1995-1996
Brierley Lecture
on
College Teaching

Nancy E. Kinner
Associate Professor of Civil Engineering
Department of Civil Engineering
College of Engineering and Physical Sciences

Delivered

March 19, 1996
Foreword

The Jean Brierley Award is the highest recognition bestowed upon a University of New Hampshire faculty member for excellence in teaching. It is awarded annually to a faculty member with a distinguished record as a master teacher. A recipient is selected by faculty and hosts an event to share his or her perspective with peers. This year we honor Professor Nancy Kinner in the Department of Civil Engineering of our College of Engineering and Physical Sciences.

Effective teachers possess a devotion to learning in a discipline and a passion for learning that inspires others. Truly exceptional teaching builds on the scholarly foundation of a discipline the most important mission of a university — preparing students for active and productive citizenship in our complex society. Professor Kinner embodies this ideal. You can hear it in her voice as she talks about her scholarship and teaching, and the relationship between them.. You will enjoy her reflections on the experience of teaching, and you will admire her dedication to her students and to the University.

Walter F. Eggers, Ph. D.
Provost and Vice President for Academic Affairs
Dedication

“This lecture is dedicated to: my parents, Gilbert and Margaret Kinner, who taught me the importance of getting an education; my husband, Taylor Eighmy, who has served as an excellent example of learning as a lifelong process; and my students, who make teaching a joy.”
"Paradigms, Parables, and Possibilities"

Nancy Kinner
Associate Professor of Civil Engineering
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I want to thank all of you for coming today and especially to thank Lee Seidel of the Teaching Excellence Program for all of his help in making this luncheon and lecture a reality. I also want to thank the University for honoring me with the Jean Brierley Award for 1995 and I especially want to thank my students, my Department, my husband and my family for all they have done to make it possible for me to be here. As required for the Brierley Lecture, I will be reading from a prepared text, so please excuse my delivery.

When Lee Seidel first talked to me about giving the Jean Brierley Lecture, he said that you would come here today to hear me talk about teaching. Well I have some bad news for you. I never took an education course and I don’t know anything more about college teaching than you do. In fact, most of you probably know more about college teaching than I do because you have more experience, or you have participated in seminars or workshops on the subject.

Lee also told me when we first talked about today’s lecture that we could attract an audience by offering a free lunch. I readily agreed to that to avoid the embarrassment of having only 10 people show up. But after Lee left the office that day, I realized that there was an error in my agreeing to this because it meant that I would be lecturing in that dreaded slot after lunch, a professor’s worst nightmare. You know, the time when the students’ eyes start rolling back in their heads and then shoot down like lemons in a slot machine as they realize that they are falling asleep and you are about to catch them. Another thing that I had forgotten when I agreed to the date of this lecture is that on Tuesdays I start teaching at 7:40 a.m. So, I guess I am going to have to try my best not only to keep you awake, but to keep me awake too.

Lee realized that I was a little troubled with talking about teaching and he said “Nancy, just talk about what you feel comfortable with.” But he quickly rescinded his suggestion because talking about what I know and love best - sewage treatment - would probably not be a good idea after lunch. So I came up with an alliterative title “Paradigms, Parables and Possibilities” to show that
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engineers do have a vocabulary of more than monosyllabic words and to reflect those things that I wanted to discuss with you today.

I suspect that many university professors became teachers because they wanted to do research and that teaching was only an afterthought. At least that is the way it was in my case. So, when Otis Sproul told me last year that I was going to receive the 1995 Brierley Award and he gleefully noted that I would get to give a talk on teaching, he did not know that he was striking fear in my heart. That night as I drove home from work, I did not see a thing. I just kept thinking “what do I know about teaching?”, “what am I going to say?”

After I stopped panicking, I began to reflect on how I learned to teach, and I realized that I learned from role models. Hence, the word paradigms, models in teaching. My conversations with colleagues and friends during the last few months as I was preparing for this lecture only reinforced my belief that what people remember are those living, breathing models of what a teacher should be.

I went to Cornell University as an undergraduate and I learned several things there about how not to teach. In my first year biology course, the professor was so far away from me in an auditorium that held 1,500 students that I could not identify him later in the semester at a gathering of students and TAs. The following year, my organic chemistry professor decided to motivate his students by threatening that only one-third of us would make it through the semester. He distinctly said “Look to your left and right and of the 3 of you sitting in my class only one will remain to take the final.” But these are not the role models and paradigms that shaped my teaching.

When I was a sophomore, something inspired me to enroll in a course on phycology, the study of algae. It was not one of the more popular electives on campus. To my great fortune, the professor of that course was John Kingsbury, who at that time was the Director of the Shoals Marine Laboratory located off Portsmouth and run jointly by Cornell and UNH. To a student fresh from gigantic classes where the professor was either a faceless blob or thrived on intimidation, Dr. Kingsbury was a breath of fresh air. He got to know his students and he was genuinely excited by and enthused about algae, which to most of us would seem rather arcane and boring. I can still see Dr. K demonstrating how organisms, like the colonial alga Volvox, turn themselves inside out during one stage in their life cycle. Somehow right before our eyes in front of the class, Jack managed to completely turn his suit jacket inside out while he was still wearing it! This demonstration so influenced me, that I now demonstrate some microbial processes for my students. In fact, I think Jack would be tickled to know that last Monday I received a card from one of my former graduate students, Bruce Campbell. He had just received FOCUS, the CEPS alumni newsletter, that contained an article on the Brierley Award. Bruce wrote: “A belated congratulations to you Nancy on your teaching award last year. It’s probably all due to the “twiddling” that you do for the micro class. That’s the dance of the bacterial cell, isn’t it? I know the teaching award is well deserved and I’m sure the “twiddling” contributed.” Now for those of you that do not
know what twiddling is, it is a tumbling about that bacteria do when they wander off-course. They twiddle in a spot until they detect the nutrient concentration in the environment and then begin to propel themselves in the desired direction. By this complex pattern, they eventually go from point A to point B toward a positive stimulus or away from a negative one. It seems that as vividly as I remembered Jack Kingsbury’s inversion of Volvox, Bruce remembered my “twiddling”. So, in a nutshell, Dr. Kingsbury’s influence on my teaching directly resulted from his enthusiasm for his subject and his energy in the classroom.

It was Jack Kingsbury who got me interested in going to the Shoals Marine Lab, a field station, where students work closely with faculty who love to teach. The Shoals Lab is a magical place where students can explore their interests, get their feet wet and get hands-on experience. It was at the Shoals that I came to love sewage treatment, but that is a story for a different time of the day. It was also at the Shoals that I met my second role model, Dr. John Anderson¹, and I am delighted that Dr. Anderson could be here with us today. Dr. Anderson’s paradigm in teaching is one that most of my students would immediately recognize in me. In fact, they would probably love to meet the man that has brought them so much grief. You see, Dr. Anderson is the professor who taught me to be demanding, to challenge students to do things that they think are impossible. Dr. Anderson never got ruffled, angry, intimidating or sarcastic to motivate students. He just kept that calm, gentlemanly demeanor, but all the while he kept demanding that you write it better, draw it better and reason it better. I remember best of all Dr. Anderson’s response the day I went into his office feeling desperate. I was taking his course in invertebrate zoology, a subject that I had become passionate about at the Shoals Lab the summer before. To my consternation, a large part of the course grade was based on making detailed drawings of the invertebrates we observed in the laboratory. Now as my students can attest, my family comes from a long line of “cave dwellers”, whose most refined drawings are stick figures. Dr. Anderson’s reply to my panic about my inability to draw the invertebrates was a measured, calm reassurance. “You can do it, Nancy. I know you can.” And with a few carefully chosen pointers, he sent me on my way. Now to be sure I needed more pointers and more reassurance than just that one day, but Dr. Anderson was always there with words of encouragement, never doubting that I could do it. And somehow his believing in me made me believe that I could do it too. He never reneged on the demand that it be done and done well. But he was there to get me through it. Thus, Dr. Anderson is my second paradigm in teaching - demanding the students work hard and do their best, but remembering they need your encouragement and help along the way. They need you to believe in them, so they can believe in themselves.

I was lucky to have had such excellent role models as Drs. Kingsbury and Anderson. I worry about those graduate students that we are educating today who have only informal mentoring about teaching because they will garner their first university position in a climate where there is an increasing
emphasis on the importance of teaching in the tenure process. That is why I
believe we need to support classes such as Grad 950, Issues in College Teaching.
In this course, offered through the Teaching Excellence Program, graduate
students examine the research on college teaching and experience active
mentoring.

I was reminded of perhaps the oldest, most effective teaching method
by Jack Savage who was the minister of the church I attended as a youth. Jack
was a dynamic speaker, renowned for his terrific sermons where he would paint
a picture in words, so you felt you were there at the site of some event he was
telling you about. I asked him in later life how he crafted such great sermons
that people remembered for years. And he said there were two ingredients: a
good dose of humor and parables. He did not take credit for originating this
latter technique, but simply said, if it was good enough to work for crowds 2000
years ago, it was good enough for him. So, I follow Jack’s advice and at some
point in each lecture I try to tell a story with a message; one based on my
experiences. These are parables about environmental engineering that drive the
point of the lecture home, and they are often what the students remember years
later.

Ironically, what I have learned in the past few years is that role reversal
is occurring. Now, I have former students call me and say that I am the role
model for them and though I hate to admit it, a paradigm shift has occurred from
a previous generation to mine. I have often wondered what my role model is to
my students. I hope that I convey: (i) an enthusiasm for the joys of learning as
a lifelong process, (ii) a reassuring, yet firm determination that we should work
hard and do our best, and (iii) a compassionate, caring attitude that reminds
students that we are all fellow travelers in this life. I also hope that I never
forget what it was like to be in their position as an undergraduate or graduate
student learning to live on my own, grasp new material and cope with life’s
realities.

I am often asked how difficult it is to teach in a discipline where
women comprise such a small percentage of the faculty and student body. Most
of the time this question catches me off guard because I do not spend much time
thinking about that. But, I realize that a large measure of what I am like as a
teacher is influenced by an awareness that I work in a male-dominated profes-
sion and I have an opportunity to influence future members of that profession.

Two of my trademarks are my bow ties and my knowing the names of
the students in my classes. Both of these are a direct response to an event I
vividly remember during the time I was working on my Ph.D. A young woman
was hired to teach the introductory, junior level environmental engineering
course while the professor, who normally taught the class, was on sabbatical.
She lasted only a few weeks in the classroom before she quit because she was so
harassed by the students. You can only imagine the fear this instilled in me. I
worried that I would face the same fate when I became a civil engineering
faculty member. One thing I was certain would help prevent something similar
from occurring to me was to dress professionally. She had always worn jeans.
So I bought a suit and always wore a bow tie to spruce it up. Second, I sensed that if you knew someone's name, he/she was less likely to harass you. Furthermore, I remembered hating being just a student ID number as an undergraduate (in my case, 156106).

Because my students will graduate and join the engineering profession and eventually become licensed professional engineers, I like to counsel them that their behavior matters. I believe that they have a responsibility as professionals to perform community service, like working for Habitat for Humanity or at local soup kitchens. So I try to set an example for them by doing these things. And along the way, I remind them that what they say and do will be remembered. Hence, I encourage them to use inclusive language, because after all they are becoming "civil" engineers.

In 1992, when I was chairing the Research Commission at UNH, I was asked to substitute at one of the statewide "UNH On Tour" breakfasts in place of Jim Morrison who was then the V.P. for Research. Jim suggested I talk about the role of research at the University and its importance to the State. Now I knew that most of the people attending that breakfast thought that professors should be lecturing to students 8 hours a day to earn their salaries, and that research is just a sideline that diverts us from our real mission of teaching.

I tried to think of a way that I could convey to that audience a simple message about why teaching and research together form the core of the University's mission. Because I am in the field of environmental engineering, it was relatively easy to explain to them that it is very important for me to do research so that I can teach students about the most current ideas on how to treat wastes in the environment. Without doing research, I explained to them, I would simply be getting those concepts out of a textbook that was probably outdated the day it was published. By doing research, I am going to conferences, reading papers, and actually doing work on the most current treatment options.

The more difficult concept to get across, however, was why teaching enhances research. To convey this point, I told them the story about how I was lecturing one day in Sampling and Analysis class about exclusion or gel permeation chromatography, a process where molecules are separated from one another based on their size. Now it turns out that around this same time my students and I had been trying to grow large quantities of protozoa isolated from contaminated soil. We were using a traditional method, culturing the organisms in a liquid solution. Our problem was that the protozoa were growing to 10 microns in size, whereas in the natural soil environment they were only 2 to 3 microns. As I was lecturing to the students about how to separate organic molecules based on size using exclusion chromatography, all of a sudden, it dawned on me. If we grew the protozoa in sterile soil they could only inhabit the pore spaces and so they might only grow to 2-3 microns. It turns out that the idea actually worked. But, the beauty of it was that teaching reminded me about a size differentiation mechanism that could be applied in my research. The same thing can happen when a student asks a question that helps you see things that you have taught many times before in a new and different perspective. What I
think we need to convey to the community at large, the Trustees, the Legislature and State officials, is the dynamic interaction between research and teaching. That synergism is certainly something that I never realized existed until I started to teach and do research simultaneously.

I was also recently reminded of how important it is that our students see the process of research between colleagues, instead of just seeing their own research in a vacuum. A few months ago, my students and I were meeting with Professor David Meeker of the Mathematics Department. Dave and I have been working for the last several years on the role of protozoa in the remediation of contaminated ground water. At this meeting, we were talking about an experiment we had conducted based on some assumptions that we had made about the time scales of protozoan/bacterial interactions. It turns out that some of the assumptions we made were wrong. So Dave and I began to discuss how we could use the data from this failed experiment and what we learned from it about how to design our future work. After that meeting, one of my students, Leah Hines, said to me, “I just loved that.” I was still wrestling with the ideas Dave and I had discussed and was not really paying much attention, so I responded, “What are you talking about?” She replied, “You guys really didn’t design the right experiment did you?” I said “Heck no, we never design perfect experiments because 95% of the time when we are doing research we don’t know the answers before we do the experiment.” Leah laughed and said “But we students always think you professors know everything.” Sometimes I think we unknowingly convey that message in the classroom and we have been at it so long we forget that the students see us in that light. Even when they ask us a question and we admit we do not know the answer, they still seem convinced that if we do not know everything, we know almost everything. I have come to realize that it is essential that students witness research interactions between faculty colleagues, so that we teach them that conducting research is a process of learning and we too are students who do not always pass all the tests the first time.

I often wonder if I will be able to teach for the next 20+ years. Will I have what it takes to come into the classroom every day, enthused about the subjects I am teaching and responsive to the students’ questions and ever changing needs? Obviously, I cannot know the answer to that question and will have to wait for the passage of time. One thing I think will help is if I can continue to be excited about learning. My role model for that was my father - who always had something he wanted to learn about. Each semester he would send me off to college with a question or two he wanted answered within 3 months. For example, he wanted to know why ducks’ legs do not freeze in the winter or why leaves turn red in the fall. Even as he was dying of Parkinson’s Disease, he would still ask me to look up the definition of some word that was in the current book I was reading aloud to him. I can only hope that, like my father, I maintain an inquisitive mind throughout my life, something I think is a major ingredient to continued zest in the classroom.

As I said earlier, I did not decide to become a university professor to
teach, but rather to do research. The teaching was a means to an end. Now, ironically, I cannot envision my life without teaching. A few years ago, I got a free meal at the New England Center when President Dale Nitzschke invited me to lunch to discuss the possibility of my moving to an administrative position. For the few seconds after that suggestion was made, I was psyched - I had visions of a big office, a secretary, a raise, a parking spot, no more complaints from the students about their being overworked and no more grading. The latter was especially palatable because I had just finished a weekend of grading 20 page lab reports. But then the reality set in. Accepting that offer meant no more teaching, no more research, and no more students. I immediately knew that for me, leaving a faculty position was not a viable option. Now do not get me wrong, I would happily give up correcting spelling and math errors, and verb tenses in a heartbeat, but I could not bear losing the joys of giving a good lecture where the students and I are really on the same wavelength. You know what I mean. It would mean giving up the possibility of achieving that unparalleled high when the professor and the students are both enjoying the thrill of learning something together and I submit to you it is that possibility that keeps us all in the classroom.

Thank you for listening. I hope that some of what I have said has resonated with you and I invite your comments and questions. Finally, in answer to the question I know you have all been asking yourselves - the material from today’s lecture will not be on the final exam! Thank you.
About Jean Brierley...

Jean Brierley (1908-1986) graduated from the University of New Hampshire in 1930 with a baccalaureate degree in zoology. After leaving the University of New Hampshire, Ms. Brierley became a teaching assistant in the Zoology Department at the University of Michigan in Ann Arbor until 1937. The University of Michigan awarded her the degree Master of Science in 1931 and the Doctor of Philosophy in 1937. In 1938, she moved to Texas State College for Women in Denton, Texas, where she was an Assistant Professor of Biology. In 1945, she joined the faculty at Michigan State College, teaching freshman biology and natural science. She retired in 1973 as a full Professor.

Professor Brierley was a member of many professional organizations, including the Genetics Society of America, Society for the Study of Evolution, Michigan Academy of Science, Sigma Xi and the American Association for the Advancement of Science (AAAS). She was active in civic affairs as a member of the League of Women Voters, Common Cause, the Sierra Club, National Organization of Women, and Concerned Scientist. Her many interests also included travel.

About the Jean Brierley Award...

Professor Brierley established an endowed fund in 1973 to recognize teaching in any field or discipline at the University of New Hampshire. This fund was completed upon her death as a tribute to those members of the UNH faculty who have distinguished themselves as teachers. One award is rendered each academic year as the highest recognition for excellence in teaching. Working with the UNH Teaching Excellence Program, recipients host an annual event to advance the teaching mission of the university.

Recipients have been:

1991-1992  Lester A. Fisher, Professor of English
1992-1993  Christopher F. Bauer, Associate Professor Chemistry
1993-1994  Wallace A. Bothner, Professor of Geology
1994-1995  Marc W. Herold, Associate Professor of Economics
1995-1996  Nancy E. Kinner, Associate Professor of Civil Engineering

1 Drs. John M. Kingsbury and John M. Anderson are both Professors Emeritus of Cornell University, Ithaca, New York