Learning Assistant Reflection:

Learning by Teaching

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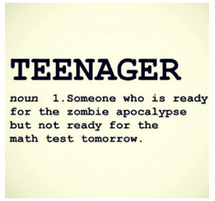


Factoring Intervention

Background: Factoring is a fundamental tool in math that extends into virtually any computational course in mathematics, from basic Algebra to Differential Equations, and beyond. While critically important to understand, the concept of factoring and its applications continues to be a murky spot in students' mathematical ponds of knowledge.

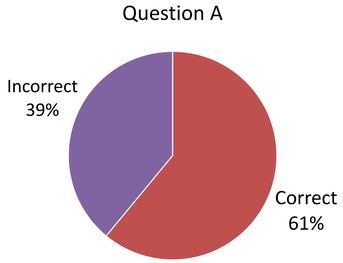
Factoring can consist of simple procedures, such as 'breaking down' numbers into products of powers of primes (for example, $18 = 2 * 3^2$), or more involved ones (for example, finding the roots for $x^3 - 5x^2 - 4x + 20 = 0$).

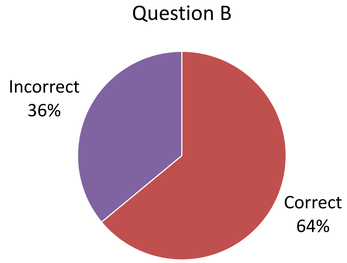
For the purposes of this pre-calculus course, factoring would be needed and used to complete the square, find/identify equations of conic sections, simplify trigonometric equations, prove trigonometric identities, simplify binomial theorem expansions, prove induction, and more.

Why factoring?

Students were assessed the first week of class on key concepts from college algebra. After taking an initial quiz, each student was given a homework assignment specifically generated to target the concepts they needed to review. Upon submitting this homework, students would be eligible for a second attempt at the quiz.

Among other concepts, the students were assessed on their factoring skills. Each quiz contained two factoring questions out of 21 total questions. The results for these (Question A and B) are shown below. Considering a sizeable chunk of the students were still struggling with factoring, and that they would need strong factoring skills for this course and future ones, it seemed that a good course of action would be to develop a mini-lesson that explicitly teaches what factoring is and how it works.





Mini-Lesson: Students were emailed a copy of the lesson. Their homework assignments so far required them to follow along a pre-recorded lecture while filling in printed outlines for notes. Similarly, the document for the factoring mini-lesson was designed to serve as both a (mini) lecture on factoring as well as printable notes.

The document began by establishing what factoring is, and explaining it at the basic level. As the lesson progressed, factoring with variables was included and further extended to solving equations for *x* using factors and factoring by grouping. Additionally, the lesson worked through examples with the students, increasingly leaving steps up for the student to fill in until the student could work the problem individually.

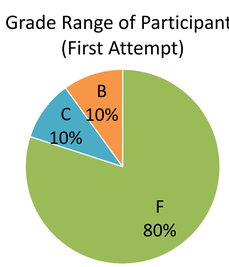
After working through the mini-lesson, students would complete a six-problem assignment and submit it. Submission of a genuine attempt at the assignment granted them a third attempt at the quiz.

(Note: The mini-lesson and corresponding assignment were optional.)

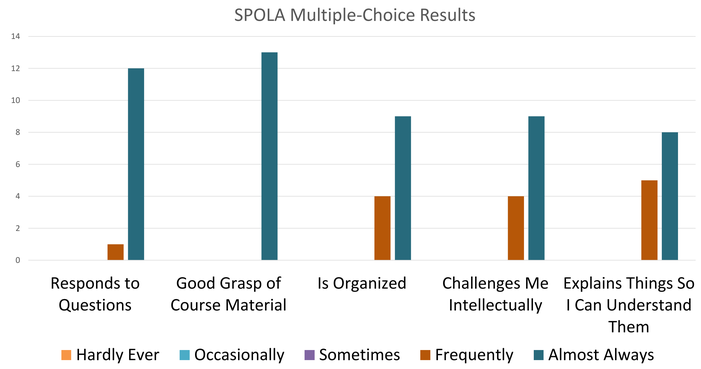
Results: No clear conclusions can be made from the third-attempt data regarding the effectiveness of the worksheet. Data was contradictory and/or unclear when considering (Previous attempt(s) vs. 3rd quiz attempt):

- Time spent solving factoring problems
- Accuracy
- Overall quiz grade

However, there were some observations worthy of noting. First, a majority of the students that submitted the assignment demonstrated mastery of the concept and procedures on this untimed assignment. Second, a majority of the students that submitted the assignment had previously scored below a 60% on the first quiz attempt (refer to chart).



Student Perceptions Of Learning Assistant (SPOLA) Results

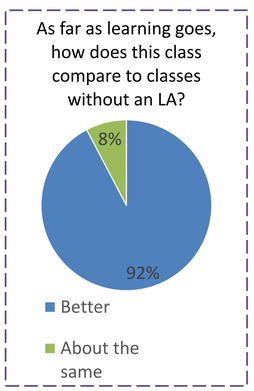


Direct student feedback for improvement:

- *"Try to answer questions from all the groups and not spend too much time on just one."*
- *"Spend equal amounts of time at each table."*
- *"Explain solutions more thoroughly."*
- *"Just answer my question. Sometimes you don't always need to draw a whole diagram for one problem…"*
- *"I think in-class lectures or further explanation of course content while in class could be helpful."*
- *"I also didn't like how we addressed problems that some students had with the online notes."*

How could I be a better LA next semester (based on SPOLA)?

- Be more aware of time spent with specific students/groups.
- Consider that groups that are not asking for help may still need or expect it.
- Get better at gaging the level of support needed by each student/group.



The Art of Teaching

Now that I have been a Learning Assistant for a semester, I think teaching and learning are...

…interrelated, but require separate skill sets. Being a good learner doesn't imply you're a good teacher- even those that have figured out how they learn would not know how to reach or address the needs of other type of learners without research and explicit study in teaching students with various learning styles, strengths, and needs. In this way, teaching requires an in-depth knowledge of learning, learning styles, and intelligences (Redish, 1994) if it hopes to result in successful learners.

Further, the LA experience has shown me the importance of knowing your students. There are two main ways in which building and developing a positive relationship with students impacts learning:

1. Getting to know your students guides your teaching practices. The better you know and understand your students, the better you can
   i. Monitor their progress.
   ii. Identify areas or concepts they are struggling with.
   iii. Adapt or develop lessons to build on their strengths and address their areas of need. When teachers teach the same way aimed at the average student, even the average student loses, as the teaching tends to be lacking in challenging experiences/opportunities (Tomlinson, 2014).
   iv. Develop lessons that are applicable and relevant to them (and thus increasing engagement and effort). Many students don't believe, or have convinced themselves, that 'formal' mathematics is connected or useful in real life (Schoenfeld, 1987).
   v. Determine when it is better for them if you step in to help vs. when to pull back and let them work it out on their own. Guided-discovery maximizes the likelihood of students engaging in fruitful metacognition processes (Ricky & Stacy, 2000).
2. Students respond positively to being treated like people. According to research (Stronge, 2002), students value fairness and respect, and are more likely to succeed when they feel the teacher understands, knows, and listens to them. Teachers that show students they care and value their input are rated as the most effective by students (Stronge, 2002). Moreover, a student that has healthy relationship with their teacher -that feels listened to, respected and understood- invests more effort into the course, and displays positive behaviors and academic practices (Stronge, 2002).

Course Reflection

The pedagogy course is a necessity for being an LA. Throughout the semester, people would interchange LA, TA and IA, assuming these are all the same –they aren't. In practice, the main difference is student interaction. Being a Learning Assistant is exactly that- assisting students in-class every session; it requires involvement and preparation, and skills that college students (a.k.a. LA's) on their own wouldn't possess. The pedagogy course delves into relevant topics that have direct applications to our work as LA's. In this course, students are exposed to research-backed information, theories/philosophies, and practices, in education that develop fundamental skills for having productive interactions with students.

Less formally, the course gives newbie LA's a space to share their experiences –the good, the bad and the ugly- with peers that are going through similar experiences and with a seasoned mentor (aside from the instructor of the class we LA for), and to seek guidance or reassurance when needed.

References

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