Name: Glen Hinta

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Department/College: Medical Illustration/CIAS

Department head name and e-mail: Carol Woodlock; cmwfaa@rit.edu

Faculty rank: (full-time lecturer, tenured, and tenure-track faculty only): Associate Professor

Proposed project name: Teaching Anatomic Figure Drawing with Interactive Media and 3D Simulations

Total funds requested: (Exploration grants of $3,000-$5,000 will be considered): $5000.00

Include these statements under the appropriate heading beginning on page 4.

Statement of utility: (two pages maximum)

1. Provide an overview of the experiment/research you are proposing, including:
   • Its conceptual framework and objectives
   • An explanation of the teaching/learning problem(s) it is designed to address
   • An explanation of the significance of the experiment/research

2. The potential application to other courses, faculty, and/or disciplines. (Please note that special consideration will be given to proposals that have potential for application in more than one discipline.)

   Provide a brief description of pertinent research already conducted with applicable references.

Statement of creativity: (three paragraphs maximum)

Provide a brief description of how this is a novel approach, or a new application of an existing mode or model of teaching and learning, or represents an entirely new paradigm. (Please note that special consideration will be given to proposals that demonstrate a new use/application of a model, system, or technology already in use at RIT.)

Statement of efficacy: (two pages maximum)

Provide a brief description of the experiment/research design, methodology, and methods of data collection you will use to gauge efficacy.
**EXPLORATION GRANT APPLICATION FORM 2013**

**Dissemination plan (Optional):**
If applicable, provide details about the journal, conference, show, other external vehicle with strong potential for dissemination of your results. Include supporting documentation such as preliminary interest or acceptance with your application, if available. *(Please note that special consideration will be given to proposals that have a defined opportunity for external dissemination, such as an academic journal or professional conference.)*

**Budget:**
Provide information on how the funds will be used, modifying the following categories as needed to match your project. *(Please note that the budget total must match the “Total funds requested” amount on page one of the application.)*

<table>
<thead>
<tr>
<th>Budget item</th>
<th>Amount requested</th>
<th>Amount committed from other sources</th>
<th>Brief statement of explanation/justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel (including course release, consulting support, etc.)</td>
<td>$4500.00</td>
<td></td>
<td>Covers time to create models, record, edit, and assemble modules into interactive “Anatomic Units.”</td>
</tr>
<tr>
<td>Equipment</td>
<td>External HD</td>
<td>$200.00</td>
<td>Record and store all original files and videos, as well as, edited versions</td>
</tr>
<tr>
<td>Licenses (i.e., software)</td>
<td>Camtasia</td>
<td>$300.00</td>
<td>Software to record software screen, while creating illustrations and demonstrating lighting</td>
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<td>Travel</td>
<td></td>
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<td>Other Resources (specify)</td>
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<td>Total</td>
<td>$5000.00</td>
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**Proposed timeline:**
Provide a high-level timeline for your investigation.
*(see the Dissemination Agreement section of this application for more details)*

<table>
<thead>
<tr>
<th>Task</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment/study design complete</td>
<td>June 20, 2013</td>
</tr>
<tr>
<td>Preliminary findings complete</td>
<td>Conclusion of Fall Semester</td>
</tr>
<tr>
<td>Summary of final findings complete</td>
<td>Week 1 February 2014</td>
</tr>
<tr>
<td>Final budget accounting complete</td>
<td>Week 1 February 2014</td>
</tr>
<tr>
<td>Faculty Teaching &amp; Learning Commons entry complete</td>
<td>Week 1 February 2014</td>
</tr>
<tr>
<td>Participation in faculty panel event complete</td>
<td>Week 1 February 2014</td>
</tr>
</tbody>
</table>

*Please note that the timeframe for milestone completion must align with the PLIG timeline.*
Dissemination agreement:
By completing this grant application, I agree to provide the materials described here, in support of disseminating what is learned from this project to other faculty at RIT.

I also agree to return all/a portion of the funds that I receive for this project to RIT if I fail to complete or provide the materials described here.

- Project plan (including roles and responsibilities, milestone dates, and pertinent project details)
- Overview of preliminary findings (may include experiment/study design, lessons learned, initial data collection, and/or literature review summary)
- Research findings summary (including data collection, lessons learned, implications for further study, and which may be in the form of an article abstract, conference presentation outline, or short report)
- Faculty Teaching & Learning Commons entry (excerpts from research findings summary, the development of which is facilitated by the ILI Teaching & Learning Studio)
- Participation in faculty panel event (presentation of a brief summary of project and lessons learned and response to faculty questions. Event is planned and facilitated by the ILI Teaching & Learning Studio)
- Final budget accounting (reconciliation of budget provided with your application and the actual project expenses)

By submitting this application through my RIT email account, I accept this agreement.
Statement of utility: (two pages maximum)

1. Provide an overview of the experiment/research you are proposing, including:
   - Its conceptual framework and objectives
   - An explanation of the teaching/learning problem(s) it is designed to address
   - An explanation of the significance of the experiment /research

2. The potential application to other courses, faculty, and/or disciplines. *(Please note that special consideration will be given to proposals that have potential for application in more than one discipline.)*

   Provide a brief description of pertinent research already conducted with applicable references.

1. Conceptual Framework and Objectives, Teaching/Learning Problem(s), Significance

   **Framework:** Anatomical Figure Drawing (2019 – 304 > ILLM Illustration Human Anatomy) is a required course for BFA Medical illustration program and students in 3D Computer Graphics. Students majoring in illustration also attend this course for elective credit. The population of illustration majors is often as large as medical illustrators.

   The goal of this proposal is to create a collection of interactive digital videos describing how to draw an anatomically accurate human figure. Lessons will focus on the skeletal and muscular systems and will be divided into the anatomic regions defined in Human Gross Anatomy; back, chest, upper extremity, head and neck, pelvis, and lower extremity. This anatomic foundation will then be applied to illustrating the human figure for instructional and editorial applications. Completing this collection will shift the two (2) of class time devoted to this material weekly, to applying the lessons in the collection to course assignments.

   **Objectives:**

   After studying this collection the learner will be able to:

   1. Construct a proportionately accurate diagram of the human skeletal and muscular systems in the anatomic position from an anterior, posterior, and lateral viewpoint using the “five-eye” cube system created by Robert Beverly Hale
   2. Identify on a diagram the bones of the skeleton
   3. Identify on a diagram the superficial muscles
   4. Identify on a diagram of a human figure the bones and/or muscles creating the topographic landmarks
   5. Employ this knowledge to illustrate a human figure that demonstrates accurate proportions and form, correctly positioned topographic landmarks, gesture, and balance, when creating solutions for instructional and editorial communication problems.

   **Teaching/learning problem(s) it is designed to address**

   Robert Beverly Hale demonstrates in his lectures on anatomical figure drawing from the Student Art League in New York City, that the widest expanse of the human skull equals five (5) eyes aligned next to one another. A cube with this five–eye width, height, and depth provides an invaluable proportion tool for drawing the human skeleton. The sternum height, for example, equals this five–eye cube. The humerus is two (2) five–eye cubes in length. The scapula, is one five–eye cube wide at its widest expanse and one five–eye cube tall at its maximum height. The remainder of the skeleton all aligns relative to this cube. While soft tissues vary widely between individuals, skeletal proportions remain very consistent. Once an accurate skeleton is portrayed, its frame may be used to construct the rest of the figure.

   Mr. Hales’ teachings have been incorporated into my course, Anatomical Figure Drawing, for the past
eight (8) years. Initially, students were required to go to the library each week and recreate the drawings from each of the ten (10) lectures in the series. This series is a collection of unedited black and white videotapes. While the information in the series is invaluable, the quality of the video and audio components are inconsistent. Students complained that they were often unable to see the charcoal line Mr. Hale was drawing during his lectures and that the sound track was difficult to understand and sometime stopped playing all together.

To try and convey this information to my class, I begin recreating the lectures using large sheets of paper, while the student drew along with me. This method is quite different from having the students copy a completed illustration. By drawing along with me, students gained insight into the construction of the anatomy and its form as it evolved. In short, the learned the process, and not just the end result.

Trying to make these drawings large enough, while keeping the time it took to construct each drawing reasonable, became difficult. I then switched to using a projection unit, “ELMO”, to project my drawings. The “ELMO” solutions expedited the time, but limited the number of values recreated from my drawings. This limit creates a high contrast diagram; instead of the subtle tones needed to create the illusion of volume and depth.

I am proposing recreating these drawings using a Wacom Cintiq monitor and pen and recording this process using Camtasia software. These edit recordings would be combined with 3D simulations of the anatomic region being studied that I would create in Autodesk Maya. The combination of the recorded digital drawing sessions and the supplemental 3D simulations would be combine into “Anatomic Units” that the learner will access via myCourses.

**Significance of the experiment/research**
Students may learn a qualitative process from watching interactive video and apply that process when creating solutions to communication problems using traditional and/or digital media.

With this collection accessible to the students, class time may be focused on applying the proportions, anatomy, and plane definition contained in the recordings to their assignments. The class contains two (2) areas of focus, each addressing different markets in medical illustration and commercial illustration. Instructional assignments demonstrate how something is done. For example, how an exercise strengthens a specific muscle group or rehabilitates an area of an individual following injury or surgery. Editorial assignments ask the learners to use the figure to “editorialize” or summarize written content.

Currently, one (1) to two (2) hours of class time are used complete the “anatomy lesson” each week. An additional two (2) hours are spent preparing for the “live” presentation weekly. With the “Anatomy Units” online the class focus may switch to the application of these lessons in creating illustrations. The online anatomy lesson means students may receive more help on developing “thumbnails” and “client ready” sketches with me during class. They will also be able to work on completing their “print ready” illustrations in class with my help. This additional contact will significantly improve the quality of their final illustrations as well as the process they use to create them.

**2. Application to Other Courses, Faculty, and/or Disciplines**

This collection of interactive video will be of value to all disciplines that include portrayal of the human figure in their curriculum. As mentioned, Anatomic Figure Drawing is a required course in 3D Digital Graphics and the BFA Medical Illustration Programs in CIAS. The inclusion of the 3D simulations described in this proposal will make its content even more applicable to both groups of students, since it will connect the anatomy with the construction of the polygonal models the create using 3D software in other course in the major.

The collection will also serve as a foundation for Foundation Drawing course and Illustration courses, since its content will be universally valuable to portraying the figure, regardless of the application.
Statement of creativity: (three paragraphs maximum)

Provide a brief description of how this is a novel approach, or a new application of an existing mode or model of teaching and learning, or represents an entirely new paradigm. *(Please note that special consideration will be given to proposals that demonstrate a new use/application of a model, system, or technology already in use at RIT.)*

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Mr. Hales’ teachings have been incorporated into my course, Anatomical Figure Drawing, for the past eight (8) years. Initially, students were required to go to the library each week and recreate the drawings from each of the ten (10) videotapes in the series. This series is a collection of unedited black and white videotapes. While the information in the series is invaluable, the quality of the video and audio components are inconsistent. Students complained that they were often unable to see the charcoal line Mr. Hale was drawing during his lectures and that the sound track was difficult to understand and sometime stopped playing all together. To try and convey the information to my class, I begin recreating the lectures using large sheets of paper, while the students drew along with me. Trying to make the drawings large enough for everyone to see, while keeping the time it took to construct each drawing reasonable, became difficult. I then switched to using a projection unit, “ELMO”, to project my drawings. The “ELMO” solution expedited the time, but limited the number of values recreated from my drawings. This limit creates a high contrast diagram; instead of the subtle tones needed to create the illusion of volume and depth.

I am proposing recreating these drawings using a Wacom Cintiq monitor and pen and recording this process using Camtasia software. The drawings would be constructed in RGB mode and built following the same process I have been using with charcoal, pencil, color pencil, and markers. Creating the drawing directly with digital media will eliminate the loss of information that occurs when traditional drawing media are reproduced digitally. Using the Wacom tablet in Adobe Photoshop will create images with two hundred fifty–five (255) values. Recording each module with Camtasia will permit editing the content to eliminate redundancy and error inadvertently included in the lecture. Additionally, the recorded modules will be organized into “anatomic units.” The units will then be assembled in Adobe Flash, thereby allowing each module to be accessible interactively. This interactivity means students can draw from the anatomic unit as it plays in its entirety or skip to specific modules to review information. Autodesk Maya will be used to add additional ways of studying this material. Initially models of each anatomic region will be constructed with simple geometric shapes that are proportionate to the skeleton. The simulation will demonstrate how light defines the major planes of each region (the thorax, lower extremity, head etc.). The models will then be refined to more literally portray the anatomy, but will continue to demonstrate that despite the level of detail, the major plane definition remains consistent.
Statement of efficacy: (two pages maximum)

Provide a brief description of the experiment/research design, methodology, and methods of data collection you will use to gauge efficacy.

Experiment/Research Design

1. Illustrations created with the Wacom Cintiq pen and tablet in Adobe Photoshop can portray a value system equally applicable to traditional and digital media.
2. Access to an interactive digital collection of instructional material will improve student mastery of its content.
3. 3D simulations added to this interactive collection will improve student mastery of its content.
4. Providing this material online, outside of class, will increase time devoted in class to its application, as well as, increase the one-on–one interaction between student and faculty.

Methodology

Camtasia will be used to record the Adobe Photoshop screen as each module is created from start to finish. Modules will then be edited using Camtasia and Adobe After Effects. Lessons focusing on how light defines major plane of each anatomic region will be constructed using Autodesk Maya. The 3D Maya simulations will be recorded with Camtasia as well. The edited modules will then be combined with one another and the Maya simulations to create “Anatomic Units” using Adobe Flash. These “Anatomic Units” will match the body regions as defined in Human Gross Anatomy. Adobe Flash will permit interactive access to the each unit and their modules. This interactivity will expedite student access to subjects they wish to review within the anatomic unit.

This interactive digital video collection will be accessible through myCourses. Each week, students will be required to recreate the information in each unit in their sketchbooks, using traditional media.

Data Collection

Quantitative analysis
Students will be asked to identify the bones and muscles covered in the current anatomic unit on a diagram. The diagrams will be collected and graded.

Qualitative analysis
On the first day of class students will be asked, without references, to create a drawing of a figure, in any pose, as accurately as possible. These drawings will be collected and saved. Half way through the semester and again at its conclusion, students will be asked to complete the same assignment. It will not be necessary for the student to replicate the same pose. During mid semester review and again during final their final exam, the drawings will be evaluated in terms of:

1. proportion,
2. topographic accuracy,
3. balance,
4. gesture,
5. portrayal of form,
6. illusion of depth.
Dissemination plan (Optional):
If applicable, provide details about the journal, conference, show, other external vehicle with strong potential for dissemination of your results. Include supporting documentation such as preliminary interest or acceptance with your application, if available. (Please note that special consideration will be given to proposals that have a defined opportunity for external dissemination, such as an academic journal or professional conference.)

This teaching tool and the results of the data collected to gauge its efficacy will be presented at the Association of Medical Illustrators (AMI) annual conference in 2014. Whether successful or not the analysis will provide insight into the one method for incorporating interactive digital media as a teaching tool creating figures in instructional and editorial assignments.

Several other professional organizations will be interested in these results, including the Society of Illustrators and the National Art Education Association.

Until the study is completed, no application has been made to any of these groups.