We teach medical and other health professional students “human physiology,” so one might wonder at the title of this editorial. One definition of humanize is “to make something friendlier to humans. Humanizing makes things more civilized, refined, and understandable” (https://www.vocabulary.com/dictionary/humanize). So, should we even attempt to humanize physiology education? And, if so, how might we do this?

Given that every instructor would wish to make the subject friendlier and more understandable, it follows that we should attempt to humanize physiology education. So how can we work toward achieving this?

We are actually in a unique situation in physiology, for in no other course is the student also the subject of the course. I used to say to my students, “Physiology is not out there; it’s not in books, it is all about you. And if you analyze how you respond in situations, then you already know a lot of physiology.” So the first simple thing we can do is just make sure that students relate what we are discussing to themselves. It really is extraordinary how much students can tell you in response to a series of questions. We can lecture at them about, say, the production of a concentrated urine, but it’s much better if they can begin by telling us under what circumstances they notice that their urine is more highly colored. They can then speculate about what this means and the physiological advantages of a concentrated urine in the morning or after exercise. Having thought about this, they are then curious to understand the detailed mechanisms of how this concentration of the urine is achieved and are perfectly capable of researching and finding the required information for themselves.

It used to be that this “active learning” approach was best carried out with small groups interacting directly with an instructor. This is expensive in staff time, and for that reason many of us, although we would like to have used this approach, just could not do so. But modern technology is transforming learning, and it is now possible for students to study online either individually or in small groups and work their way through a series of questions and receive immediate feedback as they go. Their instructor can see what they have done, and how long they have taken, and can then meet with them to discuss any issues that have arisen during this self-study session. Note that this approach does not replace instructors. Instead, it allows much more meaningful interactions between students and instructors—an example of humanizing physiology by making the learning friendlier for humans!

We can also humanize physiology education by appropriate use of laboratory time. There continues to be debate about the place of laboratory learning in courses for aspiring health professionals. If we run laboratories in isolation from the rest of the teaching program, perform the experiments largely using anesthetized animals or animal organs and tissues, and do not include assessment of the laboratory work in determining the final grades, then laboratory time can never be justified. However, it can be justified when the experiments are performed on the students themselves, with the laboratories integrated into the rest of a course that includes illustrative patient cases, and with due recognition of the laboratory learning in the assessment procedures. There is essential learning that occurs best in a laboratory setting. Laboratory work enables students to appreciate biological variability, it illustrates basic physiological principles including homeostasis, and it shows students the difficulties and pitfalls in making “simple” measurements of biological variables (e.g., blood pressure, pulse, ECGs, lung function tests, nerve conduction studies, measurements of blood glucose or body temperature, urine analysis). It provides experience in data analysis (e.g., interpretation of tables and graphs), including simple statistical analysis. And, very importantly, laboratory work can provide an introduction to scientific method and experimental design.

Modern technology has allowed us to transform the laboratory experience, making it possible to measure many important physiological variables on the students themselves. And nothing excites students more in a laboratory than seeing their own physiological data. It is also very easy to show students how to do a technique and then allow them to design and perform their own studies. So, for example, we can show them how to record their blood pressure and then let them generate questions that they can then answer with the equipment provided. For example, they might ask whether posture affects blood pressure or whether cuff size makes any difference to the measured pressure.

We can also record data from patients with a particular condition using the same hardware and software that the students use in the laboratory. This allows students to make the same measurements on the patient’s data as they do on their own. Differences in the findings are immediately obvious and provide an ideal opportunity for discussion of the disturbances in physiology that result during illness. Also, comparison of student and patient results shows the students that what they are doing in the laboratory is directly related to how disturbances in function are assessed clinically.

Through the online study and laboratory work, students feel a sense of ownership of their learning. They are learning the things that they have identified as important to know and understand. But it is also very important that students learn the context in which they will use the information in the future. To retrieve information from our memory when we need it, we must have associated this learning with its future use. Since our students intend to become health professionals, what better way is there for them to learn than to do so in clinical contexts.

Many of us have used paper cases to provide a learning framework for basic physiological principles. For example:

“Mrs. M is a 74-year-old lady who has become increasingly breathless over a number of years. She is now very limited in what she can do because of this. She was admitted to hospital with..."
acute respiratory symptoms on three occasions over the last 2 years. She has a past history of cigarette smoking.

On examination, Mrs. M is a rather thin woman. Her face is a dusky color, and her lips have a bluish tinge. Her breathing is quiet but labored. Her chest movements are poor but symmetrical, with a lot of activity in her accessory inspiratory muscles and expiratory effort as well. Listening to her chest reveals very quiet breath sounds. There are occasional crepitations and scattered rhonchi. Her heart rate is 82 beats/min. Her heart sounds are normal.”

The difficulty with paper cases is that we don’t see the people as “real.” The students always think that we have “created” the person to provide a good example of the condition about which we wish them to understand the basic physiology. And certainly with a paper case, there is a temptation to manipulate the story and the data to remove the complexities of real life. Importantly, because the students don’t really see the “patient” as a person, they are not really concerned for him or her.

With modern computers and fast internet, it is now possible to replace these paper cases with videos. Here is how the same case, described as a paper case above, is shown in a video presentation.

First, we see and hear Mrs. M as she describes her breathlessness.

“My breathlessness has gradually got worse, perhaps over the last 2 years it has got worse. I’m OK when I’m in bed—it doesn’t seem to affect me—but it’s as soon as I put my feet to the floor, that’s when I find that I’m not so good. I can’t walk very far, and just everyday things, it just seems to block everything. Oh, and always, I’ve got to feel right to go out somewhere, and to go to the supermarket, sometimes I can go in and do the shopping, as long as I’m holding the cart, and other times I just can’t. My poor husband has to do all of that.”

We then see her walking down a corridor, and it is obvious that after just a few steps she is struggling to breathe. She sits down, and we can see the pursed lips and the use of the accessory muscles. Students can hear her recorded breath sounds.

When students see and listen to a patient, they identify with the person and his or her problem. They are now motivated to understand the normal physiology and the ways in which the physiology has been affected by the disease process. And by learning the physiology and pathophysiology together and relating it directly to a person they have “met,” they take the knowledge into long-term memory stored in a way that it can be retrieved in the future when they see other people with similar problems.

In addition, by video taping real patients, together with family and health care professionals (doctors, nurses, physiotherapists, occupational therapists, dieticians, etc.) involved with the patient, we can provide students with a broader perspective about the patient’s problems and his or her professional management, and place the physiology and pathophysiology in a wider cultural and environmental context. Since personal, family, and social issues arise naturally from these video-taped interviews, these videos can also be used to provide an introduction to discussion of such issues.

In summary, modern technologies enable us to deliver material designed to facilitate learning and understanding. Through online, active learning sessions, modern laboratory sessions and discussion of relevant patient videos, we can humanize the teaching of physiology for students entering the health professions. So, from the very beginning of their training, the students learn their physiology in the context in which they will use the information throughout their professional lives. And, because the patients are real people whose lives and the lives of those around them are affected by illness and the problems that illness brings, it is possible to use the patient videos to integrate the learning of physiology into the wider social, economic, and cultural learning that is essential in all education.