

STEAM grant proposal

Development of an experimental Mobile Application ('APP') for learning how to draw from observation in Science courses

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Background

Many sources of evidence, from traditional accounts to more systematic research, have found that when learning to draw from observation, people need to recognize that forms are best captured by rendering local information such as edges and subtle changes in lighting. Unfortunately, when approaching this process, adults tend to default to a habitual manner of visual processing that stresses object identity over perceptual features.

In spite of the well documented benefits of drawing to learn in Science (Ainsworth et al., 2013), introducing drawing techniques in science courses has been very challenging. Not only are students reticent at attempting to draw what they see, but sometimes professors perceive such 'exercises' as superfluous and time consuming.

This project is designed to develop a mobile application (app) whose objective is to facilitate and accelerate the process of learning to draw from observation. It is hoped that the availability of such a tool will improve the incorporation of drawing skills to the scientific repertoire.

Justification

We have compelling evidence that drawing from observation is a sensorimotor process that involves eye-hand coordination skills. As any such process, drawing requires continuous practice and consistent feedback. Our app is meant to provide a gamified interface that will increase practice and provide instantaneous feedback. Also, the app will capture data as students practice their skills allowing the professor to comment on their progress.

Comparison to available apps

Current drawing apps can be divided into two main categories: 1) drawing apps, in which a blank canvas is available for the user to draw their own creations using a number of tools such as pens and brushes and 2) learning to draw apps in which the user is guided through exercises that are meant to facilitate the development of the skill to draw from observation. These last category of apps such as 'How to Draw' (ArtelPlus) and 'Learn to Draw' (Scoopma) use traditional approaches to teach drawing such as tracing preloaded line drawings or step-by-step construction of a form from more elemental shapes.

When first approaching sketching, students typically use their knowledge of the world to guide their representation of what they see in front of them. This strategy tends to produce unrealistic 2D images, as the view of the object in three-dimensional space is often a projection of the 3D shape. The net result of such unsuccessful attempts in our students is an increase in frustration and confirmation of the belief that they ‘cannot draw’.

Compared to other apps, ours will aim at the more fundamental process of eye-hand coordination and will encourage students to practice.

Continuation of START project

This project is a continuation of our START project *Perceptual and Motor Processes in Art Creation and Appreciation*. In that project, we began studying the behavioral correlates of participants as they learned to draw from observation. Also, the project allowed us to recognize the applications of the information we derived from our research.

Part of the START project included a budget that would allow us to begin developing an app. We funded two EXCEL scholarships in the fall 2013 semester and one more in the spring 2014 semester and have a working prototype of the program (figure 1). This program is currently running on desktop PCs, not in portable devices.

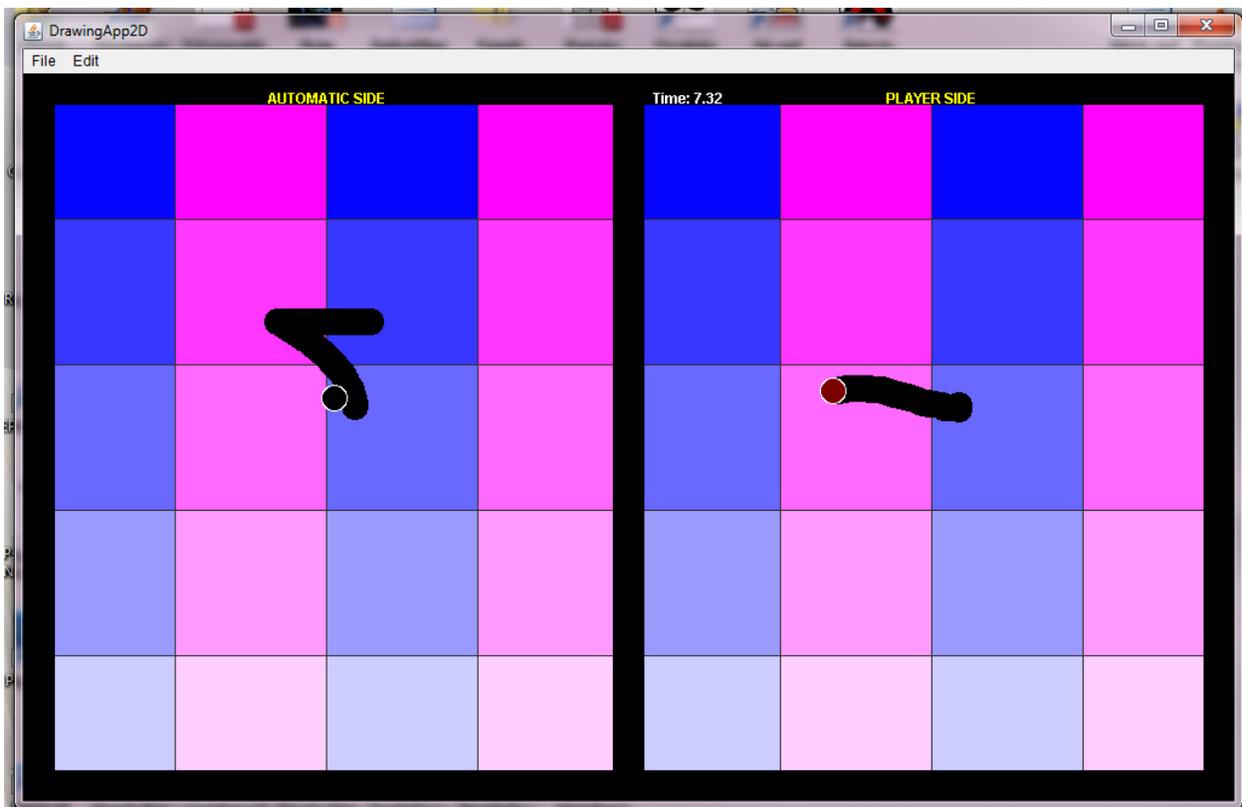


Figure 1. The APP in its present state (non portable).

Effects on student learning

A first application will be the incorporation of drawing from observation to a Physiological Psychology laboratory module taught by one of us (Schettino). In that module, we typically ask students to learn the anatomy of the sheep brain as they dissect it. The students spend two laboratory sessions going through the dissections and memorizing the structures they observe. We believe that adding drawing from observation to this process will result in better retention of the names of the structures as well as in the recognition of features that would otherwise not be noted.

Having an app that will accelerate the acquisition of drawing skills in our science students would greatly improve the chance for success of these additions to science courses.

We will measure the success of our modification by noting the ability of the students to do well in their neuroanatomy practical exams.

Budget \$4,000.00

We are asking for funds to support a summer EXCEL scholarship for a student that will focus on the app for 10 straight weeks rather than do it during the regular semester period. The student's goal would be to streamline the app and port it to a mobile platform.