

Effective Usage of iPads for Teaching of Elementary Mathematics

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What are iPads?

- iPads are mobile learning devices.
- They are wireless computer tablets with touchscreen technology made by Apple©.
- They allow users to access:
 - the internet
 - email
 - digital books
 - Applications (AKA apps)



Image courtesy of Apple Inc.

iPhones and iPads equipped “apps” tend to keep children occupied.

The popularity of these devices continues to grow.

- More than 9.9 billion apps have been downloaded for free or sold via the iTunes store as of January 2011 (Apple, 2011).

- The development of apps for children has expanded dramatically during the past year.

However, there is not a great deal of research investigating the impact of these devices on children's learning.

YET These Handheld tablet computer designed, developed, and marketed by Apple, Inc are infiltrating the education system

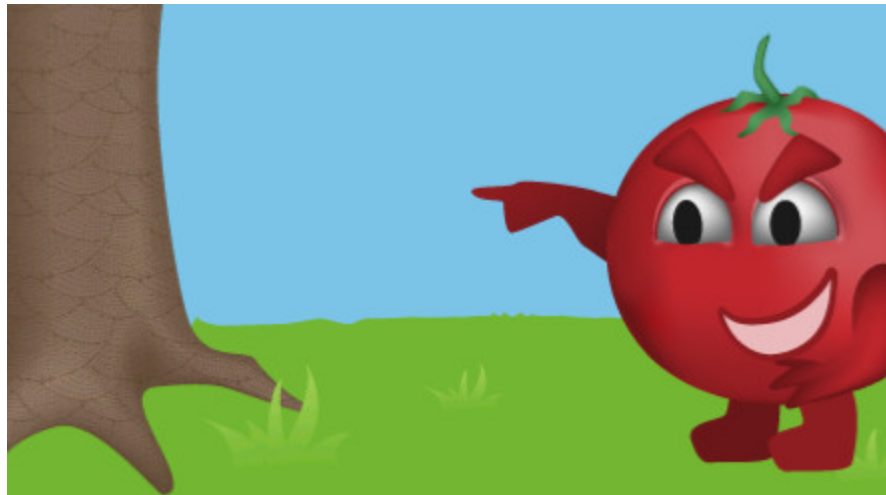


- In recent years, various public schools have incorporated these devices into their curricula (e.g., at the Chicago Elementary Public Schools, students are now using iPads during daily classroom learning as well as for formative assessments, to improve student performance and engagement:
<http://www.govtech.com/education/iPads-In-The-Classroom.html>)

Applications

- Applications (apps) exist for all uses:
 - Subject-specific education
 - *Arithmetic*
 - *American States and Capitals*
 - Skill-specific education
 - *Word Wizard*
 - Productivity
 - *Pages*
 - Reference
 - *Encyclopedia Britannica*
 - News
 - *National Geographic Magazine*
 - Arts/Entertainment
 - *Comic Book!*

Arithmetic Apps



You'll eat those words... as I eat your treasure! Hahaha!



Upgrade Skills
Your Cash: \$125

| | |
|----|---|
| 50 | ∞ |
| 15 | 0 |
| 0 | 0 |

Ninja Star

Level: 1/5 Max Shots: 15

Hold your fingers on the screen to shoot ninja stars continuously!

Upgrade to level 2: Allows you to regenerate ninja stars at 2x the normal rate. **Cost: \$75**

+15 Shots **Cost: \$25**

Refund
>Done Shopping

American States & Capitals

- Cost: \$0.99 (wryIP, LLC)

Touch a State to Begin



Michigan: "The Great Lakes State"

Abbreviation: MI
 Capital: Lansing
 Largest City: Detroit
 Size: 96,810 square miles
 Became a State: 1837

Name of Residents: Michiganders

State Bird: Robin
 State Fish: Brook Trout
 State Flower: Apple Blossom
 State Tree: White Pine

Major Industries: Automobile Manufacturing,
 Farming, Timber, Fishing



Return

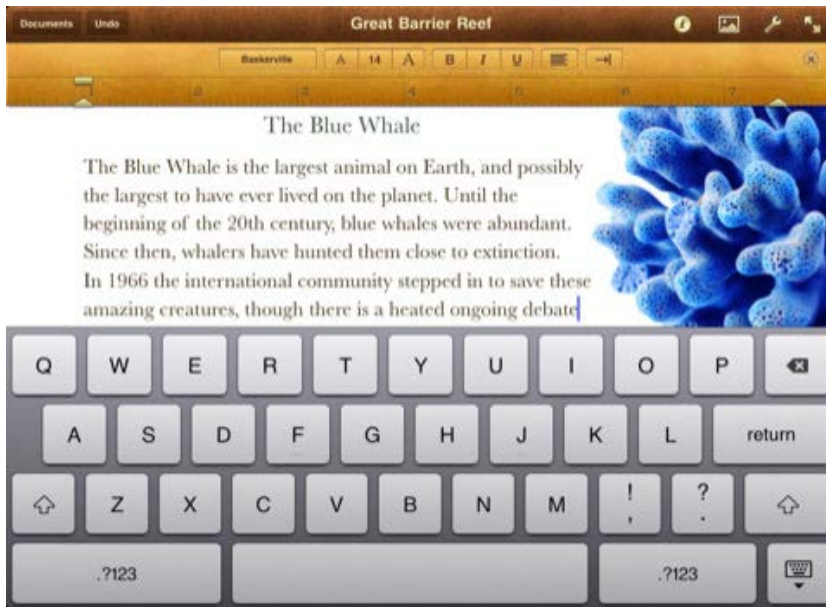
Word Wizard

- Cost: \$2.99 (L'Escapadou)



Pages

- Cost: \$9.99 (Apple)

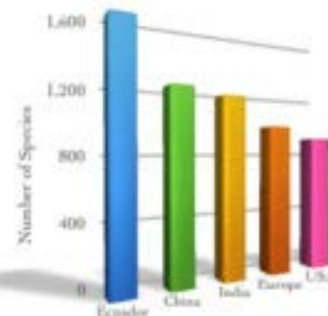


Spectacular wildlife.

Our coastal bird list includes the Gull-billed Tern, Snowy Plover, Emeralds Woodstar, Pacific Royal Flycatcher, Collared Antshrike, Guayaquil Woodpecker, Plumbeous Kite, Laughing Falcon, and Chilean Flamingo.

About 1,000 kilometers off the mainland lie the Galapagos Islands, where you can take in many geographical points of interest, from beautiful beaches to ancient rock formations, active volcanoes, lava caves, and other lava flow formations. In terms of birdlife, you're likely to see Greater Flamingos, Great Frigate Birds, Red- and Blue-footed Boobies, Finches, Short-eared Owls, Storm-petrels, Flightless Cormorants, and Galapagos Penguins.

With more bird species than many larger countries have, Ecuador is one of the top birding destinations in the world.



Of course, the wildlife on view in Ecuador is certainly not limited to birds. During your travels you may also spot butterflies, fox, puma, jaguar, ocelots, monkeys, sloth, anteater, spectacled bear, mountain tapirs, iguanas, geckos, tortoises, lizards, and anacondas. And Ecuador has more frog and orchid species than any other place on earth.



Encyclopedia Britannica

- Cost: FREE! (Encyclopedia Britannica, Inc.)

The image displays three screenshots from the Encyclopedia Britannica website, illustrating its content and navigation.

Top Left Screenshot: Amazon River Article

The article for the Amazon River includes a table of contents, images, and a link map. The text describes the river as the greatest of South America and the largest drainage system in the world. It mentions the river's length (at least 4,000 miles) and its source in the Andes Mountains. A map shows the vast Amazon basin (Amazonia) in Latin America, covering approximately 2.7 million square miles.

Top Right Screenshot: George Washington Network

This screenshot shows a network diagram for George Washington, connecting him to various historical figures and events. Key connections include Alexander Hamilton, Benjamin Franklin, Frederick North, Lord North, the American Revolution, the United States, James Madison, John Adams, Thomas Jefferson, and the Constitution of the United States of America.

Bottom Screenshot: This Day: April 17

This screenshot shows the "This Day: April 17" page, featuring a "Featured Event" and "Other Events on This Day".

Featured Event: 1982: Canada Act proclaimed. The Canada Act, also known as the Constitution Act, took effect on this day in 1982, establishing certain individual rights, preserving parliamentary supremacy, and making Canada a wholly independent, fully sovereign state.

Other Events on This Day:

- 2003: Anneli Jäätteenmäki was sworn in as prime minister of Finland, which thereby became the second country (after New Zealand) to install a woman as head of both state and government.
- 1975: Cambodia's ruling Lon Nol government collapsed, and the communist forces of the Khmer Rouge, led by Pol Pot, entered Phnom Penh and forcibly dispersed its citizenry into rural areas.
- 1956: Cominform, the international Communist Information Bureau founded in 1947, was disbanded as part of a Soviet program of reconciliation with Yugoslavia.
- 1961: Cuban leader Fidel Castro's forces repelled the Bay of Pigs invasion, which was led by recent Cuban exiles and financed by the U.S. government during the Cold War.
- 1895: The Treaty of Shimonoseki concluded the Sino-Japanese War, which ended in China's defeat.
- 1521: Martin Luther appeared before the Diet of Worms to defend his ideas on church reform.

National Geographic Magazine

- Cost: FREE! (National Geographic Society)

SMART TRAVELER

THE LIST
Museum Season Preview






LONDON The Charles Dickens Museum reopens in time to fete his 200th Christmas with a fresh look, seasonal readings, and mulled wine at the Camden house where the Victorian novelist (above) wrote *Oliver Twist*.

LONG ISLAND The Parrish Art Museum reopens November 10 to a dramatic structure in the Hamptons' Water Mill Swiss architects Herzog and de Meuron showing William Merritt Chase paintings (above).

BERLIN On December 6, 1912, a German archaeologist found the Queen Nefertiti bust (left). The Neues Museum "In the Light of Amarna" (December 7 to April 13).

CREDITS

Young worshippers stand at a church door in San Miguel de Allende.



CREDITS

TAP ON STORY

La Bonne Vie in Paris
By DON GEORGE

Finding Peace in South Africa
By ALEXANDRA FULLER

Spirited Away in Kyoto
By PICO IYER

My Grandfather in Tangier
By TAHIR SHAH

Steppe by Steppe in Mongolia
By STANLEY STEWART

Finding a Lost Soul in Mexico
By FRANCES MAVES

Reborn in the Bay Area
By ELLEN GILCHRIST

Letting Go in Uganda
By ANN HOOD





Comic Book!

- Cost: \$1.99 (3D TOPO Inc.)



- TECHNOLOGY CAN BE A POWERFUL TOOL WITH INCREDIBLE POTENTIAL FOR ALTERING ESTABLISHED FORMS OF TEACHING AND LEARNING.
- The usage of iPads has spread rapidly with the hope of improving student performance and motivation as well as altering learning environment to be more engaging and interactive.
- In order to prevent these iPads to become a fad and sit in a closet or a table (similar to the computers) there need to be clear goals and plans regarding why iPads are needed and how they can be integrated effectively into school curriculum.
- Pensky (2001) refers to today's children as **digital natives**, a term for "*native speakers of the digital language of computers, video games and the internet.*"
- Children born in the new millennium and growing up with these new digital technologies are likely to "think and process information fundamentally differently from their predecessors" (Pensky 2001a, Oblinger & Oblinger, 2005). Therefore, one good way to reach digital natives is through communication in their native language.

Goals for using technology

- 1. Make schools more efficient and productive than they currently are
- 2. Transform teaching and learning into an engaging active process connected to real life
- 3. Prepare the current generation for young people for the future workplace.
- 4. Students must be given 21st century tools that simulate authentic work environments.
- Cuban (2001)

- To facilitate technology integration into daily instruction to improve teaching and learning, the administrators must establish and maintain a learning community where all faculty members continue to develop professionally and in which technology becomes integrated as a means for teaching and learning (carr,2011)

ATTITUDES AND BELIEFS

- In order to better understand how to help teachers develop the capability to effectively incorporate iPads technologies into their student-centered instructional practices, it is critical to understand the **students'** and **teachers' attitudes and beliefs** toward technology integration.

Suburban School

I. Students' Beliefs and Attitudes toward iPads:

| | Math, Language Arts, Reading, Social Studies | Math Only |
|---|---|------------|
| Questions | Mean Score | Mean Score |
| I enjoy using the iPads | 3.73 | 4.00 |
| Use of iPads in schools will better prepare me for my life as an adult, both as an individual, and as a community member. | 3.74 | 3.55 |
| iPads give me opportunities to learn new things. | 3.57 | 3.55 |
| I enjoy school activities that involve the use of iPads. | 3.85 | 4.00 |
| I think iPads are difficult to use | 1.75 | 1.15 |
| Using iPads increases my motivation to complete school work. | 3.15 | 3.84 |
| The iPad provides too many distractions and is not conducive to improve learning | 1.37 | 1.15 |
| N | 22 | 20 |

Strongly Agree: 4, Agree: 3

Disagree: 2, Strongly Disagree: 1

I. Teacher Perceptions and Attitudes:

| Questions | Mean Score |
|---|------------|
| I believe iPads are a valuable tool to use with my students | 3.67 |
| I believe ipads are a valuable tool for enhancing my teaching practice | 3.57 |
| The greatest impact of iPad initiatives is on academic improvement. | 3.50 |
| Positive changes will happen if you provide every student with an iPad | 3.20 |
| Positive change will happen if you provide every teacher with an iPad. | 3.00 |
| I believe that textbooks will be replaced by electronic media (including iPads) within 5 years. | 2.88 |
| I believe that the role of schools will dramatically change because of iPads within 5 years. | 3.13 |
| I believe that I am a better teacher when I use an iPad. | 1.80 |
| If my district offered iPad based professional development activities, I would use them. | 3.75 |
| Student time on the iPad is time well spent | 3.13 |
| The iPad can help accommodate different learning styles. | 3.75 |
| The iPad provides too many distractions and is not conducive to improve learning | 2.13 |
| N | 10 |

Strongly Agree: 4, Agree: 3, Disagree: 2, Strongly Disagree: 1

Results of Teacher Survey

I. Teacher Needs:

| Questions | Mean Score |
|--|------------|
| I need access to more iPads for my students. | 3.00 |
| I need access to a more reliable or faster Internet connection. | 3.25 |
| I need more apps that can be used for educative purposes. | 3.57 |
| I need more training with iPad technology. | 3.88 |
| I need more training with curricula and pedagogy that integrates ipad technology. | 3.88 |
| I need more compelling reasons why I should incorporate iPad technology into my classrooms. | 2.71 |
| I need more time to learn to use the iPad and the Internet. | 3.25 |
| I need to be able to try out technology enhanced curriculum units in my classroom before I feel comfortable with them. | 3.38 |
| I need more time to change the curriculum to better incorporate iPad technology. | 3.57 |
| N | 11 |

Strongly Agree: 4

Agree: 3

Disagree: 2

Strongly Disagree: 1

II. Teacher Perception and Attitudes:

| Questions | Mean Score |
|---|------------|
| I believe iPads are a valuable tool to use with my students. | 3.67 |
| I believe ipads are a valuable tool too for enhancing my teaching practice. | 3.57 |
| The greatest impact of ipad initiatives is on academic improvement. | 3.50 |
| Positive change will happen if you provide every student with iPads. | 3.20 |
| Positive change will happen if you provide every teacher with iPads. | 3.00 |
| I believe that textbooks will be replaced by electronic media (including iPads) within 5 years. | 2.88 |
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| If my district offered iPads based professional development activities, I would use them. | 3.75 |
| Student time on the iPad is time well spent. | 3.13 |
| The iPad can help accommodate different learning styles. | 3.75 |
| The iPad provides too many distraction and is not conducive to improve learning. | 2.13 |
| N | 11 |

Strongly Agree: 4

Agree: 3

Disagree: 2

Strongly Disagree: 1

Please list the 3 most important things you need immediately in terms of professional development to maximize your use of the iPad:

- Apps, Apps, Apps; Districts have professional develop curriculum for subject areas. Perhaps, the district should have a committee that can develop an "app curriculum"
- Knowledge of other apps that are educationally beneficial.
- Training; Time to review apps; Personal iPads.

What do you think has been your biggest challenge while participating in the iPad initiative at your school?

- I have not always received the applications I request. Many of my apps are either free or self-purchased. For me, to plan effectively, I believe the district should have ready available apps for me to choose from.
- Inability to use other programs and discuss with others who have used other helpful educational programs.
- Providing the iPad for each student, tech support, funding for apps, finding apps for specific lessons.

Findings

- Increased student- to- student discourse during the practice sessions (Some related to finding solutions; some related to social interactions).
- Re-enforcing understanding of content knowledge.
- Students appeared to be more motivated and engaged when using iPads in the classroom.
- As shown in the surveys, both teachers and students view iPads as easy and valuable tools to learn, which have the “potential” to improve learning outcomes.

- HOW ARE iPads USED TO ENHANCE MATHEMATIC INSTRUCTION

MODELS OF USING iPADS IN THE K-12 SCHOOLS

- **Model 1. every day every where model**

iPads are distributed to every student or a specific group of students. And thus, students are responsible for them. iPads are used in the classroom and are taken home.

Model 2. Student – centered model

Students had their own iPad in a cart located in the classroom and took out the iPads during classroom session, as indicated by the teacher.

Model 3. teacher –centered model

A teacher could check out his/her iPads and occasionally demonstrate concepts on a Smartboard or document camera. Students were called up to manipulate the screen.

Model 4. Technology – centered model

technology specialist kept the iPads in a cart in the technology department and brought them as requested by the teachers. Students used the iPads for specific activities occasionally.

STUDENTS WITH SPECIAL NEEDS



- students with down syndrome.
- Special Education teacher with two teaching assistants. The teacher used almost 60 applications.
- Individualized lesson: Each child had a different type of application, as based on his / her IEP.



- EXAMPLES OF APPS
APPROPRIATE FOR SPECIFIC
MATH CONTENT

GEOMETRY

○ MEASUREMENT

- GIVES MEANING TO NUMBERS ON A RULER
- Research indicates that when students see standard rulers with the numbers on the hash marks, they often believe that the numbers are counting the marks rather than indicating the units or spaces between the marks.


EFFECTIVE IMPLEMENTATION

- **The lessons** “Measurement”:
 - Lesson regarding Measurement →
 - Demonstration of how to use a ruler on the Board and how to use the app on a SmartBoard →
 - Activity with ipads by using the “Measure” app.

Elementary School



Length

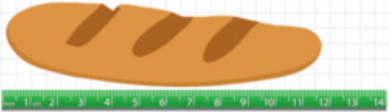


Length cm

CORRECT!

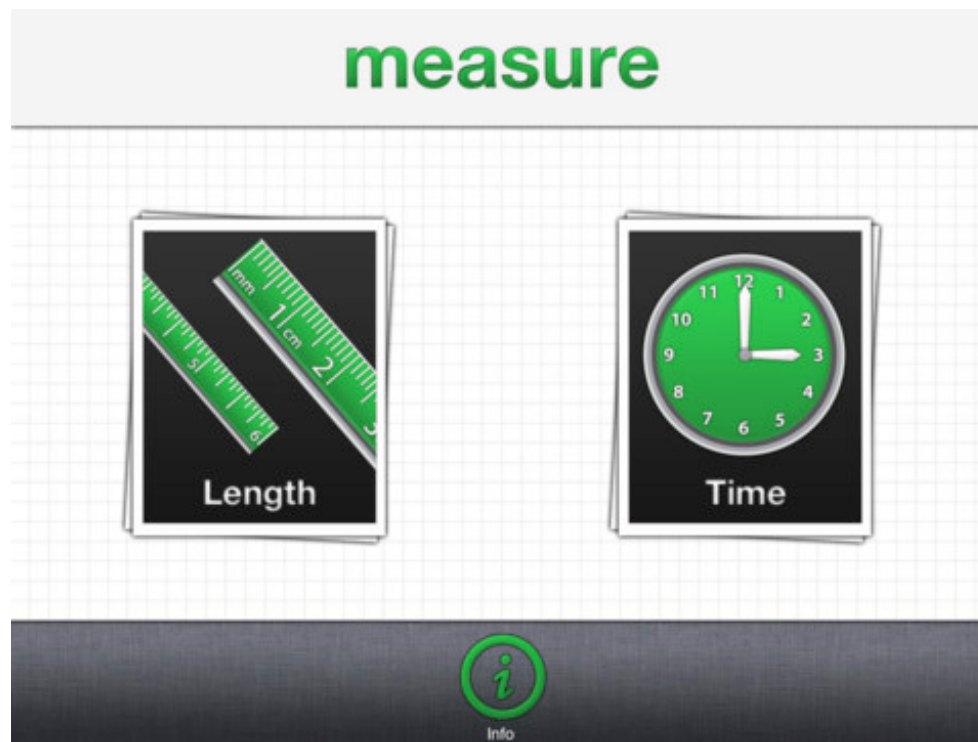
The answer is

Length



Length cm

Experience the app.



SPLASH MATH

- NUMBER SENSE AND PLACE VALUE

- INSTANT FEEDBACK

option for intervention and remediation



HUNGRY FISH

- Composing and Decomposing Numbers



MULTIPLICATION SUSHI MONSTER

- PRACTICE VS DRILL



CHICKEN FRACTION COOP ESTIMATION GAME (FREE)

- CONNECTING FRACTIONS AND DECIMALS
- **KEY IDEA:**
- DECIMAL FRACTIONS ARE SIMPLY ANOTHER WAY TO WRITING FRACTIONS. BOTH NOTATIONS HAVE VALUE. MAXIMUM FLEXIBILITY IS GAINED BY UNDERSTANDING HOW THE TWO SYMBOLS SYSTEMS ARE RELATED



Thank you

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