

Chickens Are Like Minivans

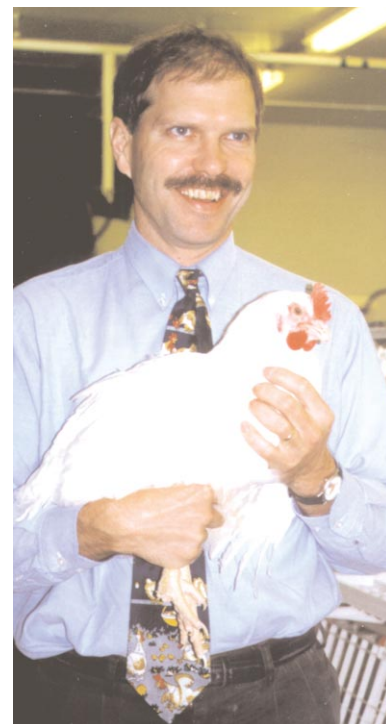
Thoughts on staying relevant, up-to-date and balanced in a fast-paced, knowledge-intensive university setting

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Viewpoint

My viewpoint in this chapter is that of a university professor in a rather practical position. The primary research and teaching that I undertake relates to issues in animal and poultry production in Alberta. I have extensive technology transfer commitments with a widely divergent, local and international clientele. I am exposed to new information through personal acquisition in my research program, as well as from external sources such as industry and research collaborators, conferences and technical research publications. I teach an introductory undergraduate course in animal production; the curriculum is interesting, technically strong in content, and relevant to current issues. I direct an advanced undergraduate research project course that aims to instill in students the challenge of discovery and many sides of scientific research. One of the biggest challenges I face is balancing all of the above in the short term (daily) and long term (career).



The following is the scenario as I see it. Scientific knowledge in my discipline is accumulating quickly. People are busier than they used to be because they have more tools to facilitate being busier. Agriculture is becoming increasingly dependent on highly technical knowledge and practices, and is dominated by fewer and larger operations. Students are legitimately seeking more value in their education. Finally, the public wants to be assured of food safety, ethical and safe genetic technologies and the welfare of agricultural animals. It is obvious that tools and strategies used 10 years ago may not be the best ones to use now to be an effective teacher, researcher and purveyor of knowledge. This chapter is a collection of thoughts on how a busy person uses knowledge acquisition, storage, application and transfer in academic life. It focuses on areas that may be unique, and in which I have implemented specific tools – not only to try to stay afloat, but also to go where others have not yet gone.

Metaphorically Speaking...

So why are chickens like minivans? Both poultry primary breeders and minivan manufacturers produce new models annually, aimed at particular customer profiles. The current love of bigger-than-car vehicles can be likened to the current frenzy for increased breast muscle yield in the poultry industry to satisfy rising demand for the original white meat. Both industries provide a guide for servicing their respective products. Both industries see financial incentives tied to the proper use of management techniques to maximize lifetime productivity from these products. In the automobile industry, preventative maintenance lessens the rate of depreciation that occurs with age. In the broiler breeder industry, proper feed management promotes bird reproductive health and lessens the rate of the normal decline in chick production that occurs with age. A few decades ago, cars were designed with big fins and flashy taillights. A few decades ago, some chickens had colorful plumage, mate-enticing tail feathers, and in some cases, feathered feet. Most of the production stocks of chickens we use now are rather



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see a wonderful portfolio
of chicken breeds at:
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heavy on practical utilitarian traits and low on style and ornamentation, rather like family-transporting minivans. Remember the Edsel or the AMC Pacer? They shared the same fate as the dual-purpose chickens of a similar era – interesting to look at, but lacking what it takes to sustain high long-term sales. The automobile industry is dominated by several large companies that, on occasion, buy each other out and merge. This has also happened in the poultry breeding industry, to the point that the number of large breeder companies for meat type chickens has decreased in the past three years from eight to six. So, yes, chickens are like minivans.

This analogy should stick in one's mind longer than would a description of historical poultry breeding. At a time when so much new knowledge is being created and distributed, one of the biggest challenges that I face as a researcher and teacher is how to put knowledge in perspective. This perspective is important to help me know what I need to know; it is also important to those I teach. The face of what is taught in applied agricultural classes in 2000 and beyond must now, more than ever, provide the learner with a basis for mental filing. Subsequent retrieval is presumably more likely when anecdotal associations with knowledge act as “key words” or “pegs” to hang information on. For example, I can vividly remember anecdotal stories relayed by R. D. Crawford (Professor Emeritus of the University of Saskatchewan) from my 1975 undergraduate days. Dr. Crawford used colorful narratives of the legendary “Lady Victorine” (world's champion hen in the mid-1920s) to anchor information about breeding programs and genetic diversity. When I meet up with fellow University of Saskatchewan alumni, everyone remembers this celebrated hen. I can also remember what the objectives of early breeding programs were when I recall how Lady Victorine and her sisters were selected and pedigreed.

Consider, furthermore, the current interest in trivia game shows on prime-time television. Most viewers will remember answers to specific, yet picky questions for a long time, as they are presented in bite-sized morsels and there may be some instant gratification if you win big money. Children's educational computer programs also make

learning fun with instant fun rewards. Despite the use of such known teaching tools in the entertainment industry, they are rarely used in teaching at the university level. I hope that the future learning infrastructure can incorporate more creativity than it does now, as we approach increased information production in universities.

What to Know: Putting knowledge in perspective

Every individual has a personal set point where they balance micro-knowledge and macro-knowledge. Micro-knowledge can be understood as in-depth knowledge in a very defined area, while macro-knowledge refers to a vast breadth of knowledge, which is perhaps less detailed than micro-knowledge. These terms are not synonymous with basic and applied knowledge, as some very applied people have very specific micro-knowledge set points. I believe that academic diversity is one of the strongest values of a university. As such, balance in macro- and micro-knowledge is best assessed on an “departmental” or “unit” basis.

Seeing the Macro Picture: Horizontal knowledge

If knowledge management can be likened to mental document filing, a learner must see and understand the big picture first. In my experience as a university teacher, I feel that too often, this never happens. In much undergraduate teaching, this first step is often left to the learner to carry out. Some students have a major problem in seeing the forest for the trees. In courses that I have taught, I have found myself spending more and more time getting the foundation laid properly. We have a wide variation in backgrounds in undergraduate classes now, and I have had problems when I have assumed that all students knew the differences between a chicken and a hen. I feel that learners should be able to tell the people beside them on the bus on the way home what foundational principles that they learned that day. If they cannot do that, the macro-picture learning process has not been effective. Even if, as in many cases, they can provide an example of one bit of relevant micro-knowledge, that is not always adequate.

As an instructor of a macro-picture class (Animal Science 200), one of my greatest challenges is staying up to date in disciplines outside my own micro area. For example, understanding changes in the production marketing or processing of dairy, beef or swine requires active knowledge-seeking. Typically the best source of information is direct contact with individuals working in these areas. In this class, I have made great use of guest speakers, including the Hon. Ed Stelmach, who spoke in 1998 when he was the provincial Minister of Agriculture. I have asked individuals who have to face the realities of market fluctuations in the swine industry to explain what it feels like to experience true financial crunches. I also gain knowledge by taking students on field trips into the real world: allowing them, for example, to see with their own eyes how wieners are made. I find that students are more likely to view as credible someone who can talk about what they do rather than someone who teaches for a living. It is also difficult to create real-world scenarios in a university setting on a restricted teaching budget. The main issue is one of internalizing information, not just hearing about it in a classroom. Personal contacts formed with extra-university people are valuable to me as well as to students.

Currently in production agriculture, primary producers are embracing intensive-scale farming, usually in a single commodity (non-diversified) manner. This is a vast change from the conventional “mixed” farm that I grew up on, and from the image of farming held by many urban people. Often, such producers do not see the whole industry (big picture); instead, they focus on their own particular segment of the “food chain”. This has resulted in a segmented, “broken telephone” image in some parts of agriculture. To overcome this divisive view of food production, some commodity groups, such as the Alberta Chicken Producers, are now working together with hatcheries, processors and retailers to form “value chains”. Some animal production groups have embraced customer-based food production, tailoring products to match what customers want. This is an improved viewpoint.



Alberta Chicken Producers
www.chicken.ab.ca

Seeing the Micro Picture: Vertical knowledge

Acquiring highly specific data relating to a particular subject is probably easier than acquiring big-picture knowledge because this area of the knowledge transfer industry is much more organized. Learned societies cater to scientific disciplines in a highly organised and catalogued manner. Such data are updated continually, and the quality of the information is ensured by the rigorous peer review process. Some journals, such as *Poultry Science*, now provide their membership with the choice of an electronic copy through their web site or a traditional paper copy of the journal. Annual meetings of scientific societies are primary means of becoming aware of new knowledge through oral presentations or poster sessions. Highly specific mini-symposia at such meetings are very valuable in offering updates of new technologies.

In some cases, the most valuable vertical knowledge transfer occurs in the hallways and poster sessions of conferences, rather than in the strictly regimented 15-minute presentations in lecture halls. My research group has interacted as much at annual meetings of the Poultry Science Association with people who do not present papers as we have with those who make multiple presentations. Again, contacts prove to be the valuable commodity in research communication, particularly for graduate students. There is no question that e-mail has made geographical distance in the research community a non-issue. When technology for fast effective video transfer is on everyone's personal computer, some forms of communication will become even easier, but not necessarily more effective.



Effective Knowledge Transfer

Learning with Dirty Hands

I am living proof that old 4-H mottos can stick in one's mind for 30-plus years. Putting the “learn to do by doing” principle into teaching undergraduates has been a major foundation for my teaching-learning base. Indeed, this is the basis for lab sessions in many science classes at the university.

I teach an undergraduate course in which students, working in pairs, select a research project, develop a proposal, carry out the research, write a scientific paper, write a popular-press article, develop a web site, and prepare and deliver a 15-minute multimedia presentation to members of the poultry industry. All of this is completed in a 10- to 12-week period, and it works well, albeit with a considerable amount of support from other faculty, staff and graduate students. This course attracts a relatively large number of students compared to other animal production courses offered in our department and it is not clear how many take this course for content or for access to the process used to meet the course objectives.

My Teaching Objectives for Undergraduate Research Courses

- to instill respect for past research and the knowledge that has resulted from it
- to provide the opportunity to create new knowledge and the literature that may result from it
- to promote the “learn to do by doing” principle
- to provide the opportunity to develop skills in working in small groups
- to provide the opportunity to use new technology that students will use in the real world
- to have students learn about a subject in considerable depth (they become the experts)



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- to boost student confidence through communication with peers, professors and real world industry people
- to keep me excited about university teaching

Over the past decade I have learned that the specific topic of dirty-hand project-learning is not important. Projects have ranged from basic physiological studies to very practical poultry production issues using a variety of classes of avian agriculture. Project-based courses require more organization than lecture-based courses, and they are riskier, as there are more opportunities for things to go wrong. Strong support lines with students are needed to avoid having their experience become one of frustration and disappointment. Such learning is “feel-good learning”, as students receive enough help that they do not flounder excessively. I have come to recognize that students go through a cycle of initial excitement and anticipation, hard work, some time management stress, more hard work, success, passage into past tense and positive feelings about the experience. Sometimes, students are diverted to frustration rather than positivism, and I am vigilant to signs of too many “dark days”. Free reviews of papers and presentations are offered to students that are highly-organised individuals and to those who are well prepared in advance of deadlines. Last year, I dropped the final exam. This year I dropped the final exam and the midterm. I think the students probably retain just as much as they did when they had exams.

Learning with Dirty Feet

I really favor learning with dirty feet if possible. In Animal Science 200, we have implemented hands-on “animal contact experiences” to provide students with the opportunity to gain valuable experience in working with poultry, swine, dairy and beef. There is no question that student evaluations rate this component of the course as the most valuable. Very few, if any, students will have a background in every commodity of animal agriculture, so all students gain something from the process. I have observed that

differences in background experience disappear when people are working with dirty feet. The old Palmolive commercial in which Madge says, “You’re soaking in it,” appears to describe knowledge uptake just as well as hand softening and cleaning the dishes.

Intensive Versus Extensive Learning

Here in Alberta, in the summer, turkeys can be ranged extensively in large fields (with minimal open sheds), or intensively in highly climate-controlled housing. Extensive turkey production (at home on the range) is relatively low in terms of inputs (buildings and equipment), takes up a lot of space, and is quite free of technology-intensive gadgetry. Intensive turkey production is high input, high-tech dominated, and can take place on small land bases. Both types of production work well, with each carrying advantages for certain production climates. The same goes for knowledge transfer.

Much of the teaching I do is intensive: it takes place in highly regulated and structured environments, it is based on densely populated classrooms with multi-course prerequisites, and it is becoming increasingly multi-media based. This is the basis for most university teaching, and it has served well in terms of efficiency of learning.

Sometimes extensive learning is even better. I teach how the chicken ovary functions and how management programs influence ovarian form and function. Explaining how the chicken ovulatory cycle works to a group of Canadian hatching egg producers is extensive in terms of the breadth of diversity in students’ backgrounds. There are no prerequisites for such a learning experience (except being able to physically get there). Specific hormones in such cases are not named by name, but as tiny messengers that flick a switch in another part of the body. The critical functions are discussed in detail, but highly technical terms are greatly simplified. This learning is no less valuable than what takes place in a university classroom.

I have long been a believer that lectures are okay... and learning with dirty hands can be very effective....but what you learn with dirty feet will stick for a very long time!

F.E. Robinson

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I teach the same introductory course (Animal Science 200) twice a year. I try to introduce some new material each term. In this kind of introductory class, it is hard to tell what course content to teach. In terms of basic principles of animal biology, I have decided to teach primarily what I remember as being important from applications that I have needed in animal agriculture, or what is immediately relevant to understanding and becoming fluent in current animal issues. In many cases, this is the only animal science course that these students will take. I therefore take the content seriously, and ask: “If they want to appear educated once they enter into the real world, what should they know?”

Initially, I explained in detail which amino acids are essential to a laying chicken at a particular age and rate of lay. That has evolved into an explanation of what a laying chicken is, and how it is different from a dairy cow (both produce secretory products that have a high calcium content on an annual cycle and both have some metabolic issues as a result of how they are bred and fed). I now consider this course to be something of a “trapping” course, giving a broad spectrum of students a glimpse of the animal industry, to try to entice them to stick around for more (a degree, for example). I try to turn students on to animal science, by discussing issues and opportunities that they will encounter later in life.

I do some of my best teaching at 3,000 metres up. My creative time to read research articles, plan experiments and draft lectures is realized best in cramped economy airplane seats. Obviously, I travel very frequently. In such a high-density environment, where personal space violations run rampant, those I bump elbows with invariably ask me everything they have always wanted to know about chickens. At times, I have found myself explaining how avian reproduction works in as much or more detail as I would use in a fourth year class. Why? The learner in this situation was in a mind-set that allowed us to communicate in a manner that was mutually effective; and I am quite sure that if a mid-term exam were to be given on that person’s return flight, they would have done well.

I greatly enjoy introducing non-conventional learner types to information that will make their world bigger as they learn something that they did not know the day before. One of the greatest rewards that an academic member can receive is to be informed that they have told someone something that they did not know. The Faculty of Agriculture, Forestry and Home Economics has hosted two major open houses in the past four years. At the 1999 Food and U Day (FAUD) at the Edmonton Research Station, about 4,000 Edmonton community people were exposed to demonstrations and displays relating the science behind where their food comes from. As people become removed from food production by one or more generations, there are many areas in which they are critically lacking in knowledge. I find it even scarier that education programs for children have minimal, if any, solid base in the realities of food production. In 1997, I revised the manual for Girl Guides of Canada for the activities needed for achievement of the Poultry Farming Badge. Dispelling the myth that brown eggs are more nutritious because they contain more fibre is effective knowledge transmission at its best.

What the Web Can and Cannot Do

In 1996, I established a web site (broiler breeders on line) for delivering knowledge about broiler breeders to primary producers in Canada. It was anticipated that producers could post questions on the web, and that I would answer them so everyone could read my responses and learn. Considerable efforts were put into making the content appropriate for this audience, and no passwords or restricted-access sites were included. In many cases, slides that I had used in presentations to such producer groups were scanned and put into slide shows. What became very apparent was that producers did not want to be identified on the web, so almost no response was seen. Instead, people e-mailed me and I answered their questions confidentially. The objective of designing such a site for Canadian producers was not achieved, as 90% of the inquiries currently come from outside North America. Nonetheless, the web site has facilitated one-way learning in a variety of arenas from elementary schools to



large integrated companies. Obviously, more and more people are accessing web sites with faster modems and so this form of tech transfer will continue to grow.

Wrap-Up

The main points that I think are essential in knowledge management now and in the future can be quickly summarized. First, we should accept the fact that we are learning from more diverse sources than we used to. We will need to be more selective in what we absorb and retain as we are exposed to more and more information. I think there will be increased competition for knowledge retention, which may result in increased creativity in teaching and technology transfer. To retain knowledge, it may be very important to put in place a mental filing system to build upon. Learners will probably need to see immediate relevance more than they did in the past, if they are evaluating what to learn from the palette that they are exposed to. Scientific information will become available in electronic form very quickly, and we will absorb less from printed journals. The future looks bright for video-conferencing, but the technology is not yet available for widespread use. I am confident that the most effective tool in imparting knowledge will be first-person to person communication.

Maybe chickens will be likened to electric micro vans in the next decade.