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# Daring to Imagine: a Large-Scale Approach to Visual Arts Assessment Through a Virtual World Environment

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# DARING to IMAGINE

A software tool is created with the hope of providing a journey into a connective, relevant, and meaningful way of knowing in and through the study of art.

## a Large-Scale Approach to Visual Arts Assessment Through a Virtual World Environment

PAMELA G. TAYLOR

often see the following lines from Lewis Carroll's (1871/2000) *Through the Looking Glass* used by authors who, like me, wish to challenge their readers to believe or imagine what may have before seemed impossible. In the quote, Alice and the Queen are discussing their ages. Alice is exactly 7 and a half, and the Queen is 101, 5 months, and a day:

**'I can't believe that!' said Alice. 'Can't you?' the Queen said in a pitying tone. 'Try again; draw a long breath, and shut your eyes.' 'One can't believe impossible things,' said Alice. 'I daresay you haven't had much practice,' said the Queen. 'When I was your age I always did it for half-an-hour a day. Why, sometimes, I've believed as many as six impossible things before breakfast.'** (p. 176)

This quote was used most recently to support the 21st Century Schools' (2010) notions that a completely new paradigm for education is difficult, but not impossible, to imagine. Art educators typically take great delight in such challenges. Imagining a new paradigm that "breaks the mold, is flexible, creative, challenging, complex, and addresses a rapidly changing world filled with fantastic new problems as well as exciting new possibilities" (para. 3) is not difficult for us. Our difficulties typically lie in trying to fit into established paradigms and resulting requirements such as assessment and accountability. According to Elisabeth Soep (2004) from the University of California, Berkeley, "The relationship between art and assessment is best characterized as awkward if not overtly hostile" (p. 579). We are not like everybody else. What art

students know and are able to do cannot be revealed on the kinds of traditional standardized tests used to measure students' learning proficiency levels. Visual arts education is about ideas, creative solutions to problem solving, inventive expressions of meaning, and working to encourage others to see the world's possibilities. How can we assess such characteristics when so much of what we do is subjective, individual, and yes, creative?

As problematic and impossible as an authentic large-scale visual art assessment may seem, the fact is if education in the visual arts is to be recognized as an important part of schooling, we need to provide evidence of the kinds of learning and knowing going on in the art class. National, state, and local government leaders and policy makers use data from large-scale



In this article, I will share a research project that resulted from such unfettered imagining and visualizing of what could be. The progress of this research is documented here, along with the implications, hopes, and plans for its continued development. Although this article reports on the development of one particular tool, my intention is to inspire other art teachers to imagine, construct, and develop or build upon the lessons learned in this project. The hope is that in this process, art education will lead the way to implementing authentic embedded assessment processes across all education disciplines and grade levels.

It all started with the idea that student connections—among visual art and other modes of learning, thinking, working, making, and knowing—could be readily visible, clarified, and valued as a form of **assessment** in schools at district, state, and national levels. I imagined that art students' creativity, experimentation, exploration, meaning, edginess, and provocative or compelling ways of working could be measured and represented in quantitative ways was not impossible. I envisioned the representation of such connective data on charts, graphs, and even the nightly television news that could accurately and justifiably report what art students know and are able to do.

The eLASTIC software is designed to take the kind of learning and knowing inherent in the original hypertextual study to a linkable virtual 3-D world/environment much like a computer video game. The entangled visual

The hope is that the interface will be as compelling as the linking process was in the original hypertext research as it provides a way to journey into a connective, relevant, and meaningful way of knowing in and through the study of art. Currently there are two rooms and a hallway in the eLASTIC software. In one room there is a balcony that overlooks the Doha Bay and city skyline. There are five picture frames on the walls, one sectional couch, an ottoman, and coffee table with sheets of paper that mimic notes, a television monitor, a light switch, and a

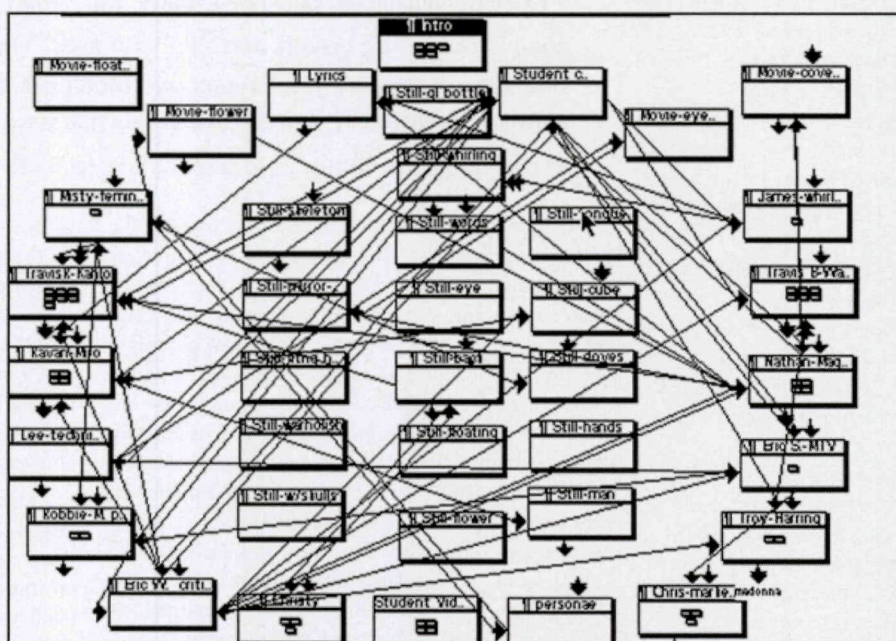






Figure 2. There are 2 rooms and a hallway in the current eLASTIC software. In one gallery room there is a balcony that overlooks the Doha Bay and city skyline. The hallway opens to the second room and largest room. The colors, wall textures and floor are designed to mimic an Arabian open air marketplace called a souq, featuring exposed wooden beams and doors, aging plaster walls, and an ornate sand-colored tiled floor.

red alert button that pulses when teachers add specific notes, reminders, and/or other critical instructions. The hall that opens to the second room is lined on either side with five picture frames and two bookshelves. There are five frames on the ceiling of the hallway, as well. The second and largest room has 20 frames on the walls and ceilings, seven television monitors, stools and tables with note papers, two desks, two light switches, and a red alert button. There is a sound speaker featured above each frame on the walls. Below each image and television monitor is a title or text card/panel. The colors, wall textures, and floor are designed to mimic an Arabian open air marketplace called a souq, featuring exposed wooden beams and doors, aging plaster walls, and an ornate sand-colored tiled floor (see Figure 2). Users upload images, movies, and sound or text files into a repository within their eLASTIC. They then place those images inside specific objects in the environment. Links are made between or among specific areas of images, text, and entire video and sound files. Notes that explain connections are attached to each link. Links may be categorized by path and color-coded accordingly. For example, in his or her eLASTIC world/environment a student may place an image of artist Kehinde Wiley's 2005 Willem van Heythuysen painting. The large oil canvas features a young Harlem, NY, man with Sean Jean designer street ware, Timberland boots, and a Hip Hop attitude (Ravenal, 2007). The student created a link

between the figure in Wiley's painting and an image of Frans Hals' 1625-1630 portrait of a 17th-century Dutch merchant by the same name. A challenge such as "Describe similarities and differences in the two paintings" issued by the teacher is attached to the red alert button. Using link notes, text panels, and/or note papers strewn about on the furniture, the student answered this challenge by writing comments relating to time, culture, geographical location, and social issues as they relate to each of the two paintings. For example, the student wrote about the ways Kehinde Wiley critiques Western canonical exclusions while at the same time comments on the excess of contemporary

cultures such as Hip Hop. Furthermore, the student included sound files in the speakers and video files on the television monitors to support and/or extend his or her line of thinking. Along with images from artists that borrow, appropriate, and critique, the student included popular and visual culture connections such as Skylar Grey's original "Love the Way you Lie" rap remake by Eminem and Rihanna in their eLASTIC world/environment. The student's own meaningful artmaking response involved his recreation of multiple-identities in a gridded Warhol-like format that includes responses to: I am, I care about, I want to be, I hate, and I wish. The student made links from the visual response

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that included social concerns, personal and family values and issues, contemporary events, news, hopes, and dreams, as well as the works of art and visual culture previously discussed in class. Links throughout this example followed such color-coded paths as appropriation (green), critical disruption (red), art history (brown), interdisciplinary (yellow), social studies (orange), and social justice (purple). When a light switch on the wall in the environment is switched off or the “show links” menu item is selected the links are revealed as colored lasers of light.<sup>2</sup>

Links are also visible when users select and work from alternate views of the eLASTIC world/environment: (1) the previously described eLASTIC in-world three-dimensional view; (2) the overhead view that features images when scrolled over; (3) a map

or radial view that mimics a mind or web map of all objects in the space; and (4) the explorer view that allows perusing of objects and their corresponding links (see Figure 3).

## Mining the Data

**Collection, analysis, and assessment made from the information students place, write about, and create in their eLASTIC world/environment will be ultimately linked directly to standards and rubrics.** Initial attempts to mine learning data were made in the 2009-2012 research study using a “statistics” feature within eLASTIC that quantified links, images, videos, and sounds along with attached notes and comments. This feature also included a word and phrase search. Characterizing words, phrases, and quantity and quality

indicators of what students know and are able to do is challenging, if not impossible. For example, how would a computer program determine and report on a student's ability to grasp the concept of appropriation? How too would a computer recognize the quality and significance of connections made among information in a student's eLASTIC world/environment? In addition to analyzing their written comments and link explanations, how could a computer program inform an evaluator that the student was appropriating—not just copying—Warhol?

According to Hilary Persky (2004) of the Educational Testing Service, authentic assessable tasks require in-depth visual and written responses. According to Myford and Sims-Gunzenhauser (2004), the 1974 and 1997 National Assessment of Educational Progress

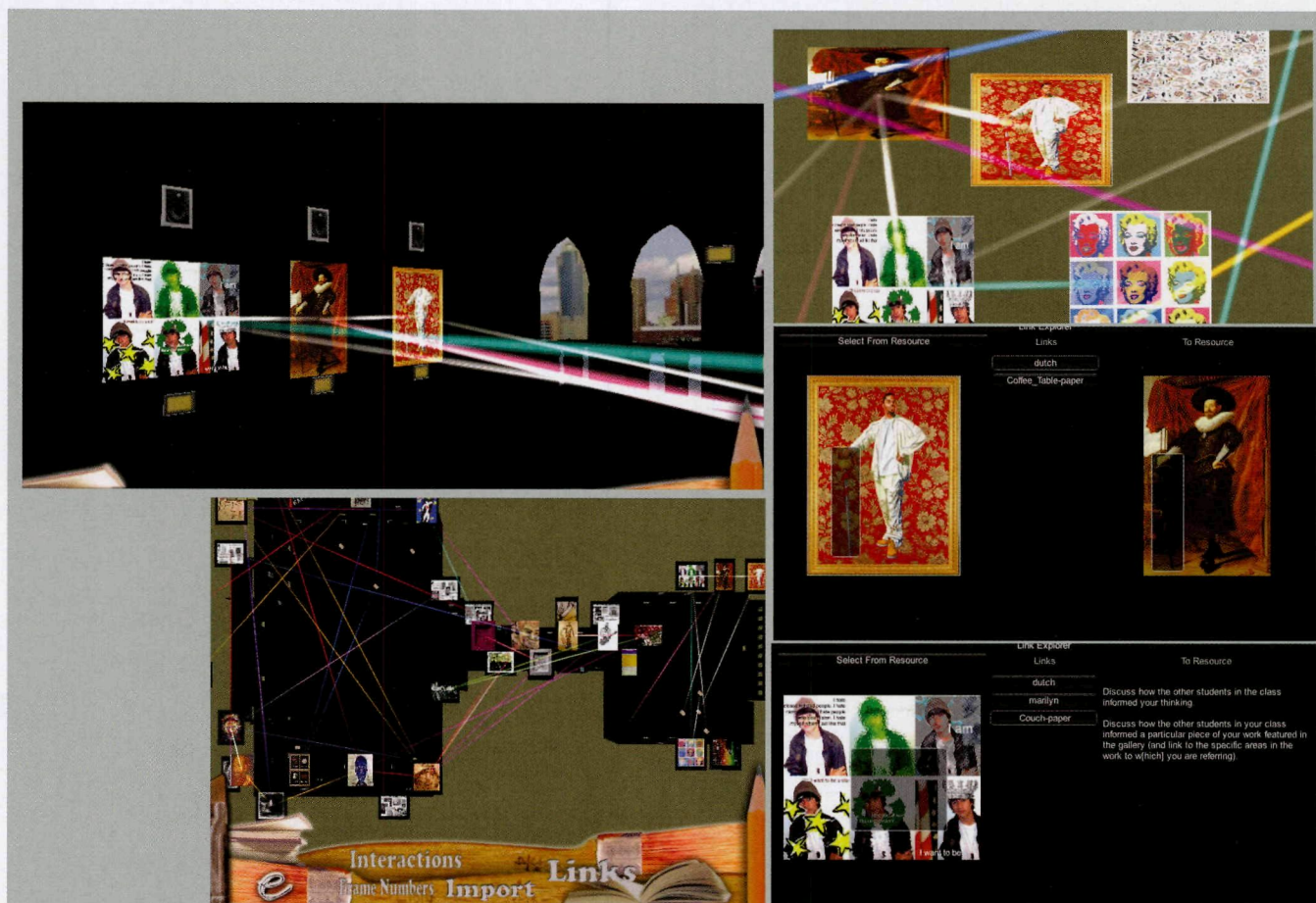


Figure 3. Links are also visible when users select and work from alternate views of the eLASTIC world/environment: (top left) the previously described eLASTIC in-world three-dimensional view; (bottom left) the overhead view that features images when scrolled over; (top right) a map or radial view that mimics a mind or web map of all objects in the space; and (middle and lower right) the explorer view that allows perusing of objects and their corresponding links.



Visual Arts Assessments outlined expectations associated with student production of works of art to include: originality and imagination; fluent expression of visual ideas (with intended meaning or function); attention to composition, subject matter, expressive character, or content; various visual conceptions; knowledge of media, tools, techniques, and forming processes; knowledge and understanding of values, aesthetics, and content; demonstration of visual, spatial, and temporal concepts of planning; experiment with ideas; and creations that reflect ongoing thoughts, actions, and new directions (pp. 640-643). The basic framework involved creating, performing, and responding.

One technology designed to analyze and assess this kind of creative, critical, and in-depth thinking through writing is called Automated Essay Scoring (AES) and in particular Robo-Reader. According to Justin Reich (2012), a fellow at the Berkman Center for Internet and Society and a doctoral researcher at the Harvard Graduate School of Education:

The Robo-Reader compares an essay (it can't actually read it) to other essays that have been scored by humans, and it "faithfully replicates" the human scores. The software can grade essays about as accurately as humans can, and it works a lot faster, too... For instance, it may use language processing to look for keywords such as first, second, third and finally to assess structure. Or the program may look for a topic sentence and subsequent words that link to or support the topic sentence in order to assess the development of an argument or idea. (para. 3 & 5)

Most significant to this discussion is the fact that these computer programs are designed to duplicate as accurately as possible the way a human being would evaluate and give feedback. Identifiable and leveled rubrics and/or indicators are outlined and programmers use this information to create algorithms that tell the computer step by step what to do. Although thinking and connecting can obviously be nuanced and subjective, the idea of identifying indicators of understanding, reflection, planning, art, and general historical influences is believable. A bigger problem probably lies in assessing a student's art and

perhaps artmaking. Like Alice, we can't even imagine the idea of quantifying art in any sort of general or statistical way on the computer. And yet, there are some old and new technologies that may inform these unimaginable efforts.

Extracting information from images through such digital processing techniques as bar coding and face recognition is possible through image analysis. Computer image analysis uses pattern recognition, digital geometry, and signal processing to quantify and qualify 2-D and 3-D images such as ultrasounds. Digital image analysis involves a computer studying an image to obtain useful information from it—for example, detecting cancer with an MRI scan, determining the size of a planet, and counting items on a conveyor belt (Russ, 2006).

A field of study involving producing numerical and symbolic information from images and high dimensional real-world data is called computer vision. Specific step-by-step computer algorithms are designed to duplicate human visioning abilities to acquire, process, analyze, and understand visual information. Applications included safety inspections, artificial intelligence, and computer- and robotic-enabled comprehension, medical image analysis, and visual surveillance. Related computer vision fields such as neurobiology involve the study of human visual stimuli processing through the eyes, neurons, and brain structures. These varied fields of computer vision have implications for visual art learning and production data specifically related to recognizing edges,

geometrical transformation, 3-D analysis from 2-D images, pattern recognition, and determining/recognizing/detecting objects, features, and activities related to and/or included in an image (Shapiro & Stockman, 2001).

Just as with the Robo-Reader, these imaging technologies work through directive algorithms based on human-determined indicators. From a simple directive of filling the page to something as finely distinctive as gradation in line, the computer can indeed identify, measure, calculate, and provide an assessment report based on predetermined criteria. Then again, how can criteria be predetermined to ascertain or measure learning that goes beyond the curriculum standards (as was noted as a finding in the original hypertextual study of connective thinking and knowing)?

According to art education professor and assessment pundit Doug Boughton (2004), assessment should be "a means to chart students' intellectual pathways" (p. 589). He referred to Arts PROPEL project (Blaikie, 1994; Gardner, 1989, 1996; Wolfe, 1988) as an example of a "long-term research effort that explored, among other things, alternative (authentic) assessment strategies based on portfolios, written reflective material, and dialog" (p. 589). Boughton continued to explain the need for an authentic assessment in the visual arts that values connections as "the relationship among history, culture, context, and production... and complexity" (p. 589).

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Let's look at another way of imagining criteria by asking: What does it look like when an art student is successful? Are they able to talk about art in meaningful ways? What constitutes meaningful? Do they make connections between a work of art and their own lives in relevant ways? Do they actively seek more information to better understand, for example, a technique, idea, or time period? Do they try out new ways of working and critically reflect upon their experiences? Are they open to others' ideas (about their work or the art of others)? Do they take time to contemplate an idea? Art educators typically trace these and other ways of working and being in the art class through process portfolios, journals, observations, and other activities. They also evaluate student oral, written, and other presentation forms that typically involve narrative, research, comparison, connection, relevance, and meaning. Now imagine that the eLASTIC research translates those kinds of student and teacher activities and observations into some sort of programmable code, such as an algorithm that performs interactive and customizable searches of students' learning processes via the artifacts and connections in their virtual environment. The program then makes the data available for analyses, visualization, and formatting in multiple reportable ways. One of those ways would obviously relate to the class, school, and community. Granted, this project was first imagined in response to the impossible dream of a meaningful and embedded large-scale art assessment. However, it is important to note that authentic assessment includes community, school, and class expectations as well. Therefore, the programming language that stores, analyzes, and reports data in an established and possibly traditional

way is also imagined to be customizable and alterable to be relevant and meaningful at the local level, or any level for that matter. The addition of such simple software features as tagging, time/date stamping, and creating color-coded paths may enable teachers to track the learning/thinking/making process of the student and/or class. Teachers involved in the research greatly appreciated this aspect of the project as it gave them clear indications (and time) to make a difference in a student's learning progress.

### What's Next?

Throughout this research I imagine young students playing in their eLASTIC environment on their phones in airports, malls, and/or simply the school hallways. I dream that they will snap a photo of something that reminds them of something in their art class so that they can instantly upload it into their eLASTIC environment. I picture that a student's handheld device will feature their eLASTIC environment open at all times so that ideas, images, and/or a crowd sourced comment or direct communication from a computer game, Facebook, website, or app can easily be linked or added to their ever-expanding map of learning and thinking. This instant access, mass of linking and connecting possibilities, ease of discovery and exploration, and broad network of collaborators is indicative of the world of today's young art students and should be considered when assessing what they know and are able to do. In fact, according to the students involved in the study of this software, this imagined possibility is not only possible; much of the technology is already on their computers and cell phones. They just need a way to link them all together.

Although the eLASTIC software will continue to stretch and grow to accommodate use as well as data collection features and opportunities, the basic principles of compelling links and connections will remain at the center of the research. These connective features are what separate eLASTIC from other visual arts portfolios and assessment tools. Finally, this eLASTIC research has and continues to propose a form of testing that contributes to and is a part of the learning experience. This research moves beyond formative evaluation as it purposefully uses the terms "assessment" and "testing" interchangeably. Granted, this is risky. But, I do this to purposefully link assessment ideas related to learning and knowing processes with the politically charged testing ideas related to accountability. Indeed, eLASTIC is imagined to stretch the notions of what it means to learn, know, and assess art and educational progress. **I dare to imagine that if we are able to expand the languages we use and the ways we describe and illustrate what art students know and are able to do, people will listen.**

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## ENDNOTES

- <sup>1</sup> Project members included Dr. Lisa Abrams, Dr. Charles Bleick, Dr. Elnour Hamad, Ms. Jan Johnston, Dr. Joan Rhodes, and Dr. Frances Smith. For more information, see [elastic.vcu.edu](http://elastic.vcu.edu).
- <sup>2</sup> This example is a summary of several students' work in their eLASTIC environments.



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