

Journal of the Association for Information Systems

JAIS

Special Issue

A Lifetime of Theory and Action on the Ethical Use of Computers: A Dialogue with Enid Mumford *

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Abstract:

"The world changes and technology comes and goes but human problems remain the same."

-Enid Mumford (2003, p. 1)

Enid Mumford devoted her career to promoting the ethical use of computers. She founded her work on ethics, socio-technical and general systems theory, and action research. These foundations translated into four principles underlying all her work: (1) Information systems should be designed to improve the quality of life for all. (2) Individuals should be able to participate in designing their own working circumstances and information systems. (3) Solutions to local problems have global consequences. (4) All research should include action to improve the situation being studied. Enid Mumford's legacy extends from ethical information system design to complex problem solving in the global era. This paper is an interview of Enid Mumford at her home in the United Kingdom in the summer of 2003 with a brief introduction to the theoretical foundations of her thinking, her research and her legacy to the information systems research field.

Keywords: *ethics, ethical use of technology, human use of computers, socio-technical theory, general systems theory, participative design, organizational change, computer-based information system design, holistic approach, complex problem solving, information systems research, action research.*

* This is a part of the special issue on Enid Mumford's contribution to information systems theory and theoretical thinking.

Volume 8, Issue 9, Article 2, pp. 467-478, September 2007

Volume 8

Issue 9

Article 2

The Four Theoretical Foundations of Enid Mumford's Work

Enid Mumford built her body of work on four theoretical foundations: ethics, socio-technical theory, general systems theory, and action research. First and foremost, Enid believed that computers should be used to improve the quality of life for all humankind not just the wealthy or powerful. Until the very end, she continued to be concerned that even the most modern information systems harness employees into monotonous, repetitive, and fractionalized work practices undermining the working individual's quality of life. Enid turned all her projects into a quest for implementing universal good and kindness.

Equally consistently, Enid applied the socio-technical theory and the general systems theory in her research. A central concept in the general systems theory is an "open system." At a practical level, this leads to recognizing that every system is embedded in its environment, which inherently affects the way it behaves. In a socio-technical context, an "open system" means that every employee changes as part of his/her work group, which in turn adapts to its department, the firm, and the global business environment (Mumford, 2003). Similarly, it means that an addict changes as part of his/her addict affiliations and dealer networks, which in turn adapt to international drug empires (Mumford, 1999). As a result of buying into the two theories, Enid embraced holism and participation as essential characteristics of all her research. Solutions would emerge from understanding the systemic dynamics within and between human groupings as a result of dwelling with affected people as they go about their everyday life.

The fourth foundation of Enid Mumford's career was action research. In this approach, which she adopted from the Tavistock Institute, analysis and theory were associated with remedial change (Mumford, 2003). The Tavistock Institute believed that in the application of socio-technical principles to improving human relations there should be *"no therapy without research and no research without therapy."* To Enid this principle meant that *"there should be no theory without practice and no practice without research"* (Mumford, 2003, p.13). Living this principle, Enid frequently facilitated organizational change according to her research findings. This is evident in the many projects she was involved in. Here we look at four of (arguably) the most influential.

Four Examples of Mumford's Work in IS

Turners Asbestos Cement

The first and most important learning experience for Enid came from a project in a British company, Turners Asbestos Cement, which made products for the construction industry. The company systems analysts were anxious to change the firm's sales office from a batch- to a terminal-based system for company accounts. They asked for help, saying that they wanted to associate good organizational and job design with the new technical system. Mumford undertook a survey of job satisfaction in the sales office and discussed the results with all the clerks, bringing them together in small groups. At these meetings, a large number of organizational problems emerged, and it was suggested to the clerks that they should think about how these might be solved.

Mumford forgot about this request and fed back the results of the survey to members of the technical design group. They then designed what they thought was an excellent socio-technical system. They called a meeting of all the clerks, described their proposed system, and sat back and waited for the applause. To their astonishment there was silence. Then one of the senior clerks stood up and said politely, *"Thank you for your presentation, your ideas are good, but while you have been designing a new work structure for our office we have been doing the same thing, and this is how we would like to be organized."* He then produced an excellent blueprint for a work structure that solved most of the office's efficiency and job satisfaction problems.

It was the clerks' solution that was implemented and Mumford learned her first important lesson about action research and participation. That is: never underestimate a group's abilities. People at any level in a company, if given the opportunity and some help, can successfully play a major role in designing their own work systems. Ever since then, Mumford has been convinced of the efficacy of using a participative approach. So much so that she developed the ETHICS methodology, which stands for Effective Technical and Human Implementation of Computer-based Systems. It was this methodology that Enid used in subsequent projects involving the analysis, design, and implementation of information systems. (Mumford, 1983)

Rolls Royce Aerospace

The second major project Enid was involved in was at Rolls Royce. It was typical of the many she carried out after the Turners Asbestos experience. Rolls Royce Aerospace made aircraft engines and was a large and flourishing company. It had a purchase invoice department that dealt with the invoices coming in from companies supplying goods and services. This department had an elderly, low-morale workforce with little motivation to work efficiently. It was shunned by young people who refused to work in a place they regarded as a graveyard. Rolls Royce had decided to computerize the clerical processes in this department in an effort to improve efficiency. As Mumford had lectured the Rolls Royce systems group on participative design on a number of occasions, the IS manager decided to try a participative approach with the new system.

A user design group was created with representatives from each section of the department together with the systems analyst responsible for the project. Mumford acted as the facilitator to the group, and one of the senior clerks was chosen by the members as their chairman. At the same time the senior purchase invoice manager held small group meetings with their constituents to consider more deeply the reasons for these efficiency and job satisfaction difficulties and to discuss possible solutions. Gradually, the work changes required in the department became clear and were documented as important objectives for the new system. The steering committee discussed these and approved them.

The systems analyst accepted the task of creating a technical system that would assist the achievement of these objectives, and the design group turned its attention to identifying three alternative organizational structures that would help to secure the required improvements. Two of these were based on the socio-technical approach of multi-skilled work teams, each responsible for a relatively self-contained aspect of the department's work.

After discussion with the steering committee and a meeting with all the clerks in the department chaired by the trade union official, an organizational structure was selected in which teams of clerks would look after all the procedures and personal relations for specific groups of suppliers. Clerks in these teams would aim to become multi-skilled within a time period of two years. A number of clerks in the department saw this new structure as too demanding and asked if they could remain on routine work. Consequently, the organization created service centre was therefore created to handle routine processes such as dealing with the circulation of mail. It was hoped that this would be a temporary structure, with all clerks eventually becoming multi-skilled.

This new structure transformed the department from a low-morale group shunned by young employees to a motivated and knowledgeable group that became of great interest to those departments in Rolls Royce seeking flexible and knowledgeable staff. Here was another example where a socio-technical approach had led to more freedom in decision making and choice. This, in turn, led to more freedom in work by providing opportunities for responsibility, learning, and greater control and autonomy (Mumford, 1996; Mumford and Henshall, 1979).

Mumford's action research with Turners Asbestos Cement and Rolls Royce were two examples from the seventies that are representative of participative projects carried out at the lower levels of companies (Mumford, 1981). In the eighties and nineties, Mumford increasingly moved the ETHICS approach up the organizational hierarchy. The next example shows how a major computer manufacturer, Digital Equipment Corporation, used participative design to create XSEL, one of its first expert systems intended to assist configuring in sales offices throughout the world. The challenge of the project was the size of the user group and the fact that it was located in many different countries.

Digital Equipment Corporation

When computers are manufactured, numerous parts have to be brought together and assembled, and, because there are so many parts, some can be lost, or assembled incorrectly. Because of this, a customer who receives a new tailor-made machine may find that it does not work, causing a serious deterioration in the relations between customer and supplier. Digital's attempts to solve this problem had failed, and the company believed that an expert system, acting as an electronic *aide memoire*, could be the answer.

In the early eighties, Digital built and installed an expert system called XCON in its manufacturing plants. This provided a graphic display of how different parts should fit together. It was very successful, and the engineers who built the computers welcomed it. Unfortunately, it did not solve the configuring problem completely because the problem originated in the sales offices. Each salesperson had to detail all the parts in a system ordered by a customer: first, to give the customer an accurate estimate of how much the machine and peripherals would cost, and second, to send a specification to the manufacturing plant stating exactly what the customer wanted. Few of the sales staff were engineers, and they often identified the specifications inaccurately, causing mistakes in assembly that the manufacturing staff could not identify. These configuring errors caused Digital losses of millions of dollars a year. As a result, the company developed an expert system for use by sales staff.

XSEL was designed with considerable user participation. The design group contained both technical experts and members of the sales force. It met regularly during the design and implementation stages and for some time after the system was installed.

In addition to the group discussions, managers employed two questionnaires to assess job satisfaction and efficiency needs, with the analysis of efficiency needs based on Stafford Beer's "*Viable System Model*." Design was an iterative process, with the sales force specifying their information needs, the technical members building an embryonic system for them to test, and this process continuing as XSEL grew until the system was regarded as ready to hand over to the sales offices for day-to-day use. In its mature state XSEL contained 15,000 configuring rules.

Although only some of the sales people could directly participate in the design process meetings and discussions, Digital kept all the sales offices informed of what was happening through its electronic mail system. Regular reports of progress were sent out and when there were arguments over strategy that could not be easily resolved, the sales offices were consulted. Participation meant that when XSEL was ready for implementation, the sales offices were enthusiastic and very willing to use it. The system was non-threatening, no-one would lose their jobs because of it, and it would prevent sales people from making embarrassing and costly mistakes.

Despite this initial enthusiasm, the system gradually ceased to be used, and the configuration errors increased in number again. The problem was both motivational and technical. Over time the sales force felt that there were few benefits in using XSEL. It added an extra administrative step to their workload when they wanted to focus on 'electronic selling.' It was also slow. A sales person could do an imprecise configuration in his or her head faster than XSEL could work through its 15,000 rules.

The Digital project is an example of a socio-technical approach directed at developing new software, not restructuring a department. It did change the salespeople's individual work responsibilities but not in a manner they regarded as improvement. The participative aspect of socio-technical design was successful, but the final product that emerged was not. Nevertheless the experience of using a socio-technical approach convinced Digital that this was the way to proceed in the future. They produced a set of guidelines for managing change based on the socio-technical design principles that were used to manage subsequent projects in other areas (Mumford and MacDonald, 1990).

Mumford's projects in the nineties were almost all concerned with using a socio-technical approach to assist managers to select and shape information systems to meet their particular needs. Firms participating in these exercises included KLM and Dutch Telecom. One of Mumford's more interesting but difficult cases was that of SKIL, a Dutch company producing power tools.

SKIL

SKIL was proposing to abandon an old and unsatisfactory computer-based material planning system and to substitute more advanced software that would run on a new IBM AS 400 machine that the company had recently acquired. Nine managers were involved in the project—two planning managers, three factory production managers, the finance manager, a quality manager, and two managers from R&D.

Because most managers are not prepared to devote time to non-production activities, Mumford had reduced the two questionnaires associated with ETHICS to one and allowed only two days for group discussions. She called this reductionist approach 'QUICKethics.' Mumford went through the QUICKethics questionnaire with each SKIL manager individually, wrote the interview up, and gave the report back to the individual manager so that he could check its accuracy. These interviews had a threefold purpose: First, to enable the manager to think clearly and systematically about his role and responsibilities before considering his information needs; second, to enable him to obtain a clear picture of his information needs before meeting his colleagues in a group situation; and third, to arouse interest and a sense of ownership in the proposed new system.

One week after the interviews the managers met as a group. As nine is quite a large number for fast decision making, Mumford split them into four groups—planning, production, quality and R&D. Each of these groups was asked to think back to their individual answers from the week before and to agree and prioritize a set of essential information needs. One member of each group described and explained each list and then the management group as a whole discussed them all. During the meeting, a board-level manager stated what senior management required: software that did not need more than 15 percent customizing for the company, that could be implemented safely and without risk—there must be no possibility of plant stoppages—and that was supporting rather than controlling users.

The last task of the group was to agree on a core information system that could act as a starting point for implementation. Everyone present agreed that this should cover three items. The first priority was bills of material, which specified in detail the materials and production steps associated with each product. Second, material planning and machine capacity planning should have next priority. These were two critical activities essential to the running of the production system. Finally, it was agreed that the managers, reduced to six in number, should become the user design group for the project. The exercise was regarded as a success in that it helped SKIL managers to look systematically at their information needs and decide on an agreed starting point for implementing the new system. This reduced the risk in a high risk situation.

These four examples all demonstrate the importance of the socio-technical philosophy of participation and of the need to take human issues into account at each stage of the design process. They also show that a socio-technical approach can be easily adapted to meet the needs of different situations. The cases also show Mumford's application of action research.

Enid Mumford was an exceptional scholar. The stability and clarity of her four research foundations manifest a highly developed sense of academic rigor. Enid's wit, however, ensured that any theory or research approach was just a tool to be harnessed for a higher, humane purpose. With this introduction, we share our last interview with Enid Mumford at her home in the United Kingdom in the summer of 2003. The purpose of the interview was to hear her talk about her career, impact, and the status of human use of computers as she saw these at the time.

The Mumford Interview

We arrived at Manchester jet lagged from the trip from the United States and had just checked into our hotel when Enid called. In her usual cheery voice she said: *"Welcome. Jim¹ and I will meet you for afternoon tea."* Thirty minutes later we were enjoying afternoon tea and exchanging the latest news about our families and friends. At the age of eighty, Enid showed no signs of slowing down. That night we had a lovely dinner. and early the next morning, we met with Enid again at her house to spend the day talking about her life and her career.

Question: How did your career start?

Mumford: I was enormously fortunate in the way my career started. My first job was probably the most important job I've had because I became a personnel manager at a very large aircraft factory. I'd only been there about a year when my boss left and so the firm, being a bit lazy, decided to give me her job rather than look for somebody else. I was responsible for all the personnel management including industrial relations and for the women's workforce. For the first job, it was enormously useful.

Question: What was the next formative step in your career?

Mumford: I got married and my husband Jim was in the Navy, and so we decided to live in Liverpool because he got a job as a lecturer in the dental school at the university, and I had to look for another job. I had another amazing stroke of luck. There was a new factory that made alarm clocks and it had a lot of government support because in those early days you could use alarm clocks for setting off bombs, so it had finance from the Ministry of Defense. And there, I was given a production management job actually running a department making these alarm clocks and—bomb making equipment—so moved from personnel management to spending a year as a production manager.

Question: What was your next important career decision?

Mumford: I did not want to be doing that forever and a friend of mine, a psychologist, got a job in the social science department of Liverpool University, and she said: *"Why don't you apply for a research job?"* So I did. I got it, and I worked for a woman named Joan Woodward who later became very famous. So I had these three amazing starting points in personnel management industry, in production management, and then in research with a really good person to show me how to do research.

Question: How did you get interested in computers?

Mumford: When these mysterious things called computers started appearing, nobody had a clue about them or what impact they would have. There was a big organization called the European Productivity Association, and it decided to run some research on what was the impact of these weird things. So I started doing research first in a bank and then in a local factory on the impact of these machines.

Question: How did you choose action research as your research approach?

Mumford: There was another very influential factor at the time, and that was anthropology. British researchers were very much into anthropology and anthropological techniques where you did not go out waving questionnaires. You actually went and sat with the group you were studying and became part of them and learned what they were doing. And we did not know what we were going to learn. Quite famous anthropologists named Madeline Kerr and Tom Lupton were in Liverpool.

¹ Enid Mumford's husband.

Tom later became the director of Manchester Business School. We were very much into anthropology, so we were never very attracted to going around waving questionnaires at people. We were much more into going into a group and working with it and finding out as much as we could about it, which of course I always continued to do.

Question: What did you learn about the approach?

Mumford: I found that it really takes time and it can be hazardous and so on, but you really get to understand the member of the group and what's making them tick and why they're doing things in certain ways.

Question: When did you first come in contact with the Tavistock Institute?

Mumford: Around that time, I met the Director of the Tavistock. He was called Professor Tommy Wilson. I had so much luck in these early years it's unbelievable. He sat on a research committee from which I was asking for a grant to do this research, and he ensured that I got a five-year grant – unbelievable! IT was my first research project and we get a grant for five years. So that was the start of participative design, and then the Tavistock Institute increasingly moved into participative dock design, and it suddenly became very famous. So I've always kind of had a contact with the Tavistock and have been influenced in what I was doing by what they were doing. So there were these different influences and practical experiences running a factory and doing industrial relations along with having contact with anthropology and then getting this big research grant. Then, soon after that the Manchester Business School started up. It was initiated by the government along with the London Business School as two British business schools trying to become graduate schools like Harvard. So I really had a series of opportunities, which were absolutely wonderful. How many social scientists, who poke around with questionnaires, have actually run a factory department or done industrial relations and sat with anthropologists...and then of course I went off to the Manchester Business School.

Question: How did you fund your research?

Mumford: Being into information technology and interested in it from a human point of view it was never hard to get money. Now, you could get some from the government funding offices, but I used to find this a waste of time. It would take nine months to get the money, and you would get half of what you asked. So I used to just go to local industry and say: *"Look, how would you like me to do a few projects in participative design?"* And an awful lot of them would say *"Yes."*

Question: How did you keep the firms interested over time?

Mumford: It more or less kept going. In each project I tried to work with the group I was studying. Eventually, this became a kind of facilitative role—making sure that management let them [employees] play a major part in the decision processes for the system, so it was all very participative. Participation included the responsibility for designing systems with the technical group who could not get it done on its own and ensuring that the system went in and was successfully accepted.

Question: How would you summarize these first experiences of your career?

Mumford: Very serious, useful experiences, which would be hard to replicate today, I would think.

Question: You mentioned that Joan Woodward was a major influence in your career. Can you elaborate?

Mumford: I was about 24 or 25 when I went to work with her. She was busily writing these major books asserting, quite wrongly, now looking back, that the major influence in the industry was technology. In fact it very often wasn't. It was more industrial relations. So anyways, she hawked all the bookstores with this, because no one had really thought about looking at technology as a major factor in determining what happened.

Question: Did you agree with her at the time?

Mumford: Yes, very much. She wasn't into computers, though. I had to make it relevant to our team. The first project was on the Liverpool docks. They had started accepting what they called a labor board to try to reduce the uncertainty for dockers. Dockers very often only had worked some of the time and were unemployed the rest of the time. So the project was to try to get them a permanent job. And if there wasn't but very little work, the dockers' labor board would still pay them, thereby providing stability for them.

Question: How did you approach this research?

Mumford: I thought, "I must go and work on the docks," but what can I work as, since of course there were no women there. Well, there were two female roles. One was a dock boat scrubber, but I decided against that. I didn't fancy that [laughter], and it also didn't have much to do with the dockers because the dockers are on the key side and the old ladies—they always were old ladies—poor old things scrubbing out the boats—were in the interior of the boats. There was another job, much better, which was a cantina assistant. There were about ten dock cantinas, which the dockers used for meals. They were not run by the docks. One of the ones I worked in was run by the Women's Temperament Association to make sure that the dockers did not get lost in the fearful drinking habit [laughter].

Question: How did you see your role in the cantina?

Mumford: I had to keep changing my role. It was very interesting. In the first dock cantina I tried to go just as a normal worker, but it was quite clear after a while that the other ladies were very suspicious of me. I would just not fit in.

Question: Why?

Mumford: Little things. I had the wrong sort of make up. I wore Elizabeth Arden lipstick, goodness gracious, and they all had very cheap lipstick. So what was I doing there? Well I was writing books about dockers. They thought it was very strange [laughter].

Question: Did that affect your approach?

Mumford: Yes. In the second cantina, I did admit I was writing a book. That gave me instant acceptance with the dockers, who loved the idea that somebody was writing a book about them having been greatly neglected. But again that caused problems with the cantina girls. Why did anyone come to work at a cantina to write a book?

Question: Did that affect your approach again?

Mumford: Yes. In the third cantina, they just thought I was some student trying to get a little bit of cash. And that worked all right. It was quite acceptable. Students were seen as being awkward and nosy and wanted to talk to dockers and so on, but we were also seen as poor and wanting to earn a little bit of money, so that worked all right.

Question: But the dockers were accepting of all your research approaches?

Mumford: Oh yes. Most certainly the dockers were accepting. Liverpool has a reputation for producing lots of comedians. They have a very strong comic sense of humor, which the cantina girls could do, but I couldn't. So a docker would come in and produce a few appalling remarks. [They would] come up to a cantina assistant who would more or less verbally pin them down to the ground [laughter] and out of the cantina. I couldn't do that. A couple of times I thought of something clever to say, and none of it I probably should have said. I was totally hopeless [laughter].

Question: How did you get into coal mining?

Mumford: Tavistock Institute's major piece of research was in coal mining. So the National Coal Board, another nationalist industry, thought the Tavistock research was very good and would like a bit more done. Only this time they wanted to find out why the coal miners were always out on strike. So they went to the Tavistock Institute and Tavistock said, "No, we do not want to do this research because it is working for the managers and we do not want to be seen as working for the management." And so the Coal Board came to Liverpool, because we had done all this Tavistock stuff and said, "Well you'll do the research." We were not quite so fuzzy [laughter] about working for the management. So we said we would do it. The subject was industrial relations -- why would the coal miners always go out on strike, causing havoc. There were two coal mines selected. One was called Maypole, which was the bad one always on strike...which I got...that was my pit. The other one was called Chanters, which was a good pit, never on strike and had very angelic coal miners there. So I went to Maypole, which again was when I was in my early twenties -- a wonderful time.

Question: What made you go into the mine to conduct your study?

Mumford: How would I be reporting on a comparative study of a working miner's life sitting around with a questionnaire on the surface? [laughter] What could be dumber! [laughter] I still have my miner's lantern, helmet and axe.

Question: How was it in the mine?

Mumford: There were many amusing episodes. I must have been approaching thirty then. People were very puritanical, and miners swore like troopers—absolutely every kind of swearing—but they never swore in front of women. What do you do if you have a woman suddenly underground? - A very difficult situation [laughter].

Question: Did your going into the mine work?

Mumford: Absolutely, yes. I found that it really takes time and it can be hazardous and so on, but you really get to understand the group and what's making them tick and why they're doing things in certain ways.

Question: Were there other women in the mine with you?

Mumford: Oh no, no, no. No woman set foot underground. It was very nice of the mine management to let me go down. First they used to ring around on the underground telephone to say "Watch out! She is coming!" So they'd stop swearing, and by the time I got there I thought: "Awful, they can't go on doing this!" Production at the pit was going to go down. There was no swearing allowed whenever I was there. "I've got to do something about this." So I produced a really good socio-technical solution. Before I went down I used to cover myself in Chanel No 9, extremely potent perfume [laughter]. And of course underground you go around with the air, because pits have shafts—air goes down one shaft and then travels around all the underground workings and then goes up another shaft. So you are traveling with the air and smell is very powerful. So I was always preceded by this great blast of Chanel No 9 [laughter]. So people knew I was coming...they would have NEVER accepted a man in the pit I was in. He would have been seen as a management's steward at best.

Question: So being a female turned out to be an asset in this research?

Mumford: It was good that I was a woman. Yes. Yes. Yes.

Question: What did you learn in the mine as a female?

Mumford: Women really had to be underground off and on to discover why all the men were on strike. Conditions were absolutely TERRIBLE. And the conditions also affected the wages because some of the faces were particularly difficult to cut and to work; so if they got a very bad section or face, their earnings would go down so they usually came out on strike -- just, of course, as the dockers used to. Contrast this with Chanters, which was a fairly easy pit to work. It didn't have these really bad conditions.

Question: How bad were the conditions exactly?

Mumford: Maypole had actually blown up on one occasion...long before I was there. It was known as the "Maypole disaster." It gave the mine a bad reputation.

Question: How did you feel about your own working conditions?

Mumford: I enjoyed it enormously. I had a great time...I was not too worried about the conditions.

Question: How did you collect data?

Mumford: I interviewed some of the miners underground. I could only do this with a few miners because it was dark down there. I'd lie side by side with them on the coal face [laughter] because we could not sit up. I would go through the questionnaire with them. It was hilarious.

Question: How long did you do research at Maypole and what happened then?

Mumford: That went on for a few years, and then this mysterious thing called a computer appeared and life would get very boring after that.

Question: Why?

Mumford: Working with computers just does not compare with docks and coal mining.

Question: How did your research change?

Mumford: We got a grant from the European Productivity Association. It was quite an international group that did this early research, and the two companies we looked at were a bank and a firm making cattle food.

Question: How would you characterize this early computer-related research?

Mumford: None of the people in research had a clue. Nobody had a clue what was going to happen with computers.

Question: How did practitioners feel about computers?

Mumford: Most people were scared stiff because they thought that they were going to lose their jobs.

Question: Why?

Mumford: They didn't know what computers were going to do and, of course, you associate machinery usually with replacing large numbers of people.

Question: So during the early days, the computer was considered to be just another machine that would help reduce jobs?

Mumford: Yes. Some of the computer firms like ICL produced HORRENDOUS films as marketing devices. In these films you had an office full of about hundred workers all busily working away and the message was: *"Buy our computer and you'll have 20 workers."* So the sales message was: *"If you want to get rid of your staff, get a computer."* It was used as a sales technique.

Question: Did people lose their jobs then?

Mumford: Of course they were right at a later date. Quite a lot of people were displaced by computers, but not at this early period. The number of jobs didn't go down, it went up, because you had this new and mysterious group of programmers, which offered a great new career to male clerks. For them it was splendid. But it brought some DREADFUL jobs for women, because this terrible punch-operating role appeared, where women had to punch the data into the computer. All the interesting bits were done by the computer. The women had to punch the data in and collect the output, so they were just kind of bits of machinery—machine minders. It was a very bad period for women. Computers didn't enhance the jobs for women AT ALL.

Question: If people did not lose their jobs, why did they continue to be afraid?

Mumford: A major problem was that there was no communication, so everyone was just left guessing. *"What if these new machines are going to put us all out of work?"* There was really no communication at all. Male clerks or management didn't know what was going to happen.

Question: So nobody knew what the impact of computers was going to be?

Mumford: Yes. Nobody knew.

Question: Have we overcome that problem?

Mumford: The exact same major problem occurs today—management doesn't notify you [the employee] what is going to happen.

Question: Did you have an inclination of what the impact of computers was going to be?

Mumford: Yes. I mean our research was really about trying to find out [laughter]. We had projects going on in quite a lot of other countries, France, Germany, probably Finland, some in Sweden, Denmark, and other parts of Europe. We all produced these little project results, and they were more or less the same.

Question: Yesterday you said that your original message that *"Systems have to be more human and people who are affected by them must become more involved in their design"* is still the same since things have not changed that much.

Mumford: Yes.

Question: What happened in your career next?

Mumford: There was a chair in dental surgery going in Manchester and Jim applied for it and didn't get it. I thought that he was probably going to get it, and I knew about the Manchester Business School, so I applied there for a job and I did get it. So we ended up with me working in Manchester and him working in Liverpool, and that's why we eventually came to live here in Appleton. And then of course the business school was obviously interested in computers, and so I continued with my research. Any business that was going to get anywhere started to think about introducing computers.

Question: How was your research received by the other researchers at the business school?

Mumford: With acceptance but not enthusiasm.

Question: What do you think was behind the acceptance?

Mumford: I used to go to companies for money and most companies had practical problems, so I always had a lot of money, and one thing you find, as you must know very well, that nobody can touch you in a university department if you've got money [laughter].

Question: You have spent nearly half a century studying the human side of computing. How far have we come?

Mumford: It still isn't there; most government systems over the last few years have failed. We've got failure after failure after failure with very large government systems: passports, pensions for the Army. Millions have been wasted because of the omission of the human aspects. I don't understand why, quite honestly.

Question: In your recent book (Mumford, 2003) you say that *"The world changes and technology comes and goes but human problems remain the same."* Can you elaborate?

Mumford: They [human problems] have certainly gotten worse, if anything. They are more and more complicated.

Question: Several years ago when C. West Churchman was asked what the core values of the information systems field should be, he said, "Ethics" (Porra, 2001). What is your response?

Mumford: I would also argue for participation. And did he also come up with the follow-up question? Nobody has strong and powerful ethics. No kind of coherent ethical presence ever has emerged. He says it's all about ethics, but nobody around is actually producing the ethics. The trouble with the Tavistock Institute was that they never went into the IT area...never had anything to do with IT, although that's astounding. So you can raise the question where are the ethics? Systems analysts, on the whole, are more into the technical design of the system.

Question: What is your follow up question?

Mumford: Why don't people with social knowledge use their knowledge in systems design? I can follow up by saying that still nobody takes much notice of the people factor, because the people with the social knowledge are not using it in information system design. Why is nobody thinking about it?

Question: You are saying that no ethical process has emerged in information system design, but your method, ETHICS, describes an ethical way to design information systems.

Mumford: Oh yes, yes, but how far have I ever penetrated? I have gotten high marks from a *"utopian correct."*

Question: How do you see the future of ETHICS and an ethical approach to information system design?

Mumford: It could be on the verge of reappearing. People are going to want this more participative involved, LEARNING. It [ETHICS] is a learning approach, because you learn how to manage change and how to create a system with ethics designed into it.

Question: Who is going to drive the change toward more ethical information systems?

Mumford: It has got to come from senior management. I think this is the trouble. You get a few IT mavericks, who don't have a clue. It has really got to come from management.

Question: Have any of the firms you worked for maintained an ethical, participative approach to information system design?

Mumford: The number one that is still going and really HAS TO nowadays is Shell, but it is an example of a company that HAS HAD TO, because it had to drill oil wells. It had to get the local population's support. It had to have an exchange program. *"So if you let us drill our oil well, we will build a school or a hospital etc. for you."* So it was sort of an exchange relationship. And the company has been doing it for 50 years so it is not an on/off thing with Shell, but it is a swap.

Question: Can you name examples of managers who have succeeded in introducing ethical information systems in their firms?

Mumford: Well Digital for example, when Ken Olsen—Digital Equipment Corporation does not exist anymore—but Ken Olsen had an ethical approach. So I did a lot of work at Digital over the years. He paid my salary for a while. So, *"Why has no ethical process emerged in information system design?"* is really a very interesting question to pose.

Question: Could we perhaps rather say that no ethical information system design process has been popularized? You have provided the world with ETHICS.

Mumford: Probably a better way to say it is to say that an ethical information system design process has not yet been popularized.

Question: How would you describe the state of ethically motivated information systems?

Mumford: They are like tiny flowers appearing in a cage, some soon tumbled on and some are being passed along.

Question: Do you believe that information systems designed on inferior ethical principles had to do with the demise of companies like Enron and Arthur Andersen?

Mumford: Well their demise was caused by people who were just crooks.

Question: Could these types of events cause people to be more skeptical about the information systems companies rely on.

Mumford: Oh yes...at least for a while.

Question: Do you think that events like these have a long-term impact in terms of a demand for more ethical information system design processes?

Mumford: No. I think it is going to make people much more careful and suspicious, but I don't think that there is a logical jump into being more involved and participative, because that would be a most INCREDIBLY HUGE cultural jump, wouldn't it? I think the attitude is, *"We're going to watch out in the future and see that they don't get away with it"* or *"We are going to police better."*

Question: How has your message changed over the years?

Mumford: I am still repeating the same old message from years ago, accepting the difference that systems are getting more complicated and the cost of failure is getting more expensive. People want to be involved more in designing work

organizations that are for them, so they don't want some unknown group coming in and doing it all. They want to be playing a part themselves. And the risks and costs are increasing all the time. So a much more human approach to systems design is required.

Question: What should universities do in order to reinforce your message?

Mumford: I raise the question: *"Why are there so few of these human-oriented approaches being taught in IT courses and in business schools in general?"*

Question: What should the information systems research field do?

Mumford: We need to think about the ethics notion a stage further, and so we need ethics but what kind of ethics do we need and how do we get these familiarized and accepted?

Question: What would make companies more interested?

Mumford: Well, cash really. Firms are putting out a lot of money on systems.

Question: Would methods to find out the financial benefits of ethical information systems help?

Mumford: Even if you use financial justifications, firms do not do the costing. They don't usually cost the necessity or the importance of people who leave or the people who are absolutely fed up. So they are not going to know the difference. These things are not costs. Companies are after the *"easy technical things"* like how much did the physical system cost? They'll never take into account this HUGE blank area of the human side of computing.

Question: What can researchers do in order to help firms visualize the 'blank area'?

Mumford: Researchers can do some costing for the company. *"How many staff have you lost because they don't like this new system?" "How much has this [system] cost you to use it?"* Who does these calculations? Probably nobody. A thing, of course, which does require some very interesting work to do, is that you've got to demonstrate that ethically designed information systems—if you should find any—actually do make some money or increase job-satisfaction and that the share price goes up as a result.

Question: Do you believe that the current disinterest in finding out about the cost of dissatisfied employees has to do with the job market? For example, in the U.S. the job market is really tough at the moment, and it is very easy to find employees. Perhaps it is really a bad time for an employee to stand up about feeling treated poorly?

Mumford: Yes. Times may be against an ethical approach. After the war, Scandinavia, in particular, couldn't get staff; so they had to provide an attractive job environment in order to attract people to Volvo, etc. At one time the Norwegian government had improving job satisfaction as a legal job requirement. Where would you find that now?

Question: Where did we go wrong?

Mumford: I think doing things like business process reengineering were negative in their consequences. They led people down paths that didn't work, but they were marketed in such a way that they sounded very attractive. It was a closed door really. Another interesting question is, *"How is this quality of working life accepted very much for shop floor systems but never for these new IT systems?"* It's an interesting question.

Question: If one would ask in the United States: *"Why do computer people in many cases have no concern for the human side?"* or *"Why are our exams technically oriented?"* one could imagine business school professors saying, *"But that is not true! We are considering the human side and that is our core competency."* How would you respond to that?

Mumford: And so what are you doing? And what they are they doing is having a few little ideas in their own heads that they assume have to do with the problem, but they are not actually going and testing them.

Question: What is your take on research trends like e-commerce or knowledge management that seem to attract a large following of researchers?

Mumford: Well, they'll go out of interest and then you write it off with no outcome. The field can say all it wants that *"We're all about human,"* but then when you have a guest speech about the human side of things, you don't get anybody. Somebody might raise a little flag occasionally just to show that the human side of computing hasn't been totally forgotten. But that's about it.

Question: One last question. Throughout the day you have said you have been lucky. Why? It seems that you were more talented than lucky.

Mumford: I was lucky...

Enid shows her garden and we take pictures outside...

Mumford: Jim takes care of the garden; while I write books... There is so much to write about...

It was drizzling. Air smelled fresh and the garden was full of bright colors. We were slowly getting wet. We didn't notice.

Mumford: Good ideas are like flowers. You just have to keep those flowers coming up and maybe some of them will survive [laughter]. Yes, keep the flowers coming up...

Enid's Legacy

Enid Mumford's four theoretical foundations allowed her to extend her legacy far beyond ETHICS and the human use of computers. In the last decades of her career, Enid applied ethics, socio-technical theory, systems theory, and the principles of action research to methods for solving "wicked problems" of humankind such as those related to drugs, cyber crime, and money laundering. Central characteristics of these kinds of problems are that they spread unhindered to regions, countries

and economic activities; are perceived as risks by some and as opportunities by others; and promote fear (Mumford, 1999). They are resistant to solutions. They morph. They are cloudy, complex and uncertain. Their solutions are difficult or impossible to implement. They are supported by the latest technologies. Failure to address this category of problems can lead to a totally corrupt global capitalism and to a worldwide criminal economy.

Wicked, global problems require problem solving methods that match them in variety (Mumford, 1999). Such methods must provide tools for gathering, analyzing, and synthesizing information; relating information to past, current and future events; and combining information with considered actions, often on the spot and under stress to capture a window of opportunity. These methods have to include feedback on the impact of the solution and a way to implement adjustments on the method and on the actions. They need to allow for creativity in response to unanticipated turns of events. Enid warns that this is a description of global problem solving for a regular, orderly world situated in an environment that changes little. Today this "comfortable situation" is hard to find.

Against the backdrop of Enid Mumford's career, it is difficult to escape the feeling that the efforts of the information systems research field as a whole are somewhat misplaced. As Enid said in the interview, as a field, we tend to become infatuated with topics that "will go out of interest" and then we "write them off with no outcome." As a discipline, we can say all we want that we are all about the human use of computers, but when it comes down to doing research on topics that really matter from the perspective of humankind and in the long run, "We don't get anybody." Enid Mumford's life and career serve as a reminder that ethical and human use of computers is a topic that never ceases to be current and of essential importance, measured by values well beyond the boundaries of our discipline. Whilst her death was mourned by all, she set an example for the rest of us to follow. She has been—and will continue to be—an inspiration to us all.

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Journal of the Association for Information Systems

ISSN: 1536-9323

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