

ONE PICTURE IS WORTH 1,000 WORDS: THE DIGITAL CAMERA AS AN INSTRUCTIONAL TOOL



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With the advent of the digital age, the universe of photography has been completely transformed. The convenience of this technology has quickly replaced film. Digital cameras are now smaller, more efficient, and more affordable than ever. They have been incorporated into most cell phones, and smart phones make it possible even to touch up photos and share them over social networks with the tap of a finger. But what if we were to use a digital camera for something other than holiday pics? This is precisely what I have attempted to do over the past two years. Before discussing the educational advantages and many possibilities offered by the digital camera, I will describe my own experiment.

AN UNEXPECTED SOLUTION

I teach histology (microscopic anatomy) as part of my college's biomedical laboratory technology program. In their time spent in the lab, students must learn how to recognize the different organs of the human body, as well as the cells that compose them, using the microscope. The first few times I gave the course, I asked my students to draw and diagram what they saw, so as to encourage them to preserve their observations physically and use them for studying. This allowed me to give them feedback on their work. At the end of each lab session, I would check all the drawings; when I noticed a problem, I informed the student and took a few minutes to re-examine the slide to ensure that everything had been properly noted and understood.

Drawings have their limitations, however, especially as they can't be done from memory. Students therefore have to do them in the lab, which takes considerable time. Furthermore, the quality depends largely on the artistic talent of each individual. Drawings that are not representative prove useless when it comes time to study. Students who can't draw well do not really apply themselves to the task; they tell themselves that, in any event, they won't be using their drawings for studying. In other words, they're doing the work, not for their own benefit, but to satisfy their teacher's requirements. Lastly, when the drawings are mediocre, it's hard for me to provide feedback, since I can't distinguish the lack of understanding of an organ's structure from a lack of application or talent to portray this structure.

I was not particularly taken with this method, but it was the only one I was familiar with. Naturally, I knew there were microscopes with adaptors for cameras, but this solution would have been much too costly. One day, I saw a student take out her digital camera, aim it, and take a snapshot. I asked to see the result, not really expecting much, but her photos were perfect—worthy of the best histology reference books! I then took a few trial runs with my own camera, and realized that it was relatively simple and that the results were astonishingly good.

I decided to propose this procedure to my students the next time I taught the course. I didn't want to impose the method, however, as I was afraid some students didn't own a digital camera or that those unfamiliar with the technology would find it an added burden. Consequently, I gave them the choice of using a camera or continuing to use drawings. Two-thirds opted for the camera. In the first lab session, I gave them a few tips for taking good photos: shut off the flash, find the optimal zoom setting, and, holding the camera steady in their fingertips, align it with the microscope's eyepiece. I had to help out some students who were uncomfortable with their camera's many settings and functions but, after two or three weeks, most had become independent and were taking satisfactory photos.

As the term progressed, I discovered the practical advantages of the digital camera. My students spent less time drawing and more time looking in their microscopes. When they had questions, rather than ask me to look in their microscope, they would take a photo and show it to me on their screen. Because I could use their snapshots to point out the aspects I was explaining, it was easier for me to answer their questions. It was also easier to give them feedback at the end of the lab, as I just had to scroll through each student's pictures to determine if he or she had observed and understood everything. I no longer had to wrack my brains trying to interpret poor drawings!

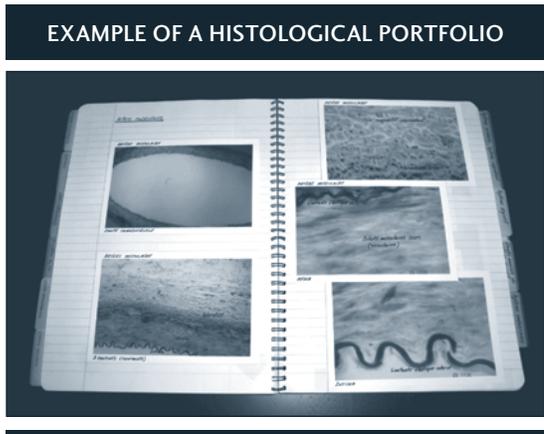
PUTTING TOGETHER A PERSONAL HISTOLOGICAL ATLAS

The digital camera has thus solved certain practical problems in my lab. But what teaching advantages might it have? Does it enhance student motivation and learning? Although I didn't tell my students what to do with their photos, almost half of them took the initiative to create a portfolio. Some did



so on computer, using software such as PowerPoint; others printed them out and put them in a binder, using a felt marker to label the items visible on each image. The really keen ones inserted summaries in each section; the more imaginative went so far as to make up “tests” for their friends. And guess where they had to do to take these tests? Facebook, naturally! In short, they began to create actual histological reference works of which they were extremely proud. Time spent in the lab, which even I sometimes found monotonous, became stimulating creative sessions for my students.

As I see it, this wealth of initiatives is the result of higher motivation. Given that taking good photos doesn't require any particular talent, most students were proud of their efforts, as their pictures were comparable in quality to those found in reference books. Their comments reflected that pride: “This picture is so good I'm going to frame it and hang it on my wall”, or “I can hardly wait for Christmas, so I can show my album to my family”. Furthermore, the students could actually use their photos when studying, which was not always possible with drawings. This source of motivation encouraged them to apply themselves more to their work, and even to exceed my demands.



Courtesy of Mélissa RÉHEL, a biomedical laboratory student at Collège de Rosemont.

At the end of the semester, I had my 70 students fill out a questionnaire on their lab work. While this was not a precise scientific study, some figures speak for themselves.

Of those students who took photos (2/3 of the total):
• 70% used them to create a portfolio (electronic or hard-copy) on their own initiative.
• 45% had them printed.
• 100% used them for studying purposes.
• 90% decided to use their camera in other courses.

Of the students who made drawings (1/3 of the total):
• 75% used them for studying purposes.
• 40% would use a digital camera if they had to take the course again.

THE DRAWBACKS

By and large, I feel my project was a success, since it solved a number of practical problems and significantly increased my students' motivation. However, I do have a few reservations. Not all digital cameras can take quality pictures when used with a microscope: for example, the focus on most cellphone cameras simply cannot be adjusted, older models were passable at best, and technical issues (full memory card, run-down battery, etc.) occasionally were problematic.

I also noticed that the learning process of the “sketchers” differed from that of the “photographers”. When students make a drawing, they must analyze what they see through the microscope right away in order to reproduce it faithfully. This is not the case with photos, since a simple click of a button suffices to produce an exact reproduction of what is observed. Students can conduct an in-depth analysis later, when examining the photos on their computer or compiling their portfolio. Some students who opted to make drawings justified their choice by stating that they had to draw what they saw in order to understand and memorize it. As I see it, this is a good illustration that there are different styles of learning, and therefore different types of learners. Some retain information better when they listen to it, while others memorize better what they can see, touch, write down or draw.

This observation raised a vital question: What is the best way to learn: photos or drawings? For reasons of scientific validity, I did not risk comparing the results of the sketchers with those of the photographers, as they may have been biased by too many factors. However, my teacher's intuition leads me to believe the motivation generated by the use of the digital camera had positive repercussions on the success of some students, particularly those who invested considerable effort in creating a portfolio, as they had to analyze in detail what they observed to do so. We cannot generalize for all students, though, since, in my view, photos can be more effective for some and drawings, for others. One method is therefore not better than the other. In this pilot project, I allowed my students to choose between photos and drawings. If I had forced all students to use photos, this may have proved detrimental to those who need to draw in order to learn. Although I consider photos much more practical than drawings, I would not want



to deprive students of their preferred method of learning, especially as they are not limited to those drawings; they can consult other resources, such as reference works or Website photos. I will therefore continue to let students choose the method they prefer, the one that motivates them more and best suits their learning style.

In short, even though I can't conclude with certainty that the use of the digital camera enhanced my students' learning, I can definitely say that it increased motivation in most of them. Is that not a good enough reason to adopt it?

▶ A WEALTH OF OTHER POSSIBILITIES

Digital cameras can be used in a number of diverse fields; the video function can also be employed. Below are a few examples to inspire you.

— **Plastic Arts** Students could take photos or film one another at each stage of the creative process in order to illustrate that process and the techniques used. Their photos could be incorporated into a written assignment or projected during an oral presentation or at a show opening. In addition to enhancing such presentations, this would allow the instructor to evaluate both the final product and the process that led to its completion.

— **Biology** Students could take photos during dissection and use them to create an anatomical atlas. This would give them a chance to preserve a physical record of their lab observations, which would facilitate studying.

— **Chemistry** Students could photograph their lab set-up; they'd also be able to take photos of each step of an experiment and include them in their lab report, enabling the instructor to evaluate both their approach and their results.

— **Philosophy** The teacher could ask the students to photograph something that represents a key concept such as freedom. In the next class, the photos would be used as a starting point for a discussion or debate.

— Physical Education, Drama, Nursing, Etc.

Students could be filmed while they practice the breaststroke, a play by Molière, or cardiopulmonary resuscitation. During these kinds of activities, because students are in the thick of things, they aren't necessarily aware of their performance. The teacher could use videos to give them feedback so they can improve their technique, gestures, and so on. While watching the video playback, students would quickly realize that their

arms were not fully extended when they were swimming, that their movements were not ample enough when their character was angry, or that their chest compressions were too rapid when they were performing cardiac massage.

These suggestions are just a few illustrations of the practical and educational advantages offered by the use of the digital camera. The possibilities are limited only by the imagination of teacher and student. ◀

◆ Go to Facebook to discuss the possible uses of this tool with the author and benefit from his technical advice.
◆ [www.facebook.com/revue.pedagogiecollegiale].

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Both the English- and French-language versions of this article have been published on the AQPC website with the financial support of the Quebec-Canada Entente for Minority Language Education.