TET1 Task 4: Special Populations

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After describing the instruction setting, this paper explores 3 unique electronic resources for each of the following special populations of students: students with disabilities, advanced learners (gifted and talented), and bilingual (English Language Learners, ELL) students. The end of the paper explains how and why it is important to choose technology to fit students with diverse backgrounds.

Instructional Setting, Learning in the Instructional Setting, and Content Area

For the math classes at the urban high school (grades 9 to 12) students are grouped by ability and not by age/grade. In total, the high school has approximately 800 students. For this task, the focus will be on the students in the college prep Algebra 1 classes (2 sections). College prep level classes are meant to prepare students who will continue onto to college after high school. With that, there comes varying degrees of motivation ranging from students who are very motivated (should have been in Honors/Advanced level) to students who are not motivated at all (should have been placed in the lower general level class).

The learners are the high school college prep level math students. This 27-member audience is from an urban setting and has 13 boys and 14 girls. The 27 students are made up of 17 freshman, 8 sophomores, and 2 juniors. In this small target population there are 14 (52%) students who are white, 9 (33%) students who are Hispanic, and 4 (15%) African American students. Another unique characteristic of the target population is that there are three students (11%) who receive special education services (either through an IEP or a 504 Plan). The special education students all have learning disabilities, there are no significant physical impairments. The third unique characteristic
of this group is that there are five students (19%) who are bilingual, one of whom is enrolled in the English as a Second Language classes at the high school.

**Technologies for Learners with Disabilities**

This section will briefly describe 3 technology resources available for learners with different categories of disabilities as defined by IDEA 2004 and that are appropriate for the instructional setting described above.

The first technology resource that is available to students with disabilities is the use of a calculator. This technology can aid students who struggle with retaining arithmetic facts (multiplication tables, etc.) and simple arithmetic rules (adding numbers with different signs, etc.). Calculators are a huge support for students with disabilities because they can focus on learning the more advanced concepts, like balancing an equation, instead of focusing on the arithmetic facts and/or rules.

The second technology resource available for students with special needs is a website called “GetTheMath.” This site relates Algebra to the real world through topics like *Math in Music*, *Math in Fashion*, and *Math in Video Games*. While “GetTheMath” would be great for all students, it would be especially useful for students with disabilities who require real-world, concrete examples of the concepts. (Thirteen Productions, 2012)

The third technology resource that is available for students with disabilities is an application called “Math 42.” This ‘app’ is incredible step-by-step solving and quizzing tool. This downloadable app is free (from Google Play and the Apple Store) and allows students to get step-by-step help on problems they were stuck on in class and/or homework problems. According to their own description in the Google Play Store, this app features “intelligent suggestions on how to approach a problem (unique worldwide), detailed step-by-step solutions that adapt to a student’s need (unique worldwide), extensive corresponding mathematical explanations with examples, …
automatically generated and curated assessment, that enables and facilitates rapid progress.”  
(Chegg, 2018) This app is a great supplemental resource for a student who is a slow processor and may need more examples to really grasp the concept being learned.

**Technologies for Advanced Learners**

This section will briefly describe 3 technology resources available for learners who are advanced (gifted and talented) and that are appropriate for the instructional setting described above.

The first resource available for gifted and talented students is the website “IXL.” This website is a game-based website where students complete lessons to learn skills. Along the way the uncover hidden treasures and virtual rewards. Students always know how close they are to earning their next reward, so this keeps them engaged and learning because that next award is just around the corner. (IXL, 2018)

The second electronic resource available for advanced learners is the website “OpenMiddle.” This website has challenging problems sorted by grade and then subject (algebra, geometry, etc.) that students can solve. According to their website, “Open middle problems require a higher depth of knowledge than most problems that assess procedural and conceptual understanding. They support the Common Core State Standards and provide students with opportunities for discussing their thinking.” (Middle, n.d.)

The third technology resource available for gifted and talented students is the website called “Desmos.” It is an online graphing software. Students can log in and complete and create challenging activities based on the idea of graphing. By logging in, students are connected to the class and the teacher. Students can see how classmates are thinking about the problem, they can also create challenges for each other to complete. Also, by connecting to the class and teacher, the teacher can get digital feedback to see how the students are doing. One of the focuses of Algebra 1
is graphing, so this opportunity to explore and go above and beyond the basics is a wonderful opportunity for the advanced learners. (Desmos, 2018)

**Technologies for Bilingual Learners**

This section will briefly describe 3 technology resources available for learners who are bilingual and that are appropriate for the instructional setting described above.

The first technology that is readily available to bilingual students are translation devices. These devices can range from no tech (i.e. a Spanish/English dictionary) to high-tech (i.e. translation websites and applications such as Google Translate and Yahoo’s BabelFish). These tools are so important for a student who is simultaneously learning English and math (the content). Translation devices are also extremely helpful for teachers to ensure that this population of students is successful in their classroom and shows the students that the teacher is trying to reach the student to the best of their ability.

The second technology resource that is available for bilingual learners is a website called “DreamBox Learning Math.” This game-based program is available in English and Spanish. Each student has their own log-in to track their progress. This program allows a teacher to assign a lesson or standard to the whole class, small group, or individual student or the student can choose which topic to explore. Then players (students) complete lessons to earn game currency, increase the number of lessons they complete, increase their avatar star rating and increase the time spent on lessons in the game. The game currency can be used to upgrade the student’s avatar, background music, and wallpaper within the game. Completing lessons in DreamBox allows students to collect achievement badges and mini-games, in addition to practicing important content. If learners get a question in a lesson wrong, the program gives a hint why the answer is wrong and gives the learner a second chance. If they get it wrong again the computer shows the correct answer with a brief spoken explanation. Within the lessons, each question is read out loud and there is an option for a
hint or two if the student is stuck on the question. DreamBox also creates and sends data to teachers for easy progress monitoring and tailoring your teaching to the needs of the students. This program would be a great supplement to the curriculum for all students, especially bilingual students. (DreamBox Learning, 2018)

The third technology available for bilingual learners is “Khan Academy.” This electronic resource is available as a website and as a downloadable application for mobile devices. Khan Academy has excellent tutorials on math (by grade level and by class i.e. algebra 1) for free. Like DreamBox, students connect to their teacher so that the teacher can track progress and assign lessons/topics to complete and practice. As students complete lessons, practice problems, and assessments, they earn achievement badges and go on missions. Bilingual learners can go to content they may not know and learn prerequisite skills and concepts. Most of the content is available in Spanish as well. Because the videos are instructional videos meant to supplement classroom instruction, the instructors use simplified wording and work through example problems while explaining the content. The videos can be easily paused, and a bilingual learner could access a translation device to help them with words they are unfamiliar with. (Khan, 2018)

**How to Choose Technology Resources**

There are many factors to consider when choosing technology resources that appropriately support learners with diverse backgrounds within the described instructional setting. One of these factors is, what are the diverse backgrounds? If there are students with disabilities, what are the disabilities? What do the Individualized Education Plans (IEPs) specify for assistive or instructional technology? Does the teacher want to allow students to be on their mobile devices for apps? Does the infrastructure of the school (wi-fi) support the use of mobile devices or laptops? How often can the teacher reserve the laptop cart or computer lab (as the school is currently not 1-1)? What is the purpose of the technology, teach, extra practice, remediation?
Once these questions are answered, start looking for technology to fit those needs. This paper discusses a combination of apps for mobile devices as well as websites, to facilitate a variety of infrastructure hurdles.

**Importance of Choosing Appropriate Technologies**

It is important to choose technology resources to support learners with diverse backgrounds, so all learners can find success with the content. Today’s students are extremely into technology and instant feedback. By choosing technology with that as one of the features will greatly increase the student’s understanding of the material. It is also important to choose appropriate technology to meet the need of the learner you are addressing, not all technology is appropriate for every student.
References


