Radical bricolage: making the liberal arts coherent

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Abstract

Because of the very broad and fragmented nature of undergraduate general education requirements there is a need to help students find unity in this diversity. The search for coherence has led my institution, the American University in Paris, to introduce a series of freshmen courses called First Bridge that deliberately pairs professors from different disciplines to develop and teach a common course that explores the linkages between each professor's area of special interest. This paper describes my own experience teaching a First Bridge course called *Visual Thinking and Artful Seeing,* in which I represented the math and computer science department while my co-teacher, a painter, came from the art department. It was our intention to explore how different ways of seeing, the very act of seeing and the art of talking about seeing can help each of us begin to discover the commonalities that often lie behind seemingly different disciplines and their methodologies. My part of the bargain requires using Imagine Logo to gain access to different levels of seeing by building computer models to examine a range of visual artefacts and their inherent structures.

My co-teacher's role was to develop, through drawing exercises, the student's ability to cultivate a heightened sense of line, texture, light, colour, volume, position in space, movement, shape and how these affect the viewer. We agreed to adopt an approach that we call "radical bricolage". Bricolage is a French term denoting the art of constructing things from whatever is at hand, using all the skills and tools available. My partner and I broadened the idea to turn our students into "bricoleurs" who would bring their own resources to bear in whatever form was helpful towards progressing into the task at hand. Using an assignment from my section of the course I will show how student J used the notion of radical bricolage to investigate the major visual themes in three paintings. Two of these were accessible by deconstructing their geometrical shapes. The third painting presented a different challenge because it was a dynamic and fluid action painting and, therefore, did not lend itself to this kind of deconstruction. When he first began, student J had no idea how to approach his tasks. But as we walked, talked, sketched, modelled, exchanged ideas and feelings in class, certain avenues began to emerge. By bringing all his senses to bear, by practising the art of radical bricolage, J found links he did not know existed. Thus he had extended and enhanced his ability not only to see and read works of art but also, by extension, the greater world around him.

Keywords

liberal arts, general education, visual thinking, visual modelling, Logo

Constructionism ... shares constructivism's connotation of learning as "building knowledge structures" irrespective of the circumstances of the learning. It then adds the idea that this happens especially felicitously in a context where the learner is consciously engaged in constructing a public entity... **Seymour Papert**

[The] 'bricoleur' ... derives his poetry from the fact that he does not confine himself to accomplishment and execution: he 'speaks' not only with things ... but also through the medium of things .... **Claude Lévi-Strauss**

To know what I mean, I must see what I say. **James Blachowicz**

Constructivist faith

Papert's quote above is a kind of constructionist manifesto – rich in interpretive potential and rich in its ambiguity. I do believe it, but as a teacher in a liberal arts environment, I don't find this quote immediately useful. We need to know more about how that model construction happens. We know it happens, but where is it happening? Can we influence it? Can we speed it up; make it more sophisticated; more innovative? We need to construct an environment in which we can both watch our own modelling and that of others because their approach might be useful to us. We need to build visual models of our modelling process, of the modelling of ourselves, so that we/it can be seen and commented upon by people with whom we have emotional and intellectual affinities.

Over the last five years I have experimented with a new course, called *Visual Thinking and Artful Seeing*, that encourages students to do just this and to talk about doing it. I've had to jumble many of the traditional undergraduate approaches to make them far more multidisciplinary. I've had to challenge some of the sacred cows of liberal arts education (like the primacy of writing) in my university to achieve this. I like to label my approach: "radical bricolage" and, as the animator of this activity, I am the "radical bricoleur".

The nature of the bricoleur

The French word "bricoleur" is often translated into English as a do-it-yourself (DIU) person but I don't think this comes close to catching the full French meaning of the term. The bricoleur does not shop at DIU centres and doesn't generally work from plans. He uses *whatever is on hand for a task*, and while he remembers how things worked together in the past he also likes putting things into new configurations. He seems to generate original thought as much from physical play with objects as from his memory and inside-the-head cognition. In fact, he probably doesn't view these as separate activities.

The bricoleur has no shame, he is not coy, nor is he hesitant. He gets on with whatever task is at hand unburdened by a need for "perfection", knowing, too, that to do one thing may leave other things less finished. The work of the bricoleur is never closed, never finalized, everything is work in progress.

Is bricolage just thoughtful trial and error? Is there no place for theory or planning? For the bricoleur, planning is an emergent characteristic of his tinkering and iterative approach. In bricolage, the notions of trial and error and planning are not two ends of some continuum, they are not separate activities: they are two qualities of his craft.

Might a bricoleur's craft, his approach to his work, give us insight into how to go about modelling/exploring concrete situations? That is, does the way he works give us a medium in which to record his methods? I agree with Levi-Strauss: "the bricoleur speaks not only with things but through the medium of things." But how can we observe this medium of things? I suggest that a first step would be to radically extend our concept of "tools" to include all the bits and pieces the bricoleur touches and the methods he uses to arrange and manipulate them. We must watch and listen as well.

What is radical bricolage?

I have talked about the need to encourage students to tinker with problems computationally because of evidence that this can encourage them to build their own models of their world. But how do they do this, this personal work? How do they know how they do this? Can they see it being done, being constructed? Are they conscious of it and, if so, can they control it? Can they watch their sense-making, can they steer it? Can they, can we, catch ourselves in the act of meaning-making so that we can watch it happen? In short, can we verify our belief in personal model construction? Isn't this radical bricolage?

Radical bricolage, liberal arts and the American University of Paris (AUP)

I teach applied mathematics and computer science at the American University in Paris (AUP), a small, private, US-style, liberal arts institution in Paris. AUP has several small graduate programs but its major activity is its undergraduate programs of about 1000 students. All undergraduates must fulfil general education requirements in languages, science, mathematics, humanities and social sciences before they go on to specialize in one or more majors.

Six years ago a committee was formed to evaluate AUP's general education scheme and to suggest changes. The committee decided that the current method of general education was giving out the wrong message. AUP's wide range of diverse courses had the effect of fragmenting knowledge, whereas a liberal arts agenda should illustrate the complementary nature of all disciplines.

To reinforce this perceived need for more coherence, the committee suggested that AUP require entering freshmen to select one option from a list of linked courses, to be called First Bridge. Each of the two courses would be from different disciplines, say one from history another from anthropology, but assignments would stress the complementarity of the two methodological approaches to explore a set theme. The two instructors would visit each others classes and time would be set aside to reflect on the links between the courses.

I was eager to participate in the First Bridge experiment and found a colleague, Ralph Petty, in the AUP Fine Arts department who wanted to join me in building a common course to be called: Visual Thinking and Artful Seeing.

Visual Thinking and Artful Seeing

My syllabus description was the following:

This course explores computing skills and applications in a non-traditional way. Using the computer languages Logo we will construct computational environments to explore how we look, think and feel. We will move quickly into such complex modelling areas as: tile design, simulation of themes found in famous works of art, design of artificial life forms, alternative spatial systems, visual data analysis and concrete poetry.

The course exercises will be tightly scheduled to keep pace with the aesthetic and design work being done in the linked course, Beginning Drawing I. The visual vocabulary and skills learned in Drawing will enhance the model-building activity; and what is done in the computational arena will amplify the effects of working in traditional studio arts.

Course outcomes

At the end of this two-part course students should have:

- *increased their visual vocabulary and design skills*
- *designed and built relatively complicated visual models for a variety of applications*
- *learned to describe and explain in words how these models were conceived and built*
- *acquired problem-solving techniques suitable for many disciplines*
- *mastered the basic notions of programming so they are equipped to learn other computer languages and software packages.*

The real agenda

All of the First Bridge courses are cross-disciplinary yet based on reading texts, writing and research. Traditional assignments and exams are given and a fairly large research paper is required supported by library and internet research methods. My teaching partner and I, while agreeing that effective writing is a major skill, shared the belief that writing education, at least in text analysis and research paper mode, is overly privileged at the expense of speaking, listening, calculating and manipulating something non verbal, like images. We felt that a combination course of visual modelling with Logo and traditional drawing could encourage a more even and rich mix and would be very much in the radical bricolage vein. Drawing, especially, has been a neglected contributor to liberal arts.

Lessons from the drawing studio

Just what are some of the features from art studios that can benefit computer modelling?

First: drawing from the nude model is a standard exercise in drawing classes. The model sits or stands on a raised platform surrounded by chairs. Beginning students have a tendency to pick a spot and sit down in one place, draw from that one position and go on to produce one “finished” drawing. It doesn’t take them long, however, to realize the advantage of drawing sketches from several different vantage points. If the viewer changes position, so too do the lines, textures and shapes of the subject. Students come to sense that few drawings are ever finished; they are works in progress and means of interacting in a complex visual and emotional space. The important thing is to produce many sketches from different points of view.

Second: drawing from the model is hard for most liberal arts students because they get hung up on whether or not they are able to “accurately” reproduce what is in front of them. Using a technique called blind drawing, on the other hand, forces a student to focus on the subject – the nude – and not on the drawing. In blind drawing the drawers must not look at the sketchpad while they are drawing. Students are totally surprised to discover the results. Not only do they recognize the subject in what they have drawn, but they also are shocked to discover that their drawing has an emotional content. The lesson here is that if allowed to, we draw naturally.

But, what do we draw naturally? We draw both how we feel as well as the image. We, our bodies, in fact, are drawing the image that we see and feel. This is an enormously important insight. It shows that our conscious mind can get in the way of fresh seeing; we see only what we have seen and cartoons of noses are easier to draw than making sense of that new thing out there. Whether we attempt to draw the shape of flesh or rely on our cartoon image of the body we are drawing us seeing. We are catching ourselves in the act of seeing.

Third: drawings recapitulate the stages of drawing. In a way, they are drawings of the act of drawing; we watch them grow in front of us, flowing out of our drawing pens. Nothing is lost, if nothing is erased: drawings recapitulate the whole experience.

A sample assignment from our course on Visual Thinking and Artful Seeing

In this exercise I directed students’ computational eyes at abstract paintings and suggested a number of painters whose use of geometrical forms can be computationally explored. I asked that they explore three paintings: two of which were by the same painter. I also asked that they pick a painter whose geometrical objects were easy to see and to manipulate and another whose paintings were difficult to deconstruct into parts.

The goal of this exercise was NOT to produce a painting that is really like, say, a Malevich or a Kandinsky. Rather, the goal is to identify the themes that we see in these paintings: first by describing them in words and sketches and then by transforming these into computer models. This activity should enable us to see more clearly both how we look at a specific painting, and the painting itself. The gap between our simple modelling play and a real Malevich holds the mystery that attracts us. More often than not, it is in this first modelling phase when students discover that seeing is an iterative process and that verbalizing can facilitate their ability to see. Each informs the other.

For example, one of my students, J., began by selecting the following painting from Kasimir Malevich.

Figure 1. Eight Red Rectangles

Relying on the radical bricolage approach which brings all our senses to bear on this image, here is what he had to say about key themes and their emotional and visual impact on him.

J's word description of the painting

"Red rectangles float in a rectangle of textured space of ambiguous dimension: flat but with painty depth. This thick, off-white background space bleeds up through the objects. Are they porous, translucent? And where are they in this space? On the surface, or in it? The red objects are organized: the do not overlap, they come close but do not touch, they are oriented along the bottom-left to upper-right diagonal, smaller objects hang below the larger. The organization is taut – tight and controlled – but inherently unstable: the rightmost element touches the right edge, pushing against it, trying to extend the space it is in, two other rectangles "push" it ... but I feel that the assemblage must slip, might collapse ….. "

J. translates his words into computer models

Just as the American Philosopher James Blachowicz has observed, "To know what I mean I must see what I say", J. started with seeing what he meant by saying "rectangles floating in a rectangular frame." The form of the procedures he wrote is not important, but what he chose to explore visually is. Here are some examples. Note that these are illustrations of ideas and themes described above. This exploration took J into areas that he found very interesting since he had a flair for math and could implement algorithms for placing rectangles of different sizes within a rectangle; first allowing them to overlap and then prohibiting this overlapping.

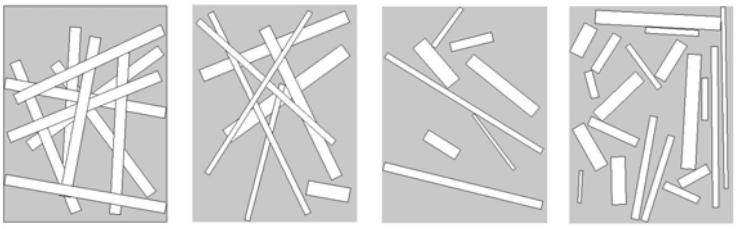

Figure 2. Some of J.'s visual explorations: Overlapping rectangles of the same size; Overlapping rectangles of different sizes; Eight non-overlapping rectos of different sizes; Twenty non-overlapping rectos of different sizes.

Computational explorations of themes J. saw in Eight Red Triangles

Here is a sequence of non-overlapping rectangles inspired by the Malevich original, playing with similar colour, orientation and spatial placement

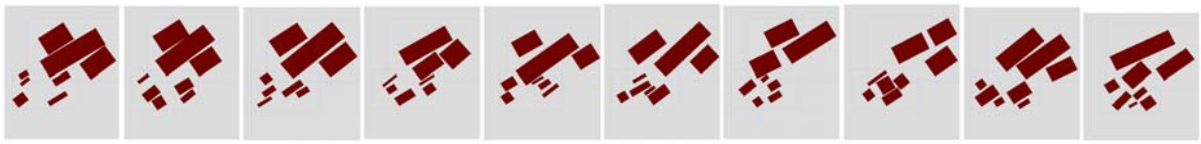

Figure 3. J explores the theme he saw in Eight Red Triangles

Comparison between one of J's images and the target image

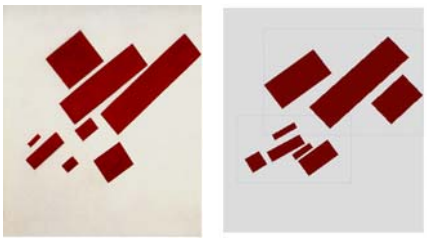

Figure 4. Malevich and J

How well did J do?

What lies between J's image and that of Malevich? When he compared these two images, J. suddenly realized that he hadn't noticed the artist's attention to texture as well as geometry. On the other hand, he was really thrilled with how he had modelled the idea of floating objects in space, on space, and how that "floatiness" could give flat canvas space a quality of depth. As a result, he was eager to explore other paintings by Malevich and he selected the one below.

Figure 5. Supremetism

J's word description for his second painting choice

"I see a strong, upside down, L-shape form, placed diagonally on the canvas. The two L legs hold parallel layers of randomly-sized rectangles. As in Eight Red Rectangles, the space is not really flat; there are several layers of objects floating in it. The bright blue stick seems to slide between two layers; and the small red and yellow rectangles are the top layer. There is also a strong V-shape in the painting against which the blue stick is slightly at odds: a blue blade slicing through the image. The whole design seems overly-tight and about to slide apart … Finally, there is an almost-invisible rectangle, just above the lower salmon-coloured object, in the same shade as the background".

To know what I mean I must see what I say

The complexity of this painting forced J. to use his sketchbook much more this time. He began by sketching the entire painting and then decomposing the whole into themes and their placement. The first motif he isolated is a rectangular box that holds three other rectangles; the second motif is another box of rectangles that is at right angles to the first box. He realized that these two boxes form a kind of tilted, upside-down L-shape. The third motif is a blue rectangle that slides between the first two rectangular box motifs. Motif four shows the V-form of the tilting

L-shape. There are two other small objects in the painting: a small red square (seen in J's drawing) and a small yellow rectangle (not in J's sketch)

Entries from J's sketchbook

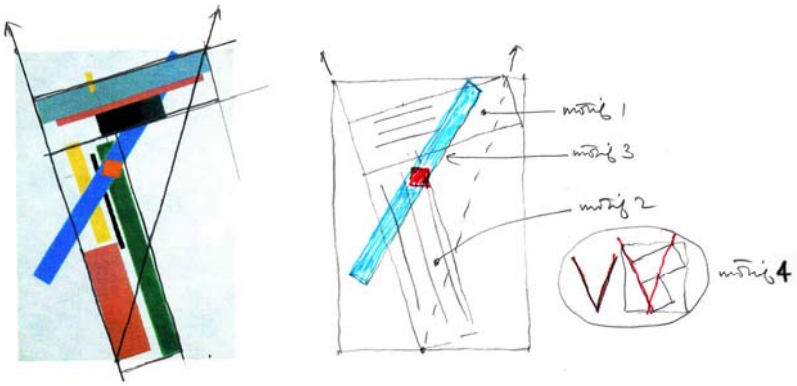

Figure 6.Overall plan and motifs as decomposed into four elements

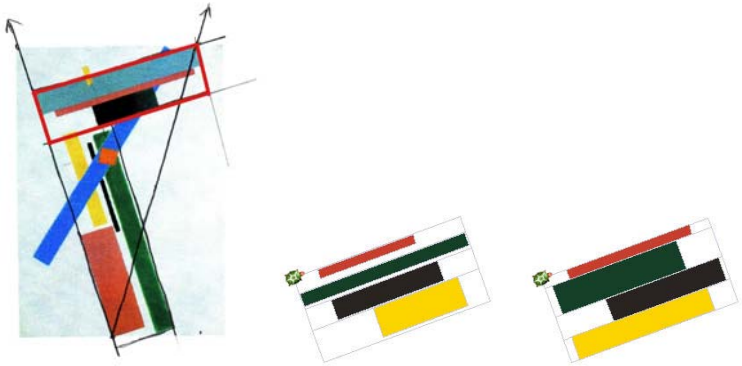

Figure 7. Motif one - the top rectangular box of rectangles. Outlined in red

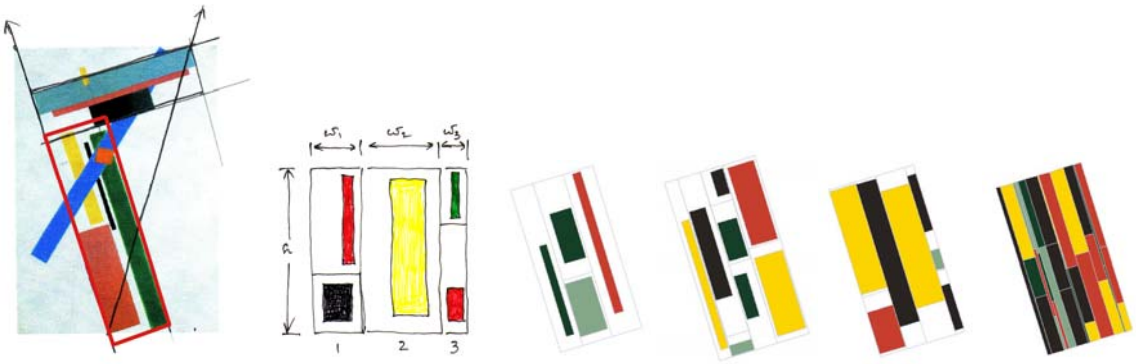

Figure 8. Motif two - the left side rectangular box of rectangles. Outlined in red

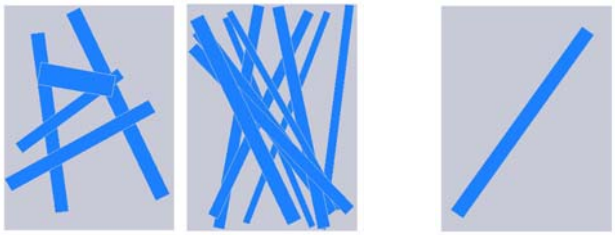

Figure 9. Motif three – the blue stick

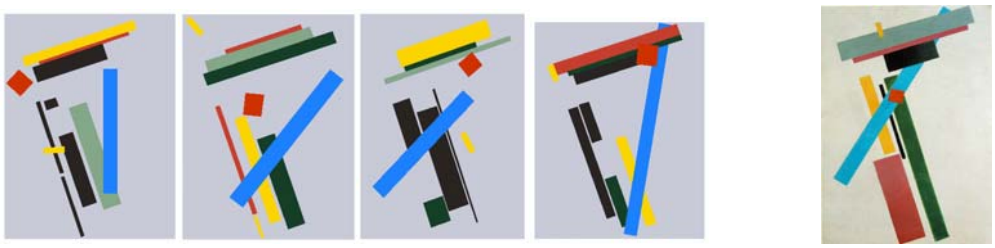

Figure 10. Computational explorations of themes J. saw in Malevich's Suprematism

Example 3

The last example is by a contemporary American painter, Brice Marden, whose themes are very different from those of Malevich and more difficult to deconstruct into distinct parts. The computer modelling is therefore more technically challenging. So how did J. proceed?

Figure 11. Tang Dancer

J's word description

I see a kind of quiet curving activity inside a rectangular frame. Black, dark green, yellow and red ribbons or trails mark paths that fill rectangular space. I very much like how the paths are not caught or stopped by the edges but move gently along the edges. I see soft sinuous waves: at ease in their curvings: exploring, playing with the rectangular.

The act of pathing, rather than a specific path, constructs this picture space. A kind of flat, wave space… equally foreground and background. Curvature ground. But, Marden called his painting: Tang Dancer and these curves do have a slow dancerly motion about them.

The theme, therefore, that I want to explore computationally, is not just this specific painting. The theme that I want to explore is a pathing process that will grow from my description of elements from this specific Marden work.

Sketching the theme

Figure 12. One loop from Tang Dancer

"I decided to select one of the paths, the red one, and sketch it independently of the others. I picked the red one, since it seemed to me to be the simplest of the four curves since it did not interact with itself. It was a sinuous curve that did not overlap. Too, it looked dancerly; the curvedancer was dancing in the space while filling it. The first idea, then, that I would like to explore is: generate a non-overlapping sinuous curve that fits happily inside a rectangular confine.

To know what I mean I must see what I say…

"First, I'll pick a point on each of the edges of the canvas randomly, then n random points placed within the canvas. Second, I'll connect these points in the order that they were generated by line segments then, third, I'll use this ordering for a spline shape. I don't know how my Logo implementation actually calculates splines so I'll explore them within my built-context. Fourth, I'll start with the first point randomly generated and then find the path based on the 'go to the next closest spot' heuristic. So here are the four scenes of these four notions based on one random selection of points."

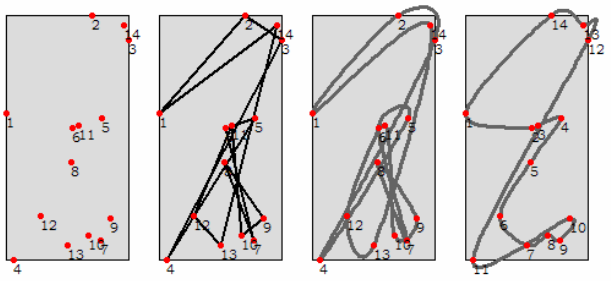

Figure 13. Random points and closest neighbour links

"I see that my nearest neighbour curve often has loops. I originally thought that maybe this curve would not overlap itself but I see that often it does and definitely so the more points I generate. So I'll explore the nature of this loopiness by generating a matrix of images:"

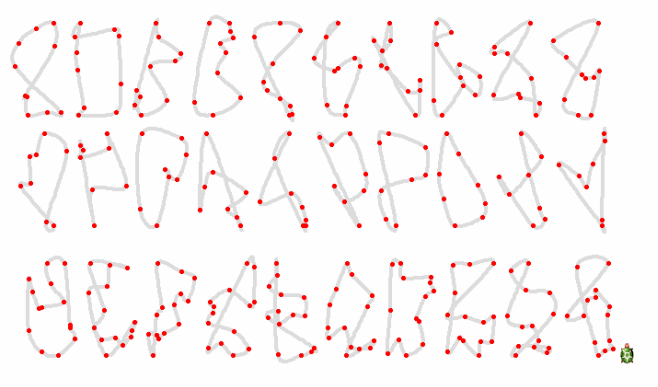

Figure 14. A suite nearest neighbour loops using ten points

J sketches and talks about unlooping

"Well, there must be some easy way to unloop a curve so I'll sketch a concrete case with one loop and see if I could come up with a way to unloop that. I drew the picture below and my doodling suggested to me a method to try. If it works in a simple case I'll extend the idea to curves with many loops ..... "

OK: find any two line segments that cross and exchange their end points like in my drawing. I'll have to reverse the order of some of the points, the circled ones, and output a new order of points with the one loop removed. I'll apply this method to multiple-looped curves, one loop at a time, to watch how it works. Sometimes my method fails and I'm not sure why. But I'll work on that later ..."

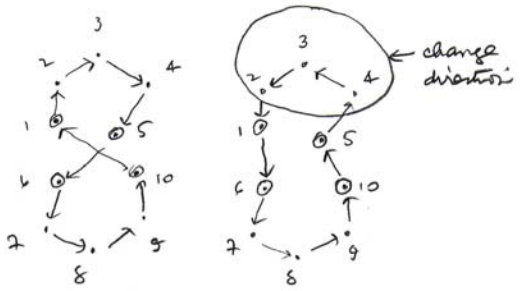

Figure 15. Sketch to think about unlooping one loop.

"Here are two examples of my method that unloops one loop at a time."

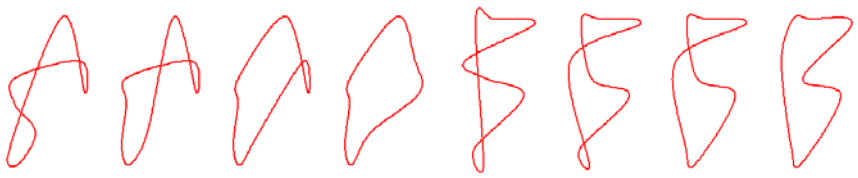

Figure 16. Two examples of unlooping

"Then I tried more points … "

Figure 17. Three examples of unlooping with more points

"Then I decided to put my ideas into a graphic as I had done previously. I add my unlooping technique to the ones above and make sure the thing fits into the frame. The last image fills my delooped curve with colour."

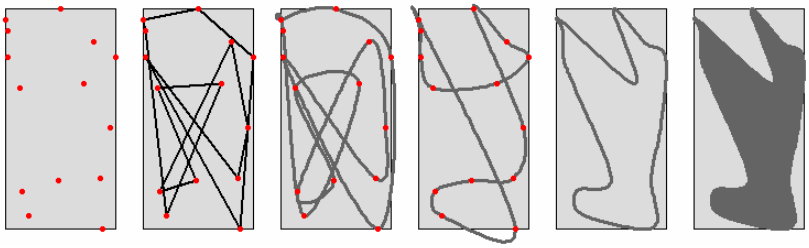

Figure 18. Unlooping with 10 points

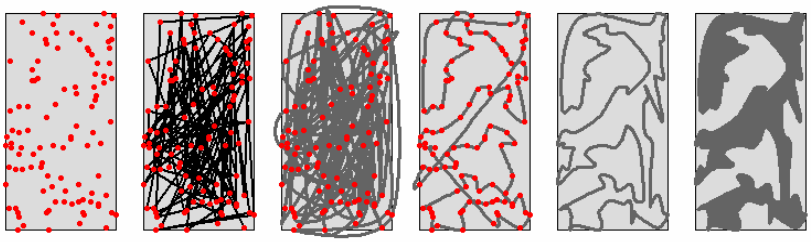

Figure 19. Unlooping with 100 points

Computational explorations of themes J saw in Tang Dancer

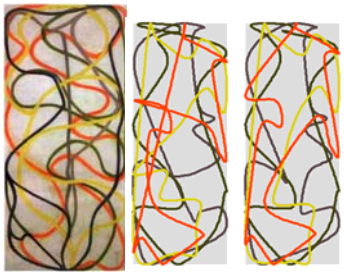

Figure 20. Marden painting and 2 of J's

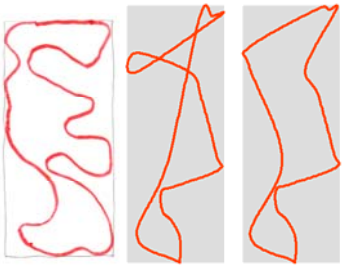

Figure 21. Marden Loop and 2 of J's

Theme extensions

"But what really struck my fancy were the odd images that formed when I filled my unlooped or partially unlooped shapes of many points with colour. That struck me as a kind of writing: *Tang* writing, perhaps."

Summary

What we have seen in the three preceding examples is an illustration of what I call "radical bricolage". In this approach, the student tinkers his way – using words, sketches, guided trial and error and computer modelling into an iterative exploration of complex visual tasks. Although liberal arts education has traditionally valued the student's acquaintance with a wide variety of disciplines and methodologies, it has often failed to re-integrate these diverse offerings within the local classroom environment, My First Bridge class at AUP, Visual Thinking and Artful Seeing, has tried to overcome this fragmentation. It requires that students bring all senses, skills and available tools to bear in constructing their own learning systems.

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