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Tackling Math Anxiety through Photography while using GeoGebra

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Cover Page Footnote
I would like to acknowledge Dr. Carol Ann Marinas for her passion for photography that made me interested in connecting photography, GeoGebra, and math anxiety together so to make teaching mathematics more exciting and less threatening for young people.

Tackling Math Anxiety through Photography while using GeoGebra

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Abstract

Math teachers can insert photographs into GeoGebra software then explore various math objectives related to the Common Core Math Standards, the paper shows how to motivate students to learn math and minimize math anxiety while doing it. While covering the new Common Core State Standards, the topics will explore the math that surrounds us in the real world thus creating a connection between the abstract math and the life experiences. When math has a purpose, then students are willing to spend time in exploring and understanding new concepts. Real-life photographs that are inserted into GeoGebra will provide the basis to observe relationships with different and similar shapes. Technology like GeoGebra can help motivate young learners to enjoy learning mathematics while addressing math anxiety and attitudes. The presentation/paper will show educators how by importing photography into the GeoGebra software, teachers can explain math concepts and make the learning of math more real-world and relevant. In an age of STEM, it is critical that we motivate and turn young people onto math through technology. Online websites and resources for addressing math anxiety and attitudes are also shared.

Key Words: Math Anxiety, GeoGebra, Photography, *Mathitudes Survey*

Introduction

Mathematics teachers can better reach their students and show them how math surrounds us by using photography and GeoGebra while teaching math. In today's high tech world, students need to be proficient in Science, Technology, Engineering, and Mathematics (STEM) fields. As endorsed by the National Council of Teachers of Mathematics (NCTM, 2000) and stressed in the new Common Core State Standards(CCSS) in Mathematics, it is critical that we teach using technology, address attitudes and anxiety toward math, and make the math

that students are learning relevant and meaningful. Often, it may be best to start teaching young people geometry first as opposed to numbers, which are considered more abstract and difficult to learn. Geometry is one of the most concrete branches of mathematics and focusing on this first can benefit students' whole view of mathematics and their attitudes towards learning it. Today teachers also need to be cognizant and checking for attitudes and dispositions toward learning mathematics as math anxiety is an issue in today's classrooms. This paper looks at ideas for teaching mathematics with the use of technology and photography using the free dynamic mathematics software, GeoGebra, to help teachers create mathematically confident young people.

Checking for Mathematical Dispositions in our Classrooms

Today math anxiety is a common problem in many classrooms. Richardson and Suinn (1972) originally defined math anxiety as "a feeling of tension and anxiety that interferes with the manipulation of numbers and the solving of mathematical problems in a wide variety of ordinary life and academic situations" (p.551). Mathematics anxiety is the "irrational dread of mathematics that interferes with manipulating numbers and solving mathematical problems within a variety of everyday life and academic situations" (Buckley and Ribordy, 1982, p. 1).

Research on math anxiety has been around since the 1970s (Richardson & Suinn, 1972). Math anxiety still continues to plague our society and affects our young peoples' success and achievement with the subject (Finlayson, 2014; Quander, 2013). Quander feels that elementary teachers need to help prepare students to be lifelong learners and develop a productive mathematical disposition so that they are prepared for future schooling and eventual careers. Math anxiety can impede not only mathematical performance but also interest and then career choice and many decisions in life. The idea of looking closely at math anxiety levels, motivation to learn mathematics, and using technology like GeoGebra to teach and motivate students is critical today in a world of STEM and also can impact achievement goals of the learners (Gonzalez-DeHass, Furner, Vásquez-Colina, & Morris (2017).

As part of the NCTM Standards (1989), the NCTM believe that mathematics teachers need to assess students' mathematical disposition regularly regarding: checking for confidence in using math to solve problems, communicate ideas, and reason; flexibility in exploring mathematical ideas and trying a variety of methods when solving problems; willingness to persevere in mathematical tasks; interests, curiosity, and inventiveness in doing math; student ability to

reflect and monitor their own thinking and performance while doing math; and value and appreciate math for its real-life application, connections to other disciplines and cultures and as a tool and language. NCTM has set the stage since the late 1980's in making educators check for dispositions and attitudes toward mathematics part of the assessment of the learner.

In research from Jackson and Leffingwell (1999) they found that in their study only seven percent of the population reported having positive experiences with mathematics from kindergarten through college. Their study cited that there are many covert (veiled or implied) and overt (apparent and definite) behaviors exhibited by the math instructor in creating math anxiety in students. Things like difficulty of material, hostile instructor behavior, gender bias, perceptions of uncaring teacher, angry behavior, unrealistic expectations, embarrassing students in front of peers, communication and language barriers, quality of instruction, and evaluation methods of the teacher. Math instructors' behaviors and teaching methods can be hurtful and negative to students learning math. Students often say: "I like the class because of the teacher" because the teacher knows how to present developmentally the subject matter, creates a learning environment conducive to learning with compassion, has high expectations for all students without regard to gender, race, or language barriers, and uses a variety of assessment methods and teaching styles to better reach all students to address math anxiety (Chernoff & Stone, 2014; Dowker, Sarkar, & Looi, 2016).

Research by Furner (2007) in synthesizing math anxiety treatments, it was found that there are two distinctions to math anxiety: prevention and reduction and there are distinct strategies and methods to address each is different ways. It has been found that there are three ways to prevent math anxiety: 1). Using "Best Practice" in mathematics such as: manipulatives, cooperative groups, discussion of math, questioning and making conjectures, justification of thinking, writing about math, problem-solving approach to instruction, content integration, technology, assessment as an integral part of instruction, etc.; 2). Incorporating the NCTM and State/Common Core Math Standards into the curriculum and instruction; and lastly, the importance of discussing feelings, attitudes, and appreciation of mathematics with students. This same research found that there are three methods to reduce math anxiety: 1). Psychological Techniques like anxiety management, desensitization, counseling, support groups, bibliotherapy, and discussions; 2).Once a student feels less fearful about math, he/she may build their confidence by taking more mathematics classes; and 3). It has been found that most research shows that until a person with math anxiety has confronted this anxiety by some form of discussion/counseling no "best practices" in math will help to overcome this fear.

It may also be beneficial to provide students with a math attitude surveys at the beginning of each school year or course and also to read the book, *Math Curse* (Scieszka & Smith,1995), to get students to talk about their true feelings toward math, surveys and biblio-therapy are both effective forms of starting the process of opening up and getting inner feelings out young people may have about mathematics or unpleasant past experiences. It is recommended that mathematics teachers survey their students at the beginning of a school year to check for their students' dispositions toward mathematics. See Appendix C Attached for a possible survey to use called *Mathitudes Survey*. There are also two good online surveys that test for math anxiety and may be useful to classroom teachers as follows are: Mathpower (http://mathpower.com/anxtest.htm) and Mathipedia (http://www.mathipedia.com/student-math-anxiety-test.html), both of these websites offer online tools for teachers ad students to be able to take a short survey to assess their overall dispositions toward mathematics.

Math Teachers during the school year while teaching mathematics should use some advantageous instructional methods which are advocated now for teaching mathematics using the Concrete-Representational-Abstract (CRA) Model for teaching mathematics as follows: First educators need to tart with the Concrete using hands-on manipulatives like Geoboards, then secondly, they must move to Representational models in diagrams (or use Virtual Manipulatives like NLVM at: http://nlvm.usu.edu/), and lastly, connect to the Abstract symbolism where student understand and function at an abstract level completely (GeoGebra software works well at: http://www.geogebra.org/cms/en/). The CRA Model is really the bases for the best practices pedagogy for teaching mathematics starting with young people, but should also be used at all levels of math instruction.

Today learning connections can be made when we teach math using such things as technology like GeoGebra and photography. Munakata and Vaidya (2012) based on their research found that students do not consider mathematics and science to be creative endeavors, although the traditional artistic disciplines rank high in this regard. To address this problem in perception, the authors used photography as a means to encourage students to find the deep-rooted connections between science and mathematics and the arts. The photography project was used in a formal classroom setting as well as an outside activity, i.e. in a more informal setting. The project found student interest and motivation were peaked when photography was part of the instructional strategies to teach new material while making meaningful connections to the math using the photography. Jones (2012) also in her book, *Visualizing Mathematics*, discusses how teachers need to help students visualize and create representations of their math understanding so to

turn them on to the subject. Beilock & Willingham (2014) feel math teachers can help to address and reduce math anxiety. The author believes by using technology like GeoGebra along with the photography teachers can make better connections and students are going to be more highly motivated to learn math.

Common Core State Standards (CCSS) as They Relate to using GeoGebra

Most schools and states today are adhering to the new Common Core Math Standards (National Governors Association Center for Best Practices (NGA Center) and the Council of Chief State School Officers (CCSSO), 2010) found at: http://www.corestandards.org/

See Appendix B for examples on using GeoGebra and photography to create meaning and understanding of geometry for the students.

When math teachers relate real-world problems through the use of dynamic technology like GeoGebra and connecting them to photography to make important connections in math, our learners recognize that geometry and shapes/mathematics surround us! Many Common Core Math Standards can all be taught using GeoGebra and Photographs an done in a way that is less anxiety provoking for students when learning mathematics. See Appendix B several examples.

Using Technology like GeoGebra in the Teaching of Mathematics in Today's Classrooms

Using technological tools is critical in today's world. Our students need to learn to excel at higher levels of generalization, model and solve complex problems, and focus on decision-making and reasoning (National Council of Teachers of Mathematics (NCTM) 1989, 2000, 2006). NCTM believes that mathematical power can arise from technology that includes: increased opportunity for learning, increased opportunities for real-life social contexts, and orientation to the future. The President's Council of Advisors on Science and Technology (PCAST) (Holdren, Lander, & Varmus, 2010) released an executive report in November 2010 where specific recommendations to the administration are given to ensure that the United States is a leader in Science, Technology, Engineering, and Mathematics (STEM) education in the coming decades. One recommendation is to recruit and train 100,000 new STEM middle and high school teachers over the next decade that are able to prepare and inspire students to have strong majors in STEM fields and strong content-specific pedagogical preparation. PCAST regards teachers as the most important factor in ensuring

excellence in STEM education. Despite the ongoing efforts to promote the use of technology in education (e.g., National Council of Teachers of Mathematics [NCTM], 2000; National Educational Technology Standards for Teachers [NETS.T], 2008), teachers' ineffective use of technology has been reported in the literature. One reason frequently cited is that teachers are not trained in utilizing technology in the classroom within the subject context. Hwang, Su, Huang, & Dong, (2009) found that by combining virtual manipulatives and software like GeoGebra along with whiteboard, teachers can better model problems, help students understand and solve the problems while reaching higher levels in the teaching of many mathematical ideas in the curriculum.

Using Emerging Technology like GeoGebra

The software, GeoGebra, is a multi-platform dynamic mathematics software for all levels of education from elementary through university that joins dynamically geometry, algebra, tables, graphing, spreadsheets, statistics and calculus in one easy-to-use package (Hewson, 2009; Hohenwarter, Hohenwarter, & Lavicza, 2009). This open-source dynamic mathematics software can be downloaded for free and accessed at: http://www.geogebra.org/cms/en/info. There are no licensing issues associated with its use, allowing students and teachers freedom to use it both within the classroom and at home. GeoGebra has a large international user and developer community with users from 190 countries is currently translated into 55 languages.

Some research by Fahlberg-Stojanovska, & Stojanovski (2009), they discovered that using GeoGebra is motivating for students and helps them learn at a higher level while exploring and conjecturing as they draw and measure. Rosen & Hoffman (2009) established the importance to integrate both concrete and virtual manipulatives into the math classroom, such as representational models like GeoGebra. Furner & Marinas (2007,2014) found that young people can easily transition from the concrete when using manipulatives like geoboards to the abstract when using geometry sketching software like GeoGebra. Although GeoGebra has been primarily intended for mathematics instruction in secondary schools, it certainly has uses in higher education and even now introduced in the elementary math levels. The Appendix A provides online websites and resources related to GeoGebra.

GeoGebra may be used to show how mathematical equations can be applied to everyday objects. Aydin & Monaghan (2011) in their research feel that math teachers need to explore the potential for students to "see" mathematics in the real world through "marking" mathematical features of digital images using a

dynamic geometry system like GeoGebra. Mathematics teachers may find the following videos (Mathematics and Multimedia, n.d.) of basic training for GeoGebra at: http://mathandmultimedia.com/2011/01/01/geogebra-essentials-series/ useful as they provide great resources for how to quickly use GeoGebra in their classrooms.

Research using GeoGebra was described as raising the enthusiasm for the effective and wise application of technology to the teaching/learning enterprise (Fahlberg-Stojanovska and Stojanovski, 2009; Hewson, 2009). Observations of participants in schools and during the summer workshops are also cited as evidence. GeoGebra was also credited with changing teacher habits. Two features were specifically referenced as causing this change: 1) that it is an award winning software system, and therefore has admirable features, and 2) that it provides an effective pedagogical model for teachers.

Mishra and Koehler (2006) found that Technological Pedagogical Content Knowledge (TPCK) is the basis of good teaching with technology and requires not only content knowledge or pedagogical knowledge but an understanding of the representation of concepts using technologies, how to teach these math concepts using technology, knowledge on the challenges their students will face when presented with this new pedagogy, and how technology can be used to build on existing knowledge and develop new knowledge. Scandrett (2008) feels that math teachers need to always start by using concrete models in geometry using manipulatives like geoboards which provide a concrete model of understanding. Rosen & Hoffman (2009) have found that teachers need to connect students understanding from the concrete to abstract and using virtual manipulatives and software like GeoGebra better help make those connections to representational models connecting the concrete using geoboards to something oven more abstract in understanding. With the availability of GeoGebra, teachers are able to make graphical representations of math concepts. As the concepts are introduced with pictorial representations, teachers and their students are able to make the connections between the pictures, the math concepts, and the symbolic representation. When presented with a new concept, students need to think, visualize and explore relationships and patterns. This is consistent with the CRA (Concrete, Representational, and Abstract) Model for teaching mathematics currently in better reaching students as they learn and understand mathematical concepts. Technology makes all of this possible for them in a short amount of time.

So Why Should Math Teachers use GeoGebra as part of their instruction?

In reviewing the research on GeoGebra, there are many reasons to use GeoGebra some of which are: that it is free to download and use from GeoGebra.org; it is an up and coming dynamic teaching tool in our schools today, dynamic for learners; it is user-friendly for students and teachers; it lends itself well to connection from the hands-on Geoboards to virtual Geoboards to something even more abstract; it is a a software that provides many resources and teaching tools at its wiki for educators at: http://www.GeoGebra.org/en/wiki/index.php/Main_Page; GeoGebra may be used for primary-aged students through college: and lastly it is fun, easy to use, and students learn a lot about geometry, algebra, measurement and beyond by using this dynamic learning tool.

Math educators may ask why it is important to make connections and excite students about learning math while using GeoGebra? To answer this educators will find that when using GeoGebra, educators will be able to: show a purpose for math; develop relationships between math concepts and shapes and ideas; the software will show practical applications to math in life; it employs innovative teaching in the classroom; it stimulates through photography/modeling; it employs emerging technologies in math with the real world application; and it can address math anxiety so students feel confident for any STEM field when they graduate from school.

Additional help with math anxiety and its research can be found at: Professor Freedman Provides Math Help at: http://www.mathpower.com and Mathitudes Online website at: http://www.coe.fau.edu/centersandprograms/mathitudes/

A famous quote from W. V. Williams (1988) is a reminder of how critical it is to teach for understanding making things as hands-on and real-world as possible: “Tell me mathematics, and I will forget; show me mathematics and I may remember; involve me...and I will understand mathematics. If I understand mathematics, I will be less likely to have math anxiety. And if I become a teacher of mathematics, I can thus begin a cycle that will produce less math-anxious students for generations to come.” Today math teachers need to break the cycle of math anxiety and address it, and by using GeoGebra and making connections with photography teachers can better connect the math they teach to students and their understanding while using emerging technologies.

Furner (1999) also made these related observations as they relate to the importance of mathematics confidence: "If math teachers do something about helping their students to develop their confidence and ability to do math, we can impact their lives in a positive way forever." And "Our students' careers and ultimately many of their decisions they will make in life could rest upon how we decide to teach math. We must make the difference for the future of our kids in an ever growing, high-tech, competitive, global world which depends so heavily on mathematics."

Final Thoughts

Young learners intrigued by technology will construct and investigate geometric shapes and many math ideas with GeoGebra and will start enjoying math and have less math anxiety in our STEM World that we now live in. By using technology like GeoGebra and incorporating photographs, our young learners who are often intrigued by technology will construct and investigate geometric shapes; when using photography inserted in the GeoGebra software students can start enjoying math more and will hopefully be less math anxious in the years to come so to pursue any STEM field of their liking. Students will see math in the real world more when using photography inserted into the GeoGebra to learning the mathematics in today's curriculum to cover many standards. There are many free resources for math teachers Grades K-12 to download which are in Appendix A.

References

Aydin, H., & Monaghan, J. (2011). Bridging the divide--Seeing mathematics in the world through dynamic geometry. *Teaching Mathematics and Its Applications: An International Journal of the IMA*, 30(1), 1-9.

Beilock, S. L., & Willingham, D. T. (2014). Math anxiety: Can teachers help students reduce it?
American Educator, *38*(2), 28-32.

Buckley, P. A., & Ribordy, S. C. (1982). *Mathematics anxiety and the effects of evaluative instructions on math performance*. Paper presented at the Mid-western Psychological Association, Minneapolis, MN.

Chernoff, E., & Stone, M. (2014). An Examination of Math Anxiety Research. *OAME/AOEM*
Gazette, 29-31.

Dowker, A., Sarkar, A., & Looi, C. Y. (2016). Mathematics Anxiety: What Have We Learned in

60 Years? *Frontiers in Psychology*, *7*, 508. http://doi.org/10.3389/fpsyg.2016.00508

Fahlberg-Stojanovska, L, & Stojanovski, V. (2009). GeoGebra- freedom to explore and learn. *Teaching Mathematics and Its Applications: An International Journal of the IMA,* 28(2), 49-54.

Finlayson, M. (2014). Addressing math anxiety in the classroom. *Improving Schools, 17*(1), 99-115.

Furner, J.M. (1999). *Mathematical power for all: Strategies for preventing and reducing math anxiety*. Workshop/Research Presentation at the National Council of Teachers of Mathematics Conference. Phoenix, Arizona. December 3, 1999.

Furner, J. M. (2007) *Mathitudes: Research, activities, websites, and children's literature toward a mathematically confident society*. Research and activities presented at the National Council of Teachers of Mathematics Southern Regional Conference, Houston, Texas, November 30, 2007.

Furner, J. M., & Marinas, C. A. (2007). Geometry sketching software for elementary children: Easy as 1, 2, 3. *Eurasia Journal of Mathematics, Science & Technology Education*, 3(1), 83-91.

Furner, J. M., & Marinas, C. A. (2014). Addressing math anxiety in teaching mathematics using photography and GeoGebra. Paper presented at *the International Conference on Technology in Collegiate Mathematics Twenty-sixth Annual Conference*, San Antonio, Texas, March 22, 2014. (pp.134-143).

GeoGebra Free Software Download, (n.d.) Retrieved on April 27, 2014 at: http://www.geogebra.org/cms/en/

Gonzalez-DeHass, A. R., Furner, J. M., Vásquez-Colina, M. D., & Morris, J. D. (2017). Pre-service elementary teachers' achievement goals and their relationship to math anxiety. *Learning and Individual Differences,* 60, 40-45. https://doi.org/10.1016/j.lindif.2017.10.002

Hewson, P. (2009). Geogebra for mathematical statistics. *International Journal for Technology in Mathematics Education*, 16(4), Retrieved May 5, 2011at: http://www.editlib.org/p/30304.

Hohenwarter, J., Hohenwarter, M., and Lavicza, Z. (2009). Introducing dynamic mathematics software to secondary school teachers: The case of GeoGebra. *The Journal of Computers in Mathematics and Science Teaching*, 28(2), 135-46.

Holdren, J., Lander, E., & Varmus, H. (2010). Prepare and inspire: K-12 education in science, technology, engineering and math education for America's future. The President's Council of Advisors on Science and Technology, Office of Science and Technology Policy. Retrieved May 5,

2011 at: http://www.whitehouse.gov/administration/eop/ostp/pcast/docsreports.

Hwang, W.Y., Su, J.H., Huang, Y.M., & Dong, J.J. (2009). A Study of Multi-Representation of Geometry Problem Solving with Virtual Manipulatives and Whiteboard System. *Educational Technology & Society*, 12 (3), 229–247.

Jackson, C. D., & Leffingwell, R. J (1999). The Role of Instructor in Creating Math Anxiety in Students from Kindergarten through College. *Mathematics Teacher, 92*(7), 583-586.

Jones, J. C. (2012*). Visualizing: Elementary and middle school mathematics methods.* Hoboken, NJ: John Wiley and Sons, Inc.

Mathematics and Multimedia. (n.d.) Mathematics and multimedia K-12 mathematics teaching and learning through multimedia: GeoGebra essentials series. Retrieved on December 18, 2013 at: http://mathandmultimedia.com/2011/01/01/geogebra-essentials-series/

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017-1054.

Munakata, M., and Vaidya, A. (2012). Encouraging creativity in mathematics and science through photography. Teaching Mathematics and Its Applications: An International Journal of the IMA, 31(3), 121-132.

National Library of Virtual Manipulatives (n.d.) Retrieved on April 27, 2014 at: http://nlvm.usu.edu/

National Council of Teachers of Mathematics. (2006). *Curriculum focal points for prekindergarten through grade 8 mathematics: a quest for coherence*. Reston, VA.:Author.

National Council of Teachers of Mathematics. (2000). *Principles and Standards for School Mathematics*. Reston, VA: Author. National Council of Teachers of Mathematics. (1989). NCTM *Curriculum & Evaluation Standards*. Reston, VA: NCTM.

National Council of Teachers of Mathematics. (1989*). Curriculum and evaluation standards for school mathematics.* Reston, VA: Author.

National Educational Technology Standards for Teachers. (2008) Retrieved on April 27, 2014 available at: http://www.iste.org/Content/NavigationMenu/NETS/ForTeachers/2008Standards/NETS_T_Standards_Final.pdf.

National Governors Association Center for Best Practices (NGA Center) and the Council of Chief State School Officers (CCSSO) (2010). *Common core state standards initiative*. Washington, DC. Authors. The Common Core State Standards may be accessed and/or retrieved on November 14, 2010 from http://www.corestandards.org.

Quander, J. (2013). Math anxiety in elementary school: Setting anxious students at ease. *Teaching Children Mathematics*, 19 *(7)*, 405-407.

Richardson, F. C., & Suinn, R. M. (1972). The mathematics anxiety rating scale: psychometric data. *Journal of Counseling Psychology*, 19, 551–554.

Rosen, D., & Hoffman, J. (2009). Integrating concrete and virtual manipulatives en early childhood mathematics in early childhood mathematics. *Young Children*, 64 (3), 26-33.

Scandrett, H. (2008). Using geoboards in primary mathematics: going…going…gone? *Australian Primary Mathematics Classroom*, 13 (2), 29-32.

Scieszka, J., & Smith, L. (1995). *Math curse*. New York: Viking.

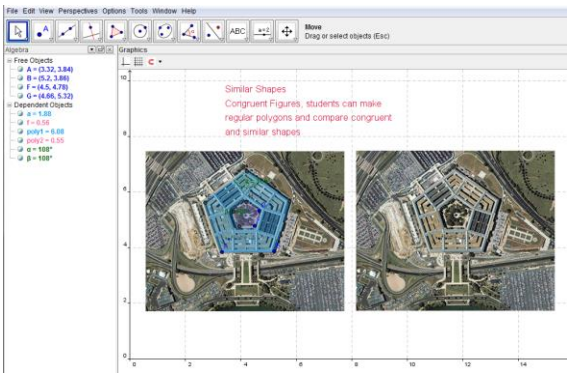
Williams, W. V. (1988). Answers to questions about math anxiety. *School Science and Mathematics*, 88(2), 95-104.

Appendix A: GeoGebra Websites and Resources for the Mathematics Classroom

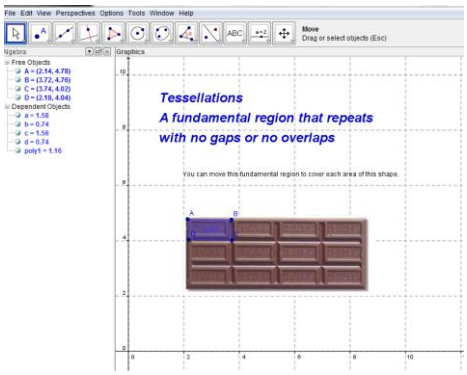
Geoboard Resources	http://msteacher.org/epubs/math/QuickTakes/geoBoard.aspx
GeoGebra	http://GeoGebra.org
GeoGebra Wiki Forum	http://www.GeoGebra.org/en/wiki/index.php/Main_Page
GeoGebra Data Files	http://matharoundus.com
Math Academy	http://www.mathacademy.com/pr/minitext/anxiety/
Mathitudes Online	http://www.fau.edu/education/centersandprograms/mathitudes/

Appendix B: K-6 Math Topics Covered with GeoGebra and Photography

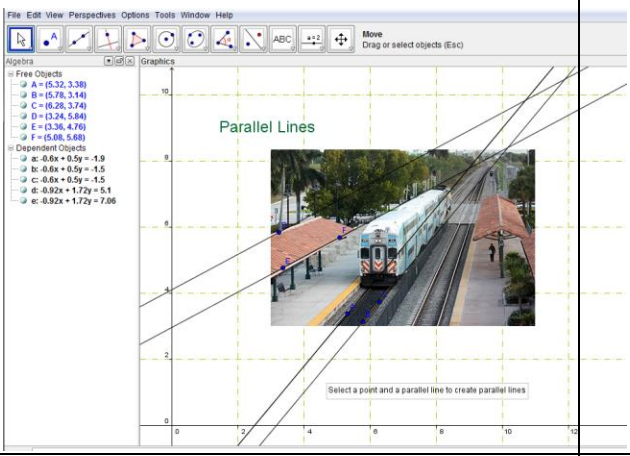
Similar Shapes



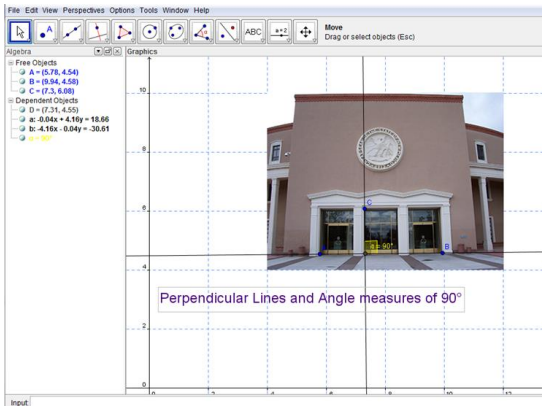
Tessellations



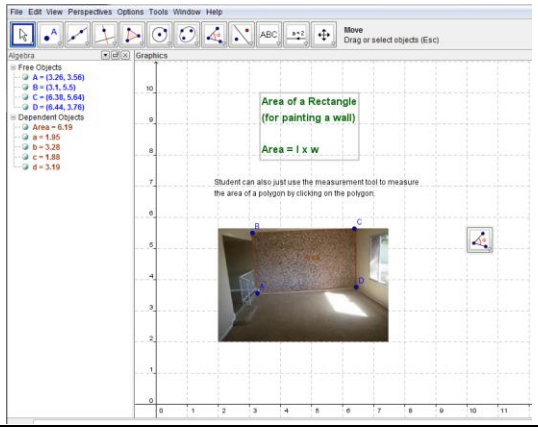
Parallel Lines



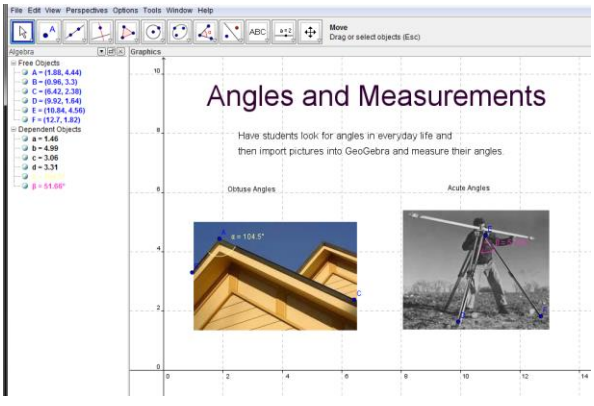
Perpendicular Lines



Area



Angles and Measures



Appendix C

Mathitudes Survey

Name_____
Grade_____
Math Class_____
Age_____
Career or Career Interests_____

Mathitudes Survey

1. When I hear the word math I.....

2. My favorite thing in math is.....

3. My least favorite thing in math is.....

4. If I could ask for one thing in math it would be.....

5. My favorite teacher for math is_____because_____

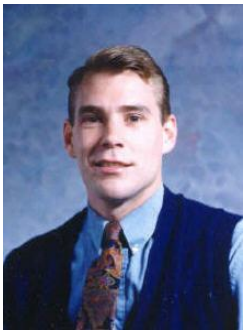
6. If math were a color it would be.....

7. If math were an animal it would be.....

8. My favorite subject is_____ because_____

9. Math stresses me out: True or False Explain if you can.

10. I am a good math problem-solver: True or False Explain if you can.



Author Bio

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