American Medical Informatics Association Nursing Informatics History project

Purpose

The overall purpose of the Nursing Informatics History Project is to document and preserve the history of nursing informatics.

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Judy Ozbolt

Introduction: **Judy G. Ozbolt, PhD, RN, FAAN, FACMI, FAIMBE Scholar, Institute of Medicine**

Interviewer: Early career; transition to informatics

Judy Ozbolt: I started out thinking I was going to want to do pediatrics. It was the late '60s. I was working at the Eggleston Hospital in Atlanta and we got the sickest babies in three states. It got to be very, very sad for me and I realized I didn't want to keep doing that. My next job was adult surgery in a community hospital, much less pressure in a way. Then I went into the Peace Corps. In the Peace Corps, I was teaching fundamentals of nursing in Liberia – a marvelous experience in the early '70s. I decided I liked teaching and, quite honestly, I liked having a work schedule that was more like a normal person's work schedule. I decided I'd been out of school five years, my GREs were about to expire; I needed to get back into grad school.

I wound up at Michigan where at that point, it was 1972, there were very few doctoral programs in nursing. Michigan's own was not yet approved, so they tried to teach us everything we would need to know for a scholarly career in the course of a two-year's master's program. That included doing research projects. Time was passing and I hadn't figured out what I was going to do for my research project. Getting a little panicky. One day, the professor in my research class – a man named Sam Schultz who later went on to found HL7 – talked about how computer programs were being written that would take patient data and formulate medical diagnoses. I thought, "Wow, that's really interesting." So I went up after class and said, "Do you think it's possible that computer programs could be written that could take patient data and formulate nursing diagnoses?" Sam said, "Yes, of course." I said, "Given that I don't know anything about computers, do you think I could learn enough to write such a program and evaluate it for my master's thesis?" He said, "Yes, of course."

I later learned that he had recently completed his dissertation in social psychology on the effects of positive verbal reinforcement. He never said anything negative to anybody. Long before I knew that, I was launched on this project. I had a research partner, Bernadine Edwards, and we worked together on this. The group that later became NANDA had not had its first meeting. Nobody was quite sure whether nurses were allowed to pronounce the word "diagnosis" let alone carry out such an activity – and if they were, what in the world that would be. We found ourselves having to think about, What are we really trying to accomplish in nursing anyway" What do we address with patients when we are taking care of patients? How shall we do this? There was a whole lot of conceptual work that I really enjoyed. We came up with our own definition, our own way of doing things that was consistent with the master's program we were in. And, eventually, as the program was written, and eventually it ran, and eventually we got our master's degrees, and then I went on and got my doctorate anyway. That's how I got started.

I was out of it for a few years after graduate school because I went off to France for a while and had the fun of teaching there. But, got started again in 1980 when I came back to Michigan on the faculty.

Interviewer: There was no field of Nursing Informatics then, right?

Judy Ozbolt: There had been a few studies in the literature of nurses and others using early versions of electronic patient records, or planners of one sort or another. One of my predecessors at Michigan had written a program for diagnosing patient anxiety levels. The El Camino Hospital in California was already up and running by then. And nurses there had been charged with how to put nurses' notes on the computer. That was their brief. They said, "No, no, no, we think it's really a more interesting problem than that," and wound up with standardized care plans for common diagnoses or common nursing problems that were, of course, "editable" in the software. It was the start of the fad of standardized care plans that overtook the country. But when those standardized care plans were introduced in paper form without the technology, then they just became another artifact to put in the

file drawer and say, “Yes, yes, yes, our patients has care plans, ” instead of being a real representation of how patients were being cared for.

There was early work going on. There were nurses thinking about this. But neither the technology nor the science had evolved very far in those early days.

Interviewer: Your major contribution to the field.

Judy Ozbolt: I’ve thought about that, since you gave me the questions in advance, and I think they have been in a couple of areas. In terms of who was doing what: Harriet Werley, who was one of our real founding mothers; when she was with the Walter Reed Army Hospital, she was a Lt. Col. She was the first named nurse researcher at Walter Reed. In the 1950s, I believe, IBM came to people at Walter Reed and said, “How could computers be used in health care?” And Harriet was one of those who had been thinking about that. She sort of put using information and information systems and data into the research agendas for nursing for the American Nurses Association. That background was there.

At the time that I went back to Michigan and started working with Sam Schultz again and trying to do some more prototype sorts of systems, Harriet was on the study section for the National Center for Health Services Research. She was succeeded by Margaret Greer, who had also done some work on early kinds of systems, particularly for education. When Margaret’s term was over, I think Harriet and Margaret put their heads together and decided I was next in line. They nominated me and I got to serve on that study section, which began to get me acquainted with others who were doing early work in informatics. One thing led to another. That led to serving on Don Lindberg’s long-range planning committee on informatics when he began at the National Library of Medicine. That got me knowing even more people and all of that got me onto the board of directors for the Symposium on Computer Applications in Medical Care. I’d been attending the sessions for a few years by then.

I think one of the things that I have had the privilege of doing has been a lot of organizational work helping SCAMC to grow into the combined SCAMC American Association for Medical (what was AMSI?) Systems and Informatics (I believe). That was the membership organization and the American College of Medical Informatics united to become AMIA. I was on the founding board of directors for that.

At the time that finally happened, a number of us -- led by Harriet Werley and Virginia Saba – had been sort of on a leadership team for a nursing special-interest group in SCAMC. When AMIA was ready to emerge from the negotiations (of course, as a board member), I said, "Look, we need to get our special-interest group nurses into AMIA. The question was, "They're paying $10 a year right now and for $10 a year, they get a newsletter and a reception. If they pay more than $100 a year for AMIA membership, what are they going to get for that?" I said that I thought the board would entertain us functioning in the following kind of way and they said, "How do you know? Prove it to us?"

I said, "OK," and sat down one time on a long plane flight to a spring congress in Utah and drafted some bylaws and brought that back first to the steering committee, where they got tweaked some more, and then when that group was satisfied with them, took them to the board and said, "If we formed a special-interest group that functioned in this way; would that be acceptable to the board?" And the board said, "Well tweak it here; tweak it there; that'll be fine." So then we could take that back to the several hundred nurses who had been in this affiliate group informally and say, "Here's what we're proposing and here's what the board of AMIA has approved. If you pay your money to join AMIA and come into our special-interest group for nursing (later it became a working group), this is what you'll get. And because of those challenges of, "Show us; prove it to us," we really came up with a very well-organized and pretty sound way of operating so that the Nursing Informatics working group, as it is now in AMIA, has always been the most active, the best model of a working group.

Part of it is, it's just nurses. If you want something done right, assign it to a nurse – or persuade the nurse to do it for you and it will be well done. But part of it is that we really figured out from the beginning what our operating rules were going to be and we provided for turnover in the leadership so it wasn't always the same people maintaining the fiefdom and it's been a very vital group. Out of that, nurses have contributed to the organization in a very big way. So, it's not just a nice little corner for the nurses to go and play in, but we have something like four nurses on the board of directors of AMIA right now out of 15 or so people. This is quite a good leadership position.

Because of the people who gave me a hand-up in my career ladder, I've been in a position to open doors for other nurses to get others more involved in this organization and that's been to the benefit of the larger organization because the nurses do the job well. They're smart and they're hard workers. Part of what I've done has been, I think, organizational.

Another aspect has had to do with nursing terminologies. Going way back to that master's thesis where we said, "What is a nursing diagnosis?" NANDA (?) came along and had different ideas about what nursing diagnosis is and other groups had a variety of approaches to saying what are the concepts we deal with in our practice. How do they relate to one another? What do we do with all of that? By the late 1990s, there were several rival terminologies and they did function as rivals. To say, "Here's the way we think you should define diagnoses." "Oh no, we think this other way would be better."

Well how about interventions? "We think interventions are this." Somebody else would say, "No, that's not what interventions are." There was an atmosphere of dispute – but maybe more heat than light was being shed on all of this.

In 1998, I moved to Vanderbilt and my dean came back from a meeting calling Conway Welch and said, "I've just been to the American Organization of Nurse Executives and they are pulling their hair out. This nursing vocabulary is a mess; nobody knows what to go with." They said, "You're at Vanderbilt; you've got a strong informatics group with

Bill Stead, you've got Judy Ozbolt there, you folks should just fix it." She said, "Judy, I want you to fix it." And, by the way, don't let it cost Vanderbilt anything.

I said, "OK. I'm brand new. I'm not overloaded with work yet. What a good challenge, I'll take this on." So the first thing I did was call some people who actually knew about terminology development, who were working out on the leading edge of this – Ida Androwich, Suzanne Bakken, Pat Button, Nick Hardicker, Charlie Meade, Judy Warren, Chris Dingo. They were all getting together from time to time to work on nursing terminology issues and at a higher level of sophistication than most of us knew how to comprehend. I said, "We want to work on this problem but you have content knowledge that I don't have. Would you be a steering committee and help us do this right?" They said, "Yes, we'll do that." Then I said, "If we're going to do this, we have to get everybody who owns a piece of the problem. So let's ask all those terminology developers who've had their work recognized by the ANA to come and participate in the discussion."

But I had seen group dynamics in action before – not with these people particularly – but in a long academic career I know there are situations where if one person is willing to make others sufficiently uncomfortable, that person may carry the day. I didn't think that should be the basis for decision-making. So, we also needed people who understood about standards development and terminology issues outside of nursing. I got in touch with my friends and colleagues from AMIA and from this advisory committee and all these things that Harriet and Margaret and Virginia and others who had opened doors for me – Stan Huff, Jim Camino, Kent Spackman. "You guys, if we're going to fix nursing vocabulary, will you come and help us do that?" Then I thought these people have no stake in nursing vocabulary and I'm embarrassed to ask them to come at their own expense and I'm going to have this meeting so then I wondered if we could get funding for this. I called one of my colleagues at the National Library of Medicine – not the one I'm currently married to – and said, "We want to have a conference to work on this and do you think there's any way we could get funding?" He guided me through the funding

process so we got a grant to provide a little travel money and a little honorarium so that everybody could get together and we had a meeting.

We had a meeting that had the luminaries in all of these aspects, so that nobody wanted to behave badly in that context. We had the right people to make the decisions. At one point when one of the participants said, "If you're telling us we have to meet HL7 standards, we need to be having this conversation with HL7." Suzanne Bakken stood up and said, Alright, here's the president of HL7," pointing to Stan Huff, and "Here's the chair of the vocabulary committee and here's the chair of the patient care data committee; let's have the conversation." And we did.

Part of what came out of that – first of all, we all came to understand that we needed to be having the discourse at the level of concepts and relationships – not at the level of, "Do you like this word better or that word better or this set of terms or that set of terms?" We knew we needed to learn a lot more. We knew we were beginning to grasp that there are various standards out there that needed to be integrated. Part of what also happened was that the Stan Huff and the Jim Cimino and the other fellows who came along to keep us from doing something stupid – that was my request of them. That baldly, "Don't let us go too far down the wrong path. – said, "These are really interesting problems and we never looked at things from this perspective before. We want to know more." They were willing to come back in future years without the honorarium and think with us more about these issues.

In a sense, we came to a peaceful settlement of the terminology wars among the American nurses and found a fruitful path for development. We wrote up the paper and sent it off to one of the international nursing informatics conferences where it got reviewed by our colleague, Evelyn Hovenga in Australia. Evelyn sent me an email and said, "I've just read this paper. It's fascinating. I've been wanting to put something forward for nursing to the international standards organizations. Do you think your group would work with a larger international group to do that, because this is the kind of thing that needs to happen -- this reference terminology model."

I said, "Yes, of course; that would be wonderful." Through all the proper channels, an international committee was set up to shepherd this through and an international task force of worker bees who had the technical knowledge to draft the standards, and work began on an international standard. Of course we were aware that the Europeans were also developing something on the European side and we didn't want to come up with competing international standards. We had decided we needed to have this terminology summit meeting a second year. At the AMIA fall meeting, we convened the leaders of the European terminology standards group who happened to be at the meeting and said, "Here's what we're doing. Let's do it cooperatively. Would you come to our meeting next year?" The next year they showed up in force. Hot off the printer was their draft standards, consistent with the kinds of things we had been proposing, that they wanted to take forward to the European standards organization and then on to ISO. We spent that meeting time resolving and harmonizing all of these approaches so that one candidate standard to go forward so there wasn't an American standard, there wasn't a European standard, and a rest-of-the-world standard. There was one thing with everybody behind it. Chris Chute, one of our non-nurse terminology colleagues here, happened to be the American representative to the U.S. group that reports to ISO. So, he took this internationally crafted standard forward to the International Standards Organization for us. The folks there said, "This is wonderful. Nothing ever gets done this fast. These nurses really have put together a broad international consensus." Yes, there were little glitches along the way that got fixed, but that we were able to do this. Again, it was a matter of people being willing to get the work done right – and not worry about who gets the credit and not worry about whether "getting my ego stroked" …was not the important thing for anybody. As a collaborative effort, we had great success and, once again, there were people who weren't in nursing who hadn't thought much about nursing, who looked at the work and said, "This is terrific and we want to work with these folks because we get better informed."

Now we have Judy Warren on the National Committee on Vital and Health Statistics; she has chaired committees at HL7. Suzanne Bakken and Susan Matney, who participate in our terminology summit (which is still going on by the way), have been leaders in LOINC for those standards. And, there is a cross-disciplinary collegiality and mutual respect that have come from this work, in addition to the substantive standards. Not just from the summit work. At the summit, we decide "What are some of the hard problems that people are confronting in several different arenas? Let's get the players together. Let's put our heads against those problems for a few days and see if we can agree on a promising direction for further development." Then people go out from there, back to their other arenas and pursue the development -- but with communication.

To have been able to facilitate that kind of thing is something that pleases me very much in my work.

Interviewer: Did you think it would work out that way?

Judy Ozbolt: No, I never imagined that it would go this way. I think it's been a matter of pursuing …when the opportunity matches my values, my interests, my abilities – and I can spot it – then just to go for it. To say, "Maybe I'll succeed; maybe I'll fail, but this is worth trying for." That's been the way it's evolved.

Interviewer: Did you have any particular vision/principles that have guided your career?

Judy Ozbolt: I really believe in nursing. I really think that nursing at its best – and nurses at their best – do very moving, important, and often unrecognized work, in our society. I think if you look at why is it that very young, low-income mothers who have consistent home visiting by nurses not only do well themselves, stay out of bad relationships….their children succeed and graduate from high school at a higher level. And it's not that the nurses are there for years and years and years. What is it about those visits that makes these mothers better able to live their lives and rear their children? You can name a lot of specific things

that nurses do, and nurses are specifically taught how to listen, how to nurture, how to intervene but also empower…but I think in addition to all that and viewing all that, the nurses just love those mothers to better health. I think that's what nursing really is about at its best -- in whatever setting.

I have wanted to play a role, however I can, in supporting and sustaining the work of the nurses so they are free to do the creative and truly loving work that they do. Why informatics? When I was in high school in the 1960s, a very conventional child in a very conventional community, I thought, "Shall I be an English teacher or a nurse. I think I can be pretty good at either one." I finally came down on the side of being a nurse. But, the part of me that wanted to be an English teacher has always been fascinated with language and with expression – what we call in an informatics content, "knowledge representation" – and communication, and those kinds of things. Those are strengths and interests that have just been part of me all my life. I found a way to make use of that in a nursing context. I am not the best clinician. It's been way too long since I've taken care of patients and many others are, frankly, more talented than I am in giving direct patient care.

If I can use the strengths that I have with regard to using language, representing knowledge, writing, thinking about information and how it's used and how it can be distilled to its essence and present it in a way that works for people to have what they need to know to do the important things they're trying to do…then I want to use those abilities in the service of nurses, and more broadly, other health providers as well. But nursing is where my training and my heart are.

That's also been a marker of my career and why it went the way it did -- having the chance to say, "When you find yourself in a new situation, there's a lot to be perceived." And I think what we perceive depends on the kinds of lenses we're wearing, what our perspectives are. I look at a situation and I say, "Oh, here's an opportunity to do something about providing nurses with the information they need to do their practice," or structuring situations that make it easy for nurses to do the right thing and hard for them

to do the wrong thing – or just get the clutter out of they way so they can do the job. Those are things that I've wanted to do.

I've had a long career in academia. After I got my doctorate, I had a chance to go to France for a while and teach in the one-and-only master's program in France -- in Lyon, in French. I was teaching research methods but also thinking very much about how you conceptualize your practice and what does it mean. I became very much aware that you don't just use a French word and an American word for the same concept and have it mean the same thing necessarily. "Nurse" in English comes from the Latin root – nurture – and we value those things about our practice. In French, a nurse is an infirmier or infirmiere, "infirm, shut-in," literally closed-in. And there was not much in the early days to differentiate between patients and prisoners -- and not much to differentiate between nurses and wardens, in a way.

They've come from a different tradition. That doesn't mean that's what nursing is like today, but we have different concepts behind our practice. And the French are more likely – at least 30 years ago when I was there – to be, frankly, a bit disdainful of the care that they call "nursing," which is basic hygiene and fundamentals of nursing kinds of things. That's interesting to think about, too. They tended to take their value and prestige more from doing more technical things. In this country, in these days, patients who are in hospitals are just so terribly sick that having a very high level of skills is critical to the survival of the patients. It's astonishing what nurses are able to do and the kinds of information they are processing all the time and the barriers they confront to being able to record, communicate, retrieve information and knowledge. There's a whole lot yet for us to do in these areas.

Anyway, I want to say that I don't in any way devalue that technical level, but I also know that my nurse colleagues, when they talk about meaningful clinical experiences, are not talking about how well they ran the monitor. They're talking about how well they helped the patient through a hard situation. And, I value that about the practice.

Interviewer: Founding fellow of The American Institute for Medical and Biological Engineering; how did that come about?

Judy Ozbolt: I was certainly surprised. I think that was a situation where that group was getting started and they wanted to have an aspect of their society, which is like our American College of Medical Informatics that was based on informatics computational methods, numerical and mathematical methods, etc. They were looking for people who had some of that kind of background. Frankly, they wanted somebody from informatics. I think they wanted more females. This was around 1990 or 1991. I was, at that point, still a founding member of the AMIA board and one of my colleagues from that board said, "You want somebody who's going to give good organizational service and she knows about informatics and she's female and she's a nurse and look at all the diversity you're going to get….." I think surely that must have been how it happened. I've felt like an imposter among the engineers much of the time. But, they have been very gracious. My organizational service has generally been to serve on the nominations committee reviewing resumes and nomination packets for people who come from informatics backgrounds or even biomedical engineering backgrounds to that organization. That's been useful and it's becoming even more integral now as, in informatics, we are beginning to marry the biological sciences to the clinical sciences to the biological engineering sciences to clinical practice.

After years and years and years as a university professor I now find myself happily at the Institute of Medicine, where I'm to head up a new initiative focusing on informatics. We're at such an exciting time in our discipline because there are federal and other initiatives to advance the agenda of informatics in the service of the nation's health. There's the explosion of knowledge in the life sciences. There are clinical systems that are beginning to demonstrate delivery on the promises we've heard through the decades in this field. I'm in a place where the colleagues I've known all these years are the ones I can call on to say, "Now we're going to do a study of this, and I need people with this

expertise, that expertise, and the other expertise, to serve on a committee." Either I can identify colleagues I know or I can call colleagues I know and say, "OK give me five names of somebody who's good at this and tell me why they'd be good on this committee." That's a nice gift to have from my colleagues – to be able to call on them again – and I must say I've had a number of people send me emails or call me up and say, "When the Institute of Medicine gets ready to address this, keep me in mind."

Interviewer: What's your role/job at the IOM?

Judy Ozbolt: They call me a scholar, which is somewhat confusing, because often when people go there for a sabbatical, they're called "scholar" and they're there for a year and a lot of people thing I'm going to disappear in a year. That's not the plan. This is my real job. It's like a senior scientist position. I don't have administrative responsibilities, but they hired me because I know the discipline and I know the people and I'm able to spot the opportunities where we need to have a study done. Or, I'm new and this hasn't happened to me yet, but Congress or some aspect of the Executive Branch could commission a study and say, "We want you to go and study this." If it's about informatics, they'll leave it up to me to write the proposal, figure out what the focus should be initially, propose names for a committee, see the study through (helping pull together resources from the literature, help facilitate the committee in doing its work) understand the discourse enough to know where the key points are that need to be sure to get into the report, edit and do such writing as needs to be done to help the report happen. The content of the work is always the work of the volunteer committees and that's critical – that it's not just the Institute of Medicine proclaiming on its own, "Here's what I think is right and the government ought to go do this, or the private sector ought to go do that." It's convening the experts who argue the issues and develop consensus among themselves and I provide the good-listening ear and note-taking to make sure that the report indeed reflects the science and the understanding of the committee.

Interviewer: Let's go back to the founding of AMIA. Seems that activity really helped establish the practice of nursing informatics or at least the name??

Judy Ozbolt: This organization has helped a lot to facilitate the development and recognition of nursing informatics, but it certainly has not been any one person. Starting this working group was really building on that group that Virginia Saba and Harriet Worley had spearheaded. When we got our nursing informatics working group going in AMIA, I had the privilege of being the first chair of that group. But then my term expired and I backed off because I thought we'd had a clear message from the membership that they want rotating leadership and other people need to come up through the ranks and have this experience and then go serve on larger organizational committees or the AMIA board, etc. I can't say that after the very beginning that I've had much of a leadership role in NIWG and part of that was, "stand out of the way and give somebody else a chance."

Not lack of interest, but thinking this is the way it's supposed to work.

That group has done a great deal; the networking has helped to strengthen this. Then, when was it – in the mid '90s -- that the ANA wanted to create a recognized area of practice in nursing informatics. Many of us in AMIA served on the committee that wrote the scope of practice. I think Mary McHugh might have headed it. Roy Simpson was on that committee and Benny Harshani (?) and Patty Brennan – can't remember off the top of my head all the other people – but we sort of sat together and crafted the language to say, "here's the scope of practice," then sent that out for review and got other people's input and so on. We defined that. And then they had to create a certification exam. I remember Patty Abbott and others served on the committee to write the certification exam. AMIA was very much involved in that.

We've coalesced as a discipline and AMIA has helped nurses to feel they had an organizational home for nursing informatics and it's perhaps incubated a lot of activities and provided a forum for sharing activities…Sue Newbold with CARING and with the weekend immersion in nursing informatics, and those kinds of initiatives, have also helped to spread the word about this as a viable career choice and a satisfying way to be a

nurse. We've done so much together that it would be hard to tease out….you can say, "this person took the lead on this and that person took the lead on that," but, in fact, all of us were empowered and emboldened to do some of these things because we had the mutual support of our colleagues. You didn't just have to feel that you were having a crazy idea that nobody else…and I would say that one of the reasons that we so valued coming to this meeting through the past 2 ½ decades – we've been just about 25 years at this game now – has been (especially in the early days) people felt isolated and alone in their work situations. There was not somebody there who got it, who understood the issues, who knew what you were trying to accomplish, and why it was important. We could come here and talk with one another and instead of glazing over, eyes would sparkle. Instead of people looking around for someone else to talk to, they'd be looking you in the face and grinning and saying, "Oh that's it; that's right." That kind of affirmation has probably helped us to achieve a lot and helped us to value one another very much.

Interviewer: Those were fun times.

Judy Ozbolt: Were and still are. We're fortunate that many of us feel that some of our most cherished friends are also our colleagues in this organization. I don't know that that's necessarily true in a lot of other organizations, particularly when we only see each other a few times a year at the meetings, or at the board meetings, or at other activities. We pick up where we left off and very much look forward to these times of being together.

Interviewer: Advice for someone considering nursing informatics.

Judy Ozbolt: If you are thinking about whether nursing informatics could be a right career choice for you. As for any other career choice, you need to think about what do you love to do and do well that could be useful. If some of those things have to do with nursing and understanding clinical practice; if you think you like to understand workflow and how people do their jobs; that can be a useful skill. If you are particularly good at organizing information, interpreting information, saying things clearly – that's a good skill. If you

are a techno-nerd – and I use that term in a complimentary sense; I'm a techno-klutz – people who are really good with the technology and know how to make it sing for others, oh boy, do we need you here. Do you want to do all this in a fast-paced, dynamic environment where the stakes are very high but where, if you do it right, you'll make a big difference? Then you should be thinking about this. People come to this from a variety of perspectives. There are nurses who are doing this very, very well.

I've also had a student who was, in fact, a biomedical engineering student. About the time he finished his master's degree in biomedical engineering, he went into the master's program in nursing at Vanderbilt (they have a fast track that makes it easy to do that), became a nurse practitioner, then – while he got his PhD in biomedical engineering – moonlighted as a nurse practitioner. He had a pretty good source of income but also was learning about the health problems that people experience and the clinical solutions we're trying to give him from a nursing perspective. Nurses deal with how to help people live the best they can with the health challenges that confront them. And sometimes they're challenges of illness and sometimes they're challenges of not-very-pleasant treatment. This young man is a biomedical engineer who now understands what it is to be ill, what it is to be a family caregiver, what it is to be a nurse trying to provide a high level of technical care. And he takes that expertise to his biomedical engineering and is now going to be so much better able to design solutions.

I think we might have people who come primarily from a computer science or informatics perspective who want to know how to deliver this service in a health care context. Picking up a nursing degree would give them a wonderful perspective on that.

I think there are lots of wonderful opportunities for people from many backgrounds to have a very satisfying career.

Interviewer: What are the biggest challenges – next hump to be addressed?

Judy Ozbolt: One big challenge is the need for very widespread dissemination of understanding of what informatics is all about in nursing and why and how nursing needs to be transformed to incorporate the knowledge and skills of informatics -- especially with the shrinking workforce and especially with ever-more acutely ill patients. It is simply not possible for nurses to give the level of care that they want to give, and that patients need to have, without the proper informatics tools. But it's not just learning to use the technology; it's learning to think about practice in a transforming and transformative way. This job is about understanding situations, getting knowledge when you need it, getting information when you need it, crunching all of that in your head, and with a technological tool, making the right decisions, delivering the care, doing the communications. Students need to learn this in nursing schools. But before they can, the faculty members need to learn this. Nurses need to learn this in practice and where are they going to get the on-the-job training? That's a big issue we're confronting right now. How do we need to change nursing practice, nursing education to give nurses the abilities to meet the challenges in practice with the help of informatics?

Then we have all of the issues of just trying to care for an aging population, a disadvantaged population, coping with high cost of care, trying to improve the quality and maintain the costs – there's a lot we could be doing within informatics to support quality and to control costs by stopping the futile care, stopping the care that doesn't really help people, but instead doing the things that are helpful. Empowering consumers to better manage their own health issues with assistance from nurses but in a different way. Instead of having to go and deliver every ounce of education personally, the nurse may be able – particularly for those patients who have the means and the ability – to point them toward knowledge resources and decision-support resources that will let them manage for themselves. Those resources have to be created; who better to create them than nurses who understand how to help people live as well as they can with the challenges they face.

Interviewer: Anything additional you'd like to add.

Judy Ozbolt: I have greatly enjoyed the opportunities to work and play with my colleagues in this field. And to contribute in some way toward systems that I hope will eventually help nurses. The challenges that are facing us right now are very much underscored by the truly cataclysmic hurricane and flooding experiences that people have undergone that have made it clear that business-as-usual is over. It's stopped in its tracks. It's not happening. As we have to rebuild from scratch in many areas where truly everything was lost, how can we use these opportunities to put our expertise in the service, let's say, of particular clinics or provider facilities as case studies and help those folks to get to a better place – not only from the devastation they're facing now but maybe eventually to a better place than they were before. And then what lessons can we learn from that about what's working and what's not working that we can disseminate to others. We have a nation that needs to go live and we don't know how to do that. Perhaps we can target some of those who are most in need and figure out how to make it work there and then decide what generalizable lessons have we learned that we can pass on to others.

That's a terrific opportunity that confronts us in the face of much tragedy – as a way of responding to the tragedies that have occurred and the devastating losses that people have suffered.

End of Interview