

**Authentic Learning with iPads: Creating Visual Representations and Explaining Understandings**Tim Pelton [tpelton@uvic.ca](mailto:tpelton@uvic.ca)Leslee Francis Pelton [lfrancis@uvic.ca](mailto:lfrancis@uvic.ca)**Classroom uses of iPads:**

- Provide Ready access to **Content** (IRP, lesson plans, worksheets, videos, etc.)
- Support **Exploration** (browser, Wikipedia, virtual museum, calculator, etc.)
- Present **Consolidation** Activities (MathTappers, reading, physics games, etc.)
- Support **Observation** Activities (collect images, video experiment, etc.)
- **Create** learning objects and artifacts (explain something, alternate projects, etc.)
- **Present** (any of the above... )
- **Document Camera** (for physical objects, papers, demonstrations, etc.)
- **Administration** support (e.g., attendance, emails, etc.)

**Purpose: How to create learning objects (manipulatives, templates and instructional videos):**

- To provide students with efficient access to manipulatives for an activity
- To provide students with a template and resources to support them in creating a video
- To provide students with exemplars to support them in creating their own manipulatives
- To capture **explanations** of concepts or processes – for use in class or out (flipping)
- To share **exemplars** that students can be encouraged to emulate

**Resources:**

- An iPad
- An adaptor – 30-Pin or Lightning to VGA or HDMI
- A projector or large TV (with either VGA or HDMI input)
- Apps: Explain Everything, Eraser, Paper (by 53)
- if you have robust/reliable WiFi, you can use an AppleTV and AirPlay
- If you need audio, you will need speakers and a sound cable

**Supporting apps:**Explain Everything (EE):

EE is a Screencasting app that supports the creation of learning objects. As students are challenged to create learning objects, they communicate their understandings and undertake an authentic problem solving process – in addition they are mastering technology, reflecting, reasoning, representing and making connections. EE allows teachers and students to create projects or interactive activities that can be used by others to explore concepts and processes. Through its recording functions, it also allows teachers and students to generate and publish video expositions/vignettes of their understandings.

Explain Everything app allows you to:

- Create - lines, text, objects, slides
- Import - images, videos, webpages
- Manipulate - duplicate, rotate, scale, layer, lock
- Record - animation, voice, together or separate
- Share - projects, images, videos
- More info ... <http://www.makingtechsimple.com/explain-everything>

**Paper (by 53):**

A nice drawing app (extra features can be purchased as a bundle)

Create a new notebook for each project or collection of projects – handy sketchbook.

You can export images to your camera roll (turn on transparency to make trimming easier)

Here is a site with some hints on using paper... <http://mademistakes.com/mastering-paper/>

**Eraser:**

An app that allows you to erase extraneous image elements (i.e., make parts of an image transparent).

We use this to create objects that we will use in EE.

**Creating and Sharing Learning Objects**

When you create a project on EE, it consists of one or more ‘slides’ with some number of ‘objects’ on each slide (pictures, text, audio, drawings, etc.). These projects can be exported and shared (via email or web) and then imported/opened on another iPad using EE. Although these manipulatives don’t offer the texture and 3D aspects of manipulatives, they do offer, easy access, zero cleanup time, zero cost, infinite quantity, etc. – just load them on your class webpage and have the students download the manipulatives/learning objects you need for the day. Once you have loaded a project, you might refine it to better suit your students’ needs, and then publish that revised version on your website.

You may also use your projects to create a video that explains some concepts or demonstrates some process, or entertains, or connects, etc.. Each slide can record animations and audio tracks. You can add the animation and audio in parts and restart or edit until you are satisfied. Once you have a complete presentation, you can export it as a video and upload it to Youtube or Vimeo.

**Some Example Manipulatives/Learning Objects:**

- Coins – a collection of coins that can be used by students to work out money problems
- Pattern Blocks – a collection of geometric shapes that can be used by students to explore geometry, fractions, art, etc.
- Triangle sorter – a collection of slides with triangles on them to allow students to describe and classify triangles in different ways.
- Fishy Glyph - create a glyph to represent a circumstance and support students in understanding abstraction
- Fraction strips - a background fraction strip grid with transparent fraction strip pieces that can be attached to each other and moved around on the grid to discover relationships
- Fraction Addition – overlay divided rectangles to find common denominators
- Fraction Multiplication – overlay fractions to make sense of fraction multiplication
- Integer chips – a collection of complementary chips for working with fractions
- Calculator pieces – a decomposable calculator that can be used to create and solve puzzles
- Function machine – a slight of hand function machine that lets you demonstrate functions

### Some Example Instructional Videos/Learning Objects:

- Fraction Strips <https://www.youtube.com/watch?v=fbQ4V97Hvxc>
- Find the Height of a Tree: <https://www.youtube.com/watch?v=8-Vv-fAsuaY>
- Adding Fractions: <https://www.youtube.com/watch?v=fSRq886P7D0>
- Using Sense-Making to Subtract: <https://www.youtube.com/watch?v=zIE8Vo5xQIM>
- Why is negative x negative = positive: <https://www.youtube.com/watch?v=2QyZ7cNts70>
- Divisibility by 3: <https://www.youtube.com/watch?v=V1tMZ8vsbk4>

Find more projects and video links at our website: [www.explainingunderstanding.com](http://www.explainingunderstanding.com)

### Let's do it – Creating a manipulative

- Creation is a problem solving process – Understand, Plan, Execute, Reflect
- What manipulatives will work for your class?
- Authentic objects to manipulate, authentic contexts
- E.g., Sorting/classifying ordering/seriating, counting/skip-counting, etc.
- E.g., Art – understanding geometry, relationships, etc.
- E.g., Useful models Fraction strips, Grids, Algebra Tiles, Triangles
- E.g., Templates for Video (background and foreground actors/objects)
- **Try it – integer chips (draw or take pictures)**

### Let's do it: Creating an instructional/explanatory video

- Creation is a problem solving process – Understand, Plan, Execute, Reflect
- Suggestions
  - Understanding is something we want to cultivate and motivate.
  - Focus on just one main message – keep it short (30seconds – 2 min)
  - Keep it simple
- Get set up
  - Gather your materials – create and import supporting images/projects/templates
  - Transform your storyboard into a sequence of pages/slides
  - Practice your presentation – but it doesn't need to be perfect
- Save as a project, export a video and share
- **Try it: Demonstrate that the sum of the angles in a triangle is  $180^\circ$** 
  - *Think through the challenge – do you understand?*
  - *Draw/capture a Scalene triangle, mark angles as unique, export image to camera roll*
  - *Open a new project in EE and import your triangle (trimmed) on the first slide*
  - *Duplicate slide and make a couple more copies of the triangle*
  - *Lock scale on each triangle on second slide*
  - *On slide 1: record your introduction to the concept – the sum of angles in a triangle is  $180^\circ$*
  - *On slide 2: rotate 2 of the triangles  $180^\circ$  and record your process while you reposition them to demonstrate concept.*
  - *Export – to camera roll, youtube, email, dropbox, etc.*
- Challenge 1 – what about the sum of the angles in a quadrilateral?
- Challenge 2 – something from a recent unit plan?
- Challenge 3 - Answer a question you know some children will have?

### **Discussion and Questions**

- Why should we create these types of manipulatives or videos?
- Why should we challenge our students to create these types of videos?
- How can you do this in the classroom?
  - Do you need a class set of iPads to make this work?
  - Won't everyone be talking over each other?
  - Is the threshold too high?
  - Is the friction too high?
- Other thoughts and questions?