (2015a, January). *Engaging the Introverted Learner using the Flipped Classroom in a hybrid calculus class*. Presentation at the Joint Mathematics Meetings, San Antonio, Texas.
- Barron, T. L. (2015b, February). *Developmental Counseling: A reality check for students*. Presentation at the 28th Annual Georgia Perimeter College Mathematics Conference, Atlanta, Georgia.
- Barron, T. L. (2017, January). *A guide for understanding and achievement: Using Developmental Counseling as a tool to provide effective communication for calculus students learning in a hybrid format*. Presentation at the Joint Mathematics Meetings, Atlanta, Georgia.
- Barron, T. L. & Gillespie, M. (2014, February). *Engaging the Introverted Learner using the Flipped Classroom*. Research on Teaching and Learning Summit, Kennesaw State University, Marietta, GA.
- Barron, T. L. & Lively, A. (2016, October). *Developmental Counseling: A Reality Check for Students that Works!* Research on Teaching and Learning Summit, Kennesaw State University, Marietta, Georgia.
- Bergmann, J. & Sams, A. (2012). *Flip your classroom: Reach every student in every class every day*. Arlington, VA: International Society for Technology in Education.
- Bergmann, J. & Sams, A. (2013). Flip your students' learning. *Educational Leadership*, 70(6), 16-20.
- Cain, S. (2013). *Quiet: The power of introverts in a world that can't stop talking*. Portland, OR: Broadway Books.