

Needs Assessment Report

Maresa M. Flood

IDT 5000

October 8, 2017

Needs Assessment Report

A strong foundation is essential for any structure to stand and endure environmental impacts. So it is with math. Students need a strong foundation in math since math builds upon itself. Children are exposed to math concepts at very young ages when learning the names of numbers, counting, and knowing their age. In elementary school, students are taught addition, subtraction, multiplication and division. In middle school, usually in the 6th grade, those concepts are expanded to include such topics as integer operations, order of operations, ratios, and converting between fractions, decimals and percents. Understanding and applying key concepts like these are part of the strong foundation students need to succeed in high school mathematics and beyond.

I am a certified teacher for Math, grades 5 – 9. My in-classroom experience is mostly with middle school students. Currently I tutor several students in math whose ages range from middle school to mid-thirties. When I begin working with my students to determine where their *basic* struggle or confusion begins, it is usually with one (or all) of these topics: integer operations, order of operations, converting between fractions, decimals and percents, and word problems. In fact, according to Rubin, Marcelino, Mortels, and Lapinid (2014), “Many students enter high school level with severe gaps in their concepts and skills in mathematics. One of these basic foundational knowledge and skills is the integers, a necessary prerequisite skill to solve equations” (p. 1).

Problem Statement

Among the students I tutor, several concepts in mathematics repeatedly emerge as problem areas: integer operations, order of operations, converting between fractions, decimals

and percents, and word problems. These gaps not only negatively impact their current situations, but if not corrected, will continue to impede their progress in future math or career endeavors.

Purpose and Goals

Establishing a strong foundation in integer operations, order of operations, converting between fractions, decimals and percents, and word problems benefits the students as they progress in mathematics. In their research brief posted on the National Council of Teachers of Mathematics website, Cai and Lester (2010) state, “Developing students’ abilities to solve problems is not only a fundamental part of mathematics learning across content areas but also an integral part of mathematics learning across grade levels” (p. 4). For example, understanding and applying integer operations is required for such things as determining proportionality and unit rate in 7th and 8th grade mathematics, solving algebraic equations in Algebra 1, and finding slope, distance and midpoint in Geometry, just to name a few. Integer operations could easily be incorporated within order of operations problems as well as word problems.

When addressing my students’ individual needs, I use many resources such as textbooks, videos, software, games, puzzles, worksheets, tips and tricks, mnemonics, models, etc. However, since tutoring is personalized, I tend to start from scratch with each student. Designing and developing a standard library of my instructional resources on these topics will improve efficiency on my part since I will not have to recreate them for each student. Furthermore, using diverse and effective resources benefits my students as well. As I find new things that "click" with my students I will include them in the library. As an added benefit, this library of "Math-magic" will be an invaluable resource when I return to teaching students in a traditional classroom.

Learner Analysis

Primary Audience

- Students being tutored
 - middle school
 - high school
 - college
 - adult

Secondary Audience

- Students in classroom
 - middle school
 - high school
 - adult education
 - students with IEP's and/or 504 plans

General Learner Characteristics

- Age: 11-38
- Gender: 50% male, 50% female (males are in middle school, females are adults)
- Education: Middle school through bachelor's degree (all read at the 6th grade level or above)
- Work experience: 0 to 18+ years

Entry Characteristics Prerequisite skill and knowledge:

- All read and speak English
- All have a basic understanding of whole number addition, subtraction, multiplication and division
- All can identify integers, fractions, decimals, and percents
- All disdain word problems

Attitudinal and motivational characteristics:

- Most lack confidence in their ability to understand mathematical concepts due to prior experiences and self-recognized deficits
- All are motivated to increase their understanding of mathematical concepts to pass tests
- Most are motivated to apply their understanding of mathematical concepts to real-world problems

Prior experience:

- All have received at least 6th grade level instruction of mathematical concepts, but most do not know how to apply it

Common errors made by novice learners:

- Failing to recognize that fractions represent division
- Failing to make the connections between fractions, decimals, and percents and not understanding they represent the same value written in different ways

- Failing to recognize key / clue words in word problems
- Making incorrect calculations due to not following the order of operations
- Confusing when to make a number positive or negative when performing integer operations

Instructional Needs and Assessment

Students will:

- learn vocabulary associated with the math concepts
- be given explanations and examples using different media (video, verbal, written, models, manipulatives) to best meet their learning style preferences
- practice the concepts using worksheets, puzzles, games, models, manipulatives, software
- apply the concepts by solving real-world problems (word problems)

Prior to instruction of a given concept, students will be given a pre-test. Upon the completion of instruction, students will be given a post-test. The results of each test will be compared to determine if learning occurred and where gaps may still exist. If gaps do exist, then those specific concepts will be retaught, practiced by the student, and reassessed. Other indicators that learning is occurring or has occurred are the questions the students ask and how they are making connections to their personal areas of interest. Using learning software such as IXL provides the students with opportunities to apply their knowledge at different grade levels and/or levels of complexity.

Summary

As academic research indicates and experience corroborates, having a strong foundation in mathematical concepts is necessary as students progress in their education. When students initially come for tutoring, gaps in their understanding of integer operations, order of operations, converting between fractions, decimals and percents, and word problems tend to emerge. Using diverse resources, media, and methods I address my students' individual learning style

preferences and at the same time provide them with challenging, meaningful, memorable, and fun instruction. Creating a library of these resources will increase both the efficiency and effectiveness of that instruction.

References

Cai, J., & Lester, F. (2010). *Why is teaching with problem solving important to student learning?*

Retrieved from

[http://www.nctm.org/uploadedFiles/Research and Advocacy/research brief and clips/Research brief 14 - Problem Solving.pdf](http://www.nctm.org/uploadedFiles/Research_and_Advocacy/research_brief_and_clips/Research_brief_14_-_Problem_Solving.pdf)

Rubin, R. J., Marcelino, J., Mortel, R., & Lapinid, M. R. C. (2014). *Activity-based teaching of integer concepts and its operations*. Retrieved from

http://www.dlsu.edu.ph/conferences/dlsu_research_congress/2014/_pdf/proceedings/LLI-II-016-FT.pdf