HISTOLOGY OF THE FEMALE REPRODUCTIVE SYSTEM: AN INTERACTIVE

EDUCATIONAL MODULE

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DEDICATION

I would like to thank the members of my Graduate Committee, my family, and my

friends.

HISTOLOGY OF THE FEMALE REPRODUCTIVE SYSTEM: AN INTERACTIVE

EDUCATIONAL MODULE

by

MOLLIE MARIE GOVE

DISSERTATION / THESIS

Presented to the Faculty of the Graduate School of Biomedical Sciences

The University of Texas Southwestern Medical Center at Dallas

In Partial Fulfillment of the Requirements

For the Degree of

MASTER OF ARTS

The University of Texas Southwestern Medical Center at Dallas

Dallas, Texas

May 2013

HISTOLOGY OF THE FEMALE REPRODUCTIVE SYSTEM: AN INTERACTIVE

EDUCATIONAL MODULE

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The University of Texas Southwestern Medical Center at Dallas, 2012

"Histology of the Female Reproductive System: An Interactive Learning Module" is an interactive animated video project designed to address the need for a complete educational exploration of female reproductive histology for medical students and residents in Obstetrics and Gynecology. The content was developed by Dr. Barbara Hoffman and Dr. Kelley Carrick, and was designed to accompany the existing histology literature in McGraw-Hill's *Williams Gynecology* textbook. The project features 18 video animations that present normal and pathological histology features set in an interactive interface. This interface offers primary and secondary menus, as well as an interactive illustration showing the complete female reproductive system. The module was evaluated by current UT Southwestern medical students and residents for its *perceived* educational value. After using the module, surveys on the efficacy of the project were completed by eleven students. Analysis showed that the project was considered a useful resource for understanding female reproductive histology.

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Introduction

A medical education is notoriously extensive. Given the limitations of print and the vast information available, it has become the duty of textbook authors and editors to select the most important content to be published. Although print has long been the educational standard, advances in educational video, hypertechnology, and e-learning modules have provided a resource for condensing the physical volume of educational materials while still providing educators and students with the necessary quantity and quality of educational materials. In addition to condensing volume, these secondary modalities also offer students information that is easily accessible, visually dynamic, auditory, and interactive. As a result, alternative learning styles are accommodated.

"Histology of the Female Reproductive System: An Interactive Learning Module" is a project designed to address the limitations of printed media. As a particularly visual study, histology typically does not receive a thorough representation in many printed textbooks. This interactive, animated video project was proposed and executed to remedy the limited histological exposure that students are given in the textbook, *Williams Gynecology*. The project goal was to cover the normal and pathological histology of the female reproductive system in a concise, interactive module, featuring animated video slides with recorded narration. The module was created for the *Williams Gynecology* eBook—designed to complement the textbook's 3rd edition, and was modeled by the textbook's authors, Dr. Barbara Hoffman, Associate Professor of Obstetrics & Gynecology at UT Southwestern, and Dr. Kelley Carrick, Associate Professor of Pathology at UT Southwestern. The post implementation success of the

project relies on the theory that hypermedia can be as cohesive and educational as traditional textbooks, while also being more accessible and engaging for the student.

Hypermedia in Medical Education

Alternative online methods for education have become increasingly prevalent in recent years, primarily due to technological advances that meet educational needs in a more efficient manner than traditional methods. The use of audio and video tools is increasing, particularly throughout medical education (Embi et al. 2006). These advancements in technology allow e-learning to adapt to all facets of the medical school curriculum (Bridge et al. 2009).

Not surprisingly, medical students tend to show predominantly favorable attitudes toward hypermedia. In a 2010 study done at University of Wisconsin-Madison and the University of Michigan, of 217 medical students, "98% liked the idea of using technology to enhance healthcare education." (Kron et al. 2010). Similarly, a study of first-year medical students at Imperial College Medical School London found that most students were noted as responding more positively to audio tutorial study than to textbook study (Schreiber et al. 2010). These studies, as with others evaluating medical students' attitudes towards hypermedia, suggest that accessibility is the primary benefit of using hypermedia in place of traditional text.

Although not every aspect of medical education is better served by the use of hypermedia, there is a clear benefit and positive attitude toward digital teaching aids in the field of histology. The traditional methods of microscopy, such as preparing slides and observing them under a microscope, are regarded as time-consuming and location-

specific practices. The introduction of technology-based education into this field provides information without the cumbersome process of ordered observation. A review of internet-based medical education in *BioMed Central* noted the particular value of technology to medical students' histology education, citing, "in studies comparing virtual microscopy… with conventional microscopy, medical student learners were reported as valuing the internet-based materials much more highly and utilised these more." (Wong et al. 2010). Currently, the standard technology-based educational tool for histology is virtual microscopy (Donnelly et al. 2012). This is a collection of "slides" or digitized static images. Typically, the images can be viewed at different magnifications (40, 100, 200 and 400x), much like a standard light microscope. A hallmark of virtual microscopy is slide labeling and annotations throughout the images. This allows the student to directly correlate the imagery with the content within the same visual field. In general, students respond well to virtual microscopy, as it is "an excellent resource, time efficient, easy to use, more productive for the students, more stimulating, flexible for learning, it eliminates the need to share glass slides, and provides effective use of time." (Donnelly et al. 2012). Although virtual microscopy is a good tool for mimicking a histology laboratory experience, it does not provide the user with a narrative of histological landmarks and explanations for the diversity in cellular structures. Because the goal of this project was to be information-, not experience-, based, virtual microscopy was not an appropriate tool for building the module. Outside of virtual microscopy, there are few digital options for accessing histology information. Classic still-slide movies with simple indication arrows and narration are available online at sites such as Virtual Histology <visualhistology.com>. There are also a host of still histology images with static arrows

and subtext available online. Although these methods are suitable for identifying cellular structures, they don't offer comprehensive, dynamic viewing or an educational narrative of clinical and histological pathology. Ultimately, the increasing popularity, convenience, and positive reception of internet-based educational materials strongly suggest that an internet-based module on histology topics would prove a useful and positive learning tool for students of McGraw-Hill's *Williams Gynecology* text. The prevalence of histology information and the experience of virtual microscopy indicate a desire for histology content online, while the absence of comprehensive, visually dynamic materials indicate an untapped market or an undeveloped avenue for histology education. Both signs support the development of **"**Histology of the Female Reproductive System: An Interactive Learning Module."

Development

    The goal for "Histology of the Female Reproductive System: An Interactive Learning Module" was to construct an online, interactive series of narrated animations that thoroughly presented clinical and histological pathologies of the female reproductive system. The content was designed to specifically address areas of histology that were not discussed within the *Williams Gynecology* textbook, due to the page volume it would have required. As an adjunct to the textbook, the module will provide the lacking histology information as well as offer a unique approach to learning with its animations. The module would be especially beneficial considering it would be online and easily accessible for medical students.

The inception of "Histology of the Female Reproductive System: An Interactive Learning Module" began with its substantive content. Dr. Barbara Hoffman and Dr. Kelley Carrick, having developed the existing histology information contained in *Williams Gynecology*, originated all narrative content and slide infrastructure for the module. The topics for education were divided into anatomical locations—specifically, fallopian tube, ovary, uterus, cervix, and vulva. There were a total of 18 topics: 3 normal histology topics (cervix, endometrium, and ovary), and 15 pathology topics (Fig.1). Each topic was to be covered in its own animated video, complete with histology slides and narration. The content for each topic was developed in PowerPoint (Fig.2). Each image was presented on an individual slide, with notations describing the animation written or drawn over the image. The corresponding narration for each image was written in the notes division of its slide.

Fallopian Tube
    Ectopic pregnancy

Ovary
    Normal Ovary
    Serouns/ MucinousCystadenoma
    Epithelial Cancer

Uterus
    Normal endometrium
    Endometriosis
    Endometrial hyperplasia
    Endometrial cancer
    Leiomyoma
    Adenomyosis
    Uterine Sarcoma

Cervix
    Normal cervix
    Cervical intraepithelial neoplasia
    Squamous cell carcinoma
    Adenocarcinoma

Vulva
    Lichen sclerosus
    Vulvar intraepithelial neoplasia
    Melanoma

Figure 1: List of histology topics and subtopics

Figure 2: PowerPoint storyboard
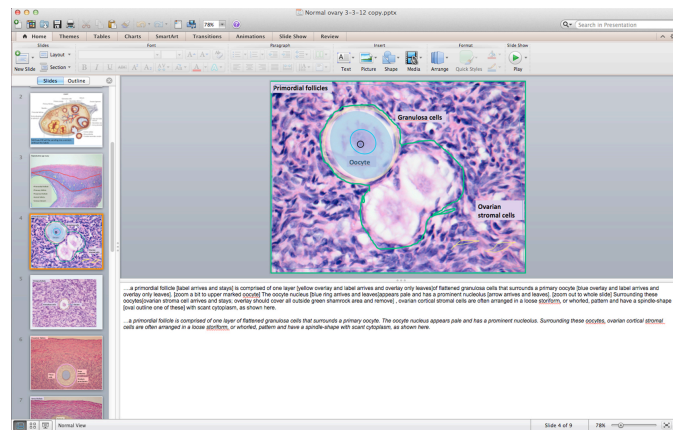
After the content of each topic had been fleshed out, the design of the interactive module had to be constructed. The biggest challenge in designing the module was translating the design of *Williams Gynecology* into a visually dynamic, auditory module. There were many considerations in formulating the design of "Histology of the Female Reproductive System: An Interactive Learning Module."

The font chosen for the module, Dax, corresponds with the title fonts of *Williams Gynecology, 3rd edition* (Fig.3). The placement of the call-outs and slide titles was determined by the arrangement of the information on each slide. Because the primary content was typically centered on the slide, the slide titles were placed in the upper left-hand corner on a white backdrop (Fig.4).

Histology of the Female Reproductive System in "Dax"

ABCDEFGHIJKLM NOPQUSTUVWXYZ abcdefghijklm nopqrstuvwxyz 1234567890

Figure 3: Dax, thesis font
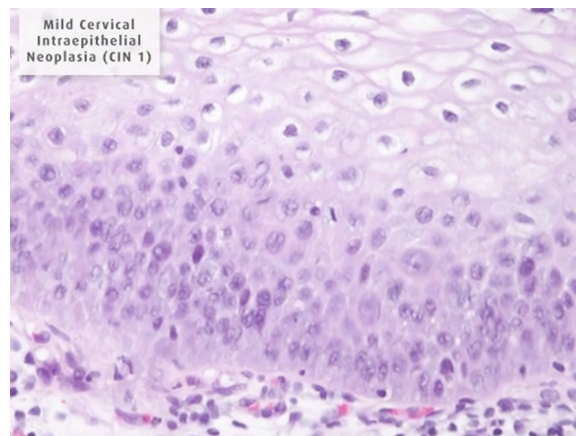
Figure 4: Slide title example

For the color scheme a medium gray was chosen for the text, along with 5 primary highlight colors for overlays, arrows, outlines, and directional lines. The colors were chosen based on optimal visibility against the high saturation and contrast of the anatomical images and the pink hues of the histology slides. Also taken into consideration was the graphic style of the *Williams Gynecology* textbook. Throughout the publication, the imagery and spot colors are muted and relatively feminine. The primary

colors chosen to complement this style were orange, green, purple, blue, and yellow (Fig.5).
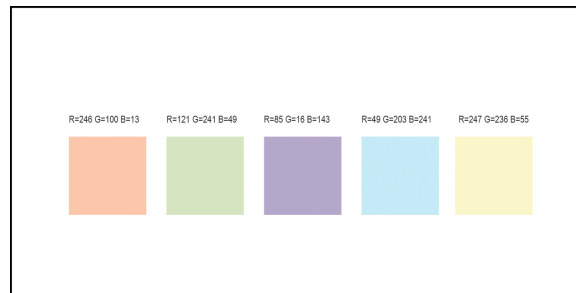
Figure 5: Animation color palate

Arrows were chosen to call attention to specific cellular structures within the slides (Fig.6). The arrow could point to a very specific location, without obstructing the remainder of the image. The design of the arrowheads went through several stages. Initially, an arrow with a slightly curved head and a curved and tapered tail was implemented, intended to reflect the feminine nature of the project. After much discussion, the arrow was repeatedly revised and modified into a shorter, straight arrow, with less tapering on the tail and head (Fig.7). These revisions increased the prominence of the arrow, which directed the viewer to the point of interest with more visual impact.
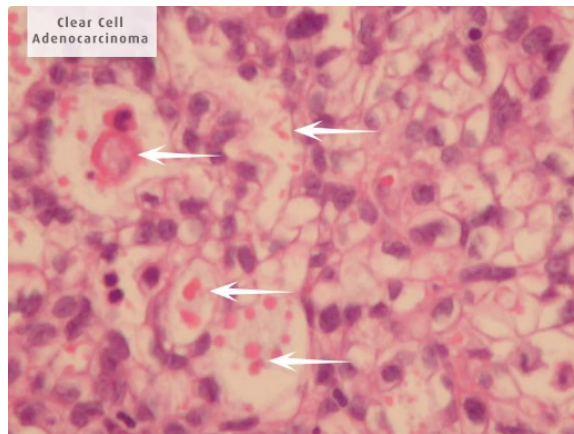
Figure 6: Arrows within animation
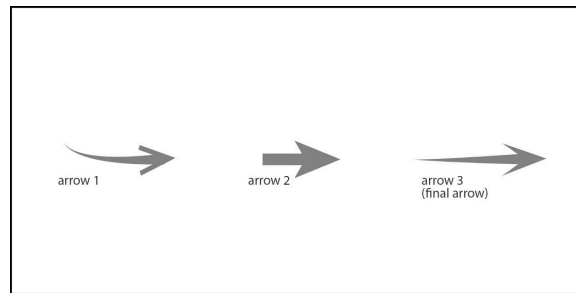
Figure 7: Arrowhead and arrow tail configuration

To dictate areas of interest and anatomical boundaries that covered an area too broad for the point of an arrow, an outline or directional line was used. The design of the outlines and directional lines within the project were determined individually based on content. Typically, a dashed line, which represents a soft boundary or temporary state (Malamed, 2013), was chosen for anatomical cross sections (Fig.8), while solid line was used to outline parameters of anatomy (Fig.9). The color of the lines was typically the aforementioned green shade, with exceptions for slides without a contrasting backdrop. Such exceptions and changes were made to the design and layout throughout the project to differentiate the images within a given animation.

Figure 8: Cross section line example

Figure 9: Outline example

When calling attention to structural areas of tissue and their relationship to adjacent structures, color overlays were used (Fig.10). A 40%-opacity color highlight was laid over the entire structure, with special attention given to the structure boundaries. The transparency was especially helpful in viewing the underlying structure, while conveying its boundaries and shape. The tone used in the overlays was consistent with the aforementioned palate, and there was an attempt to be consistent when using tone on structures seen repeatedly throughout the animations. For example, areas of tissue stroma were consistently purple, while glandular structures were consistently blue. This uniformity was intended to help viewers recognize and remember structural elements more readily.
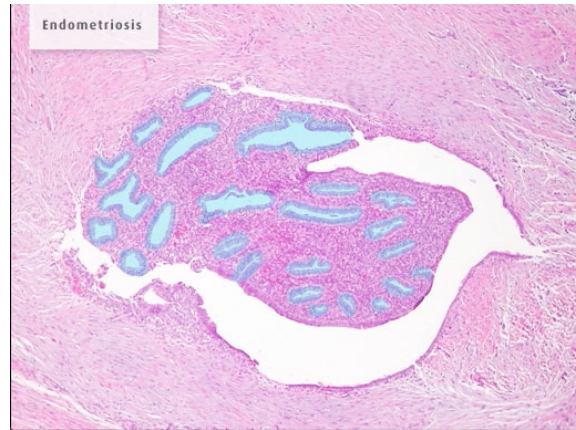
Figure 10: Overlay example

In the instance of focusing on smaller, detailed areas of tissue, while retaining perspective of their surrounding environment, a circular spotlight was used (Fig.11). The structures of focus were lit at their 100% saturation, while the area outside the spotlight was dimmed to 40%. This treatment kept the viewers attention tuned in on the appropriate region of the image, while maintaining an awareness of the structures' entirety.
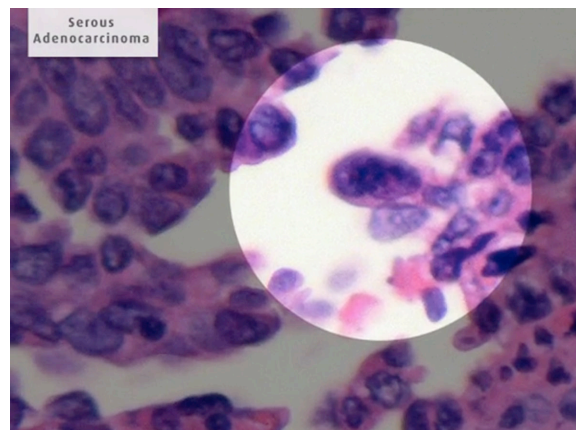
Figure 11: Spotlight example

Once the design standards had been selected, the animation, audio recording, and editing process began. McGraw-Hill's web design templates determined the dimensions of the videos, which are 520 pixels wide by 390 pixels high. Initially, the animations were guided by the narrative text and notations from the PowerPoint. The images were then uploaded to Adobe AfterEffects and animated (Fig.12). Shortly into the animation process, the narrative audio was recorded by Dr. Barbara Hoffman and edited in Adobe Soundbooth (Fig.13). The audio was then partitioned into individual slide sections and uploaded to the corresponding AfterEffects files. Once the image and audio elements were in place, the complex animations were executed.
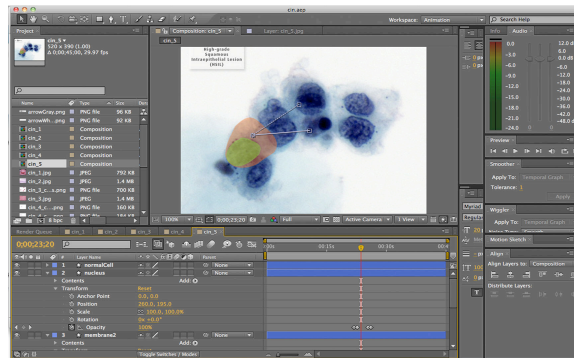
Figure 12: Adobe AfterEffects example
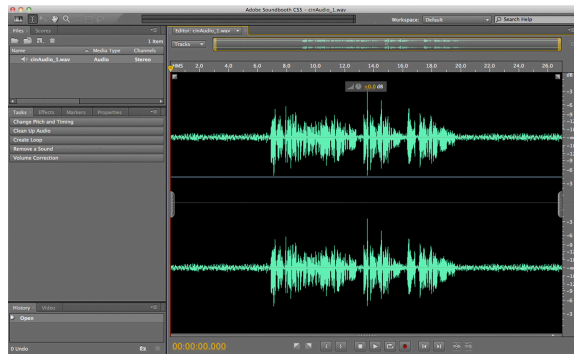
Figure 13: Adobe Soundbooth example

The animations for most slides went through several rounds of edits and revisions. Aside from the standard outlines, cross sections, highlights, and overlays, zoom-in and zoom-out animations, panning, spotlight animations, and fade-in/ fade-out animations were used. The timing of the animations was aligned with the narration, and the type of animation was chosen based on the individual image's content. Consistency in design was maintained throughout the animations. Individual cells were treated with a zoom and spotlight, and stroma was differentiated with overlays and brackets. Again, exceptions were made in cases where the standard treatment did not serve the image properly.

After the individual slides were animated, they were composited by topic in Adobe Premier Pro (Fig.14). Each video begins with a title page, followed by the individual slide animations playing through and ending with a credits page. Fluidity of the transitions was achieved using fades on the video and audio.
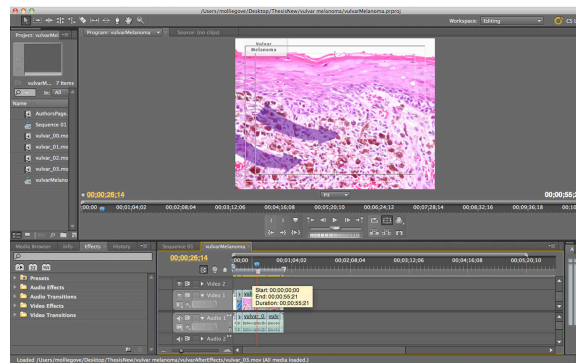
Figure 14: Adobe Premier example

The final step of the project's development was designing and constructing the interactive interface for publication. The initial vision for the interface was to use a three-quarter-view illustration of the female reproductive system as a map, along with a

main menu and submenus to lead the user through the primary topics. The interface

illustration was sketched by hand, and after multiple revisions, rendered in Adobe

Illustrator (Fig.15). The preliminary plan to was to use Adobe Flash. However, given its

inherent incompatibility with mobile Apple products, the construction was instead

completed in Adobe Captivate (Fig.16). The interactivity includes dropdown menus for

each topic, with submenus linked to the corresponding videos. Rollover images

accompany the topic headings, with a blue highlight appearing over each anatomical

structure within the interface illustration. Each video has a scrubbing function, as well as

play, pause, forward, rewind, and exit buttons. The videos automatically play upon

opening and sit upon a darkened backdrop of the interface (Fig.17).
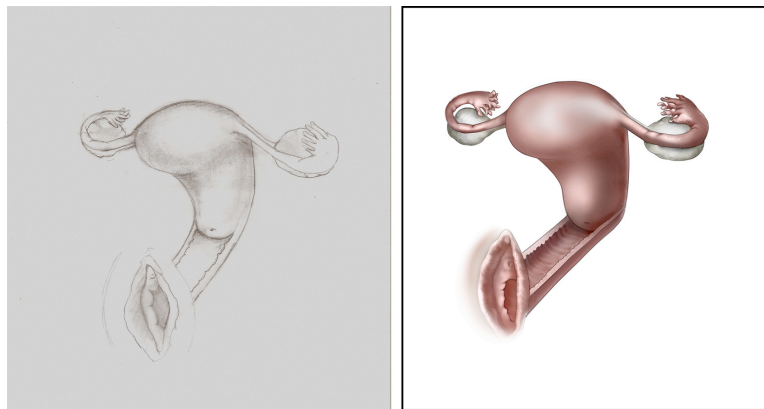
Figure 15: Interface sketch (left) and interface render (right)

Figure 16: Adobe Captivate example

Figure 17: Completed project stills, main menu (top left), submenu (top right), and video selection (left)

Publication

The primary goal for the publication of "Histology of the Female Reproductive System: An Interactive Learning Module" was to produce a project that would be accessible via McGraw-Hill's online textbook website, Access Medicine <accessmedicine.com>, and within the eBook version of *Williams Gynecology*. To this end, the project was published in HTML and PDF formats via Adobe Captivate because of its output compatibility with mobile devices and ease of interface production. Before online publication, the final products will be sent to McGraw-Hill for reformatting based on their website and eBook templates.

Implementation

  To assess the utility and usability of the project, eleven residents in Obstetrics and Gynecology were asked to review the animations and interactivity. The module was uploaded on to a personal computer in the office of Dr. Hoffman, where the students could access the module during a two-week period. After viewing the module, the students completed an online survey (Fig.18) consisting of nine open comment and Likert scale questions. The survey was designed to assess the perceived educational value of the module, in addition to or in comparison to, traditional histology education methods. The survey also assessed the perceived quality and usability of the module.

Histology of the Female Reproductive System

1. Where do you typically access histology information?

2. I felt that the information presented enhanced my understanding of female reproductive system histology.

Strongly   Strongly
Disagree   Agree

3. I found the information presented to be comprehensive.

Strongly   Strongly
Disagree   Agree

4. I felt the animations were easy to follow.

Strongly   Strongly
Disagree   Agree

5. I felt the narration was easy to understand.

Strongly   Strongly
Disagree   Agree

6. I felt the interface was intuitive.

Strongly   Strongly
Disagree   Agree

17

7. I would use a module like this in the future.

Strongly   Strongly
Disagree   Agree

8. I prefer the animated histology format to traditional histological slide viewing.

Strongly   Strongly
Disagree   Agree

9. Please list any additional comments below:

[Done]

Powered by **SurveyMonkey**
Check out our sample surveys and create your own now!

Figure 18: Example survey

Results

On the whole, the survey participants responded positively to the module. There was unanimous agreement among all participants that the module was educational, comprehensive, intuitive, and a resource they would use in the future (Fig.19). Further comments indicated that the students traditionally use textbooks and online resources to acquire their histology information and that access to a comprehensive module such as this would be a beneficial addition to *Williams Gynecology*. Suggestions for improvement included advanced interactivity (speed control), and more opportunities for normal/ abnormal side-by-side histology comparisons. The students all rated positively that they felt that the digital animations were preferable to traditional slide viewing, however, in the comments section it was noted that while the module was a great tool, it was not a sufficient replacement for traditional histological slide viewing.

1. Where do you typically access histology information?: (fill in the blank)

Student 1: (n/a), Student 2: (Textbooks), Student 3: (Online/ google), Student 4: (Wikipedia), Student 5: (n/a),
Student 6: (An ONC textbook), Student 7: (Internet images or paper atlas), Student 8: (Textbooks), Student 9: (n/a),
Student 10: (n/a), Student 11: (n/a)

2. I felt that the information presented enhanced my understanding of female reproductive system histology.
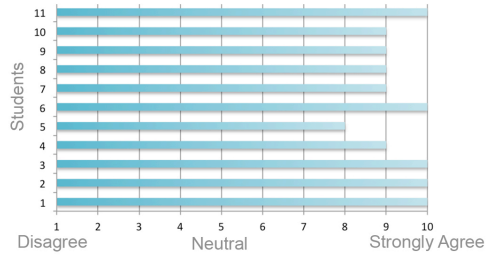
3. I found the information presented to be comprehensive.
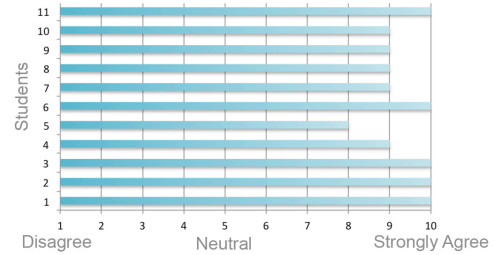
4. I felt the animations were easy to follow.
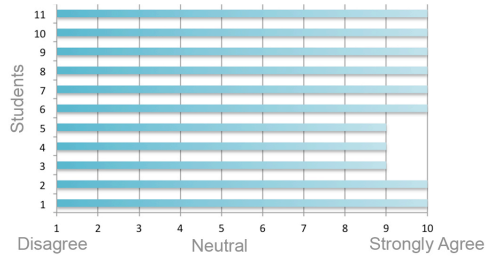
5. I felt the narration was easy to understand.
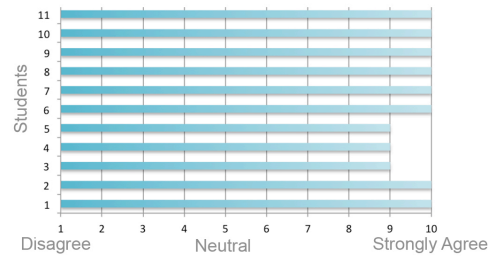
6. I felt the interface was intuitive.
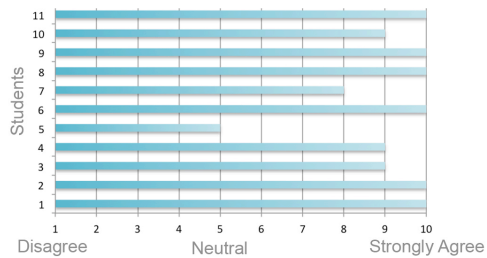
7. I would use a module like this in the future.
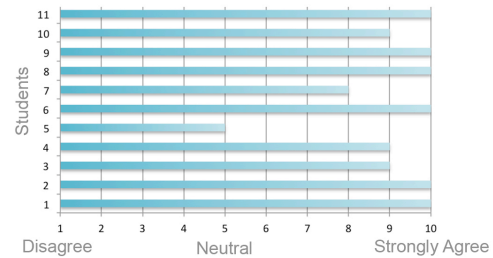
8. I prefer the animated histology format to traditional histological slide viewing.
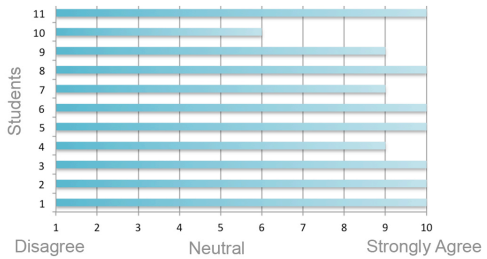
Figure 19: Survey results

Discussion

The goal of this project was to provide an in-depth, easily accessible histology education option to students of Obstetrics and Gynecology outside of textbooks and laboratory activities. The animated slides offered users a platform for viewing histology slides while simultaneously hearing a lecture-styled narrative. The topical animations of overlays and customized arrows provided users with a more detailed visual outline of histology, which supersedes the abilities of traditional text and slide viewing. The accessibility of the project is inherently convenient, given the prevalence of personal computers and Internet access in a university setting. While not every participant preferred the online slide viewing to traditional methods, all of the participants agreed that it was useful, informative, and enhanced their understanding of the female reproductive system.

The primary limitations of the study were the lack of preexisting interactive and animated histology modules in Obstetrics and Gynecology and the absence of the projects content covered within any existing text. Because the information presented within the module is not currently in print within the *Williams Gynecology* text and is not available in a comprehensive format online, there was no baseline on which to test the participants knowledge base or growth, pre and post viewing. Instead, the surveyed students were asked their perceived value, which, being a subjective measurement, was unquantifiable. Although the opinions of the students are indeed helpful for assessing the success of the project, lack of quantifiable data tempers the studies apparent educational value. Conversely, this limitation speaks to the necessity of the project in that the lack of

available resources covering the modules content articulates a direct need for a publication to do so.

In future projects, a few simple additions could improve the utility of similar modules. The students' suggestions to include advanced interactivity, and normal/ abnormal side-by-side histology comparisons were creditable. In addition, an image data bank included within the software could offer students variable images of the pathologies and provide an option for self-study. A written document of the narrative could easily be included in the software as well, accommodating a less-visual learner.

Although the module does not offer the microscope experience and self-guided learning that a laboratory practice does, it does offer a dynamic educational experience without the limitations of laboratory workspace and volume in text. Ultimately, the project and its positive reception encourage growth for forthcoming histology projects in the way of interactive modules with dynamic animations.

Appendix A: Completed Surveys

Student 1

1. Where do you typically access histology information?

No Response

2. I felt that the information presented enhanced my understanding of female reproductive system histology.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                                                                                                X

Comments:

3. I found the information presented to be comprehensive.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                                                                                                X

Comments:

4. I felt the animations were easy to follow.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                                                                                                X

Comments:

5. I felt the narration was easy to understand.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                                                                                                X

Comments:

6. I felt the interface was intuitive.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                                                                                                X

Comments:

7. I would use a module like this in the future.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                                                                                                X

Comments:

8. I prefer the animated histology format to traditional histological slide viewing.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                                                                                                X

Comments:

9. Please list any additional comments below:

No Response

Student 2

1. Where do you typically access histology information?

Textbooks

2. I felt that the information presented enhanced my understanding of female reproductive system histology.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                                                                                                X

Comments:

3. I found the information presented to be comprehensive.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                                                                                                X

Comments:

4. I felt the animations were easy to follow.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                                                                                                X

Comments:

5. I felt the narration was easy to understand.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                                                                                                X

Comments:

6. I felt the interface was intuitive.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                                                                                                X

Comments:

7. I would use a module like this in the future.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                                                                                                X

Comments:

8. I prefer the animated histology format to traditional histological slide viewing.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                                                                                                X

Comments:

9. Please list any additional comments below:

An excellent tool for students and clinicians alike! I would definitely use this tool in the future. I especially enjoyed the inclusion of "normal" histology as a reference point for the ensuing pathology. Well done!

Student 3

1. Where do you typically access histology information?

Online/google

2. I felt that the information presented enhanced my understanding of female reproductive system histology.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

                                                   X

Comments:

3. I found the information presented to be comprehensive.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

                                    X

Comments:

4. I felt the animations were easy to follow.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

                                    X

Comments:

5. I felt the narration was easy to understand.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

                                    X

Comments:

6. I felt the interface was intuitive.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

                                    X

Comments:

7. I would use a module like this in the future.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

                                    X

Comments:

8. I prefer the animated histology format to traditional histological slide viewing.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

                                    X

Comments:

9. Please list any additional comments below:

It would help to have small insets of normal histology shown alongside when describing the abnormal.

Student 4

1. Where do you typically access histology information?

wikipedia

2. I felt that the information presented enhanced my understanding of female reproductive system histology.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

                              X

Comments:

3. I found the information presented to be comprehensive.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

                           X

Comments:

4. I felt the animations were easy to follow.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

                              X

Comments:

5. I felt the narration was easy to understand.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

                              X

Comments:

6. I felt the interface was intuitive.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

                              X

Comments:

7. I would use a module like this in the future.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

                              X

Comments:

8. I prefer the animated histology format to traditional histological slide viewing.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

                              X

Comments:

9. Please list any additional comments below:

No Response

Student 5

1. Where do you typically access histology information?

No Response

2. I felt that the information presented enhanced my understanding of female reproductive system histology.

Strongly Disagree (1) (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

X

Comments:

3. I found the information presented to be comprehensive.

Strongly Disagree (1) (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

X

Comments:

4. I felt the animations were easy to follow.

Strongly Disagree (1) (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

X

Comments:

5. I felt the narration was easy to understand.

Strongly Disagree (1) (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

X

Comments:

6. I felt the interface was intuitive.

Strongly Disagree (1) (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

X

Comments:

7. I would use a module like this in the future.

Strongly Disagree (1) (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

X

Comments:

8. I prefer the animated histology format to traditional histological slide viewing.

Strongly Disagree (1) (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

X

Comments:

9. Please list any additional comments below:

The animation was great. It helped decode information one may not have understood from cellbio or pathology lectures from first and second year med school. Animated histology is important a wonderful method of teaching for us visual learners, however, it cannot supplant traditional histological slide viewing. It's like learning Anatomy through animations vs actually dissecting the human being.

Student 6

1. Where do you typically access histology information?

an onc textbook

2. I felt that the information presented enhanced my understanding of female reproductive system histology.

Strongly Disagree (1) (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

X

Comments:

3. I found the information presented to be comprehensive.

Strongly Disagree (1) (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

X

Comments:

4. I felt the animations were easy to follow.

Strongly Disagree (1) (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

X

Comments:

5. I felt the narration was easy to understand.

Strongly Disagree (1) (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

X

Comments:

6. I felt the interface was intuitive.

Strongly Disagree (1) (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

X

Comments:

7. I would use a module like this in the future.

Strongly Disagree (1) (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

X

Comments:

8. I prefer the animated histology format to traditional histological slide viewing.

Strongly Disagree (1) (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)

X

Comments:

9. Please list any additional comments below:

The animated histology was much more helpful than traditional histology slide shows!

Student 7

1. Where do you typically access histology information?

internet images or paper atlas

2. I felt that the information presented enhanced my understanding of female reproductive system histology.

Strongly Disagree (1)   (2)   (3)   (4)   (5)   (6)   (7)   (8)   (9)   Strongly Agree (10)

   X

Comments:

3. I found the information presented to be comprehensive.

Strongly Disagree (1)   (2)   (3)   (4)   (5)   (6)   (7)   (8)   (9)   Strongly Agree (10)

   X

Comments:

4. I felt the animations were easy to follow.

Strongly Disagree (1)   (2)   (3)   (4)   (5)   (6)   (7)   (8)   (9)   Strongly Agree (10)

    X

Comments:

5. I felt the narration was easy to understand.

Strongly Disagree (1)   (2)   (3)   (4)   (5)   (6)   (7)   (8)   (9)   Strongly Agree (10)

   X

Comments:

6. I felt the interface was intuitive.

Strongly Disagree (1)   (2)   (3)   (4)   (5)   (6)   (7)   (8)   (9)   Strongly Agree (10)

   X

Comments:

7. I would use a module like this in the future.

Strongly Disagree (1)   (2)   (3)   (4)   (5)   (6)   (7)   (8)   (9)   Strongly Agree (10)

   X

Comments:

8. I prefer the animated histology format to traditional histological slide viewing.

Strongly Disagree (1)   (2)   (3)   (4)   (5)   (6)   (7)   (8)   (9)   Strongly Agree (10)

   X

Comments:

9. Please list any additional comments below:

Very good - offered a nice understanding of endoemtrial hyperplasia and CIN. I liked the overlay of the colors on the slides.

Student 8

1. Where do you typically access histology information?

textbooks

2. I felt that the information presented enhanced my understanding of female reproductive system histology.

Strongly Disagree (1)   (2)   (3)   (4)   (5)   (6)   (7)   (8)   (9)   Strongly Agree (10)

   X

Comments:

3. I found the information presented to be comprehensive.

Strongly Disagree (1)   (2)   (3)   (4)   (5)   (6)   (7)   (8)   (9)   Strongly Agree (10)

    X

Comments:

4. I felt the animations were easy to follow.

Strongly Disagree (1)   (2)   (3)   (4)   (5)   (6)   (7)   (8)   (9)   Strongly Agree (10)

    X

Comments:

5. I felt the narration was easy to understand.

Strongly Disagree (1)   (2)   (3)   (4)   (5)   (6)   (7)   (8)   (9)   Strongly Agree (10)

    X

Comments:

6. I felt the interface was intuitive.

Strongly Disagree (1)   (2)   (3)   (4)   (5)   (6)   (7)   (8)   (9)   Strongly Agree (10)

    X

Comments:

7. I would use a module like this in the future.

Strongly Disagree (1)   (2)   (3)   (4)   (5)   (6)   (7)   (8)   (9)   Strongly Agree (10)

    X

Comments:

8. I prefer the animated histology format to traditional histological slide viewing.

Strongly Disagree (1)   (2)   (3)   (4)   (5)   (6)   (7)   (8)   (9)   Strongly Agree (10)

    X

Comments:

9. Please list any additional comments below:

No Response

Student 9

1. Where do you typically access histology information?

No Response

2. I felt that the information presented enhanced my understanding of female reproductive system histology.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                  X

Comments:

3. I found the information presented to be comprehensive.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                     X

Comments:

4. I felt the animations were easy to follow.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                     X

Comments:

5. I felt the narration was easy to understand.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                     X

Comments:

6. I felt the interface was intuitive.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                     X

Comments:

7. I would use a module like this in the future.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                     X

Comments:

8. I prefer the animated histology format to traditional histological slide viewing.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                  X

Comments:

9. Please list any additional comments below:

No Response

Student 10

1. Where do you typically access histology information?

No Response

2. I felt that the information presented enhanced my understanding of female reproductive system histology.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                  X

Comments:

3. I found the information presented to be comprehensive.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                  X

Comments:

4. I felt the animations were easy to follow.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                     X

Comments:

5. I felt the narration was easy to understand.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                  X

Comments:

6. I felt the interface was intuitive.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                  X

Comments:

7. I would use a module like this in the future.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
                  X

Comments:

8. I prefer the animated histology format to traditional histological slide viewing.

Strongly Disagree (1)   (2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
              X

Comments:

9. Please list any additional comments below:

No Response

Student 11

1. Where do you typically access histology information?

No Response

2. I felt that the information presented enhanced my understanding of female reproductive system histology.

Strongly Disagree (1)	(2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
	X

Comments:

3. I found the information presented to be comprehensive.

Strongly Disagree (1)	(2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
	X

Comments:

4. I felt the animations were easy to follow.

Strongly Disagree (1)	(2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
	X

Comments:

5. I felt the narration was easy to understand.

Strongly Disagree (1)	(2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
	X

Comments:

6. I felt the interface was intuitive.

Strongly Disagree (1)	(2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
	X

Comments:

7. I would use a module like this in the future.

Strongly Disagree (1)	(2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
	X

Comments:

8. I prefer the animated histology format to traditional histological slide viewing.

Strongly Disagree (1)	(2) (3) (4) (5) (6) (7) (8) (9) Strongly Agree (10)
	X

Comments:

9. Please list any additional comments below:

Some parts felt like the narration was too slow. Perhaps if there were options on what speed we wanted the narration to be set at? fast, medium, slow? the graphics were amazing. i would definitely buy something like this if it had been around when i was taking histology.

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