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Rob Kling and the Irvine School

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The Irvine School refers to an intellectual perspective on information technology in complex organizational settings that emerged at the University of California, Irvine, over the last three decades of the 20th century. In many ways, the rise of the Irvine School was synonymous with the rise of Rob Kling's influence on the international community of scholars who would eventually form what Rob called *social informatics*. This essay reflects on Rob's role in the creation of the Irvine School, and the ways in which the rise of the Irvine School shaped Rob's thinking.

The Irvine School began as an unusual confluence of talent at the new Irvine campus of the University of California in the early 1970s.[1] UCI was a new university, having opened its doors in 1965. Kenneth Kraemer, an architect and city planner by training, had joined the UCI Graduate School of Administration in 1967. He was one of the first scholars to begin careful empirical study of the effect of computerization in government agencies, and soon started a research program on IT and local government at UCI's Public Policy Research Organization (PPRO).[2] In the early 1970s Jim Danziger and Rob Kling joined him in this endeavor. Jim had been trained in political science and public administration, and had done research on local government financial practices. This perspective fit well with Ken's emerging program of study, given that finance was then the primary application for information technology. Rob had been trained in electrical engineering and computer science, and had done important work at the intersection of fuzzy logic and planning systems in the area of symbolic artificial intelligence. This was an unlikely match for a study of IT use in local government, but Rob was a rather unusual computer scientist.

As early as 1967, while a graduate student at Stanford, Rob had begun writing about social aspects of computer technology. During 2 years on the computer science

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faculty at the University of Wisconsin prior to coming to UCI, Rob had expanded his interest in social issues. His move to UCI was in part due to an agreement he struck with Julian Feldman, then chair of UCI's Department of Information and Computer Science, that specified that Rob could pursue his interests in social aspects of computing. Rob was particularly interested in improving the effects of computerization on people who used the technology as instrumental users. Before long he found Ken and Jim and joined the collaboration that formed the core of the Irvine School.

The first major PPRO research project on IT in local government was a study supported by the National Science Foundation called EPRIS, for Evaluation of Policy-Related Research on Information Systems. This documentary study established a strong basis of knowledge at PPRO, and formed a foundation for an endeavor that eventually became known as the Urban Information Systems Research Project, or URBIS (see Kraemer & King, 1977a, 1977b). Ken, Jim, and Rob received a planning grant from NSF to design the research project, and subsequently received a very large (for the time and the subject) grant from NSF under its Research Applied to National Needs program to support the research itself. URBIS was an innovative research project in a number of respects. It was the first large, systematic, empirical study to focus specifically on policy and outcomes related to computer use in complex service organizations. It incorporated a novel research design using large-scale survey research and structured field studies (see Kraemer et al., 1976). It eventually became one of the few longitudinal studies of IT in organizations, spanning more than 15 years.

URBIS offered an exceptional opportunity to study the social aspects of IT use. It provided the resources necessary to mount survey research covering the views of technical specialists, organizational elites, and end users in a variety of domain specialties from city planning to criminal investigations. The scale of the research was substantial: Extensive surveys were completed by more than 5000 end users, yielding sufficiently large response rates to allow extensive statistical analysis. The research project also allowed

for extensive field research to explore complex topics in depth. As the project evolved, other investigators joined, including Bill Dutton, Alana Northrop, Debbie Dunkle, and graduate students including John King, Joe Matthews, and Walt Scacchi.

Rob's effect on URBIS was immediate and profound. Although all of the initial investigators shared each other's interests in the research, each brought his or her own skills and and concerns to the project. Ken was particularly interested in policy aspects of IT use, focusing on identifying those policies that produced the best outcomes from computing use. Jim was interested in the political effects of IT use on local government operations, focusing on the questions of whether IT shifted politics from traditional political behavior to more technocratic behavior. As might be expected, Rob brought a much deeper understanding of technology to the project than the other participants, and his influence was important in that regard. However, Rob was deeply interested in the effects of IT use on individual people at work, especially with respect to the changing nature of tasks and the quality of work life. He was largely responsible for the URBIS project's contributions to those issues.

There are many specific examples of Rob's contributions in this vein, but it is most instructive to examine the way in which Rob went about his work. An informative instance arose from intensive case-study work Rob did in the course of developing the URBIS survey instruments during 1974. He visited the city of Chattanooga, TN, to examine a highly touted instance of IT use to help integrate delivery of social services across numerous public and private nonprofit welfare and health agencies. As always in his work, Rob was not particularly interested in how the systems he studied were purported to work, or how they were supposed to work. He was interested in how they actually worked, and especially in how they changed the underlying tasks required to accomplish the work objectives. He conducted interviews with a large number of participants in the system effort, from the technical specialists to management and workers in the numerous agencies that were part of the project. The results of his study were incorporated as planned in the design of the URBIS survey instruments, but they also took shape in one of the most interesting early papers from the project, called "Riverville" for the fictitious name Rob gave Chattanooga (Kling, 1978).

The Riverville paper provided a dramatic and instructive contrast between the ostensible purposes of the IT infrastructure that was designed to tie together multiple, independent service agencies, and what actually happened in those agencies. The system was a perfectly rational and laudable scheme to track welfare clients across multiple service agencies with the objectives of coordinating services and ensuring that no clients "fell through the cracks." Upon examination, however, Rob discovered

that the system was seldom used at all by social workers in the relevant agencies. This kind of discrepancy between claims and actuality always motivated Rob to seek the underlying explanation. Interestingly, Rob was usually skeptical of explanations that depended on straightforward problems with the technology itself. He sought explanations that captured the sociotechnical systems aspects of the problem. In the case of the Riverville system, Rob discovered that the system actually worked quite well with respect to its design specifications—it did the job it was designed to do. He also discovered that the underlying design of the system was deeply naive in its understanding of welfare clients and the agencies that serve them. The primary failure of the system was due to the fact that the key objective of the system—to integrate operations—ran counter to the cherished independence of the myriad agencies to be integrated. The system challenged the autonomy of the participating agencies, and all the agencies had to do to avoid losing autonomy was ignore the system and refuse to use it. This insight proved deeply informative for Rob's subsequent research.

A good example of the way in which Rob's research developed can be traced directly from the Riverville case into an issue arising from a completely different realm. In 1976 Rob and his doctoral student Walt Scacchi were invited to participate in an important early research meeting on the effort to develop a common, high-order computer language for the Department of Defense (DoD). This effort, which eventually produced the Ada programming language, was yet another rational and sensible endeavor that seemed likely to produce valuable results. The Riverville story raised important questions about the effort, which Rob and Walt elaborated in a talk at the conference and a subsequent paper (Kling & Scacchi, 1979a). Although Riverville had provided a retrospective assessment of what had actually happened in a systems effort, the Ada paper was a prospective assessment of what was likely to happen. Ada was designed mainly by academic computer scientists to facilitate programming for real-time systems used in weapons and other specialized defense applications. Such software was typically produced by professional programmers working for defense contracting companies, in environments entirely different from those envisioned by the academic computer scientists designing Ada. The paper suggested that the Ada endeavor would probably run into grave difficulties because of the naive assumptions the program's leaders made about the world of systems development that Ada was supposed to transform. In fact, this is what happened. The Ada language was deployed by DoD, but it fell far short of its goals, largely for reasons foreseen by Rob and Walt as informed by the Riverville experience.

This bias toward careful study of complex sociotechnical systems emerged as a key component of Rob's work, and of the Irvine School generally. Following the

publication of the major URBIS project results, the various investigators branched out into different but related lines of work. The interests shown in Rob's work on the Riverville and Ada stories emerged as a strong concern about how instrumental users learn to cope with the inevitable and usually ubiquitous problems with IT in complex task domains. In particular, Rob was interested in routine use of computers by nontechnical specialists: the focus of his computer use (COMPUS) project of the late 1970s and early 1980s that involved graduate students Walt Scacchi, Les Gasser, and Suzi Iacono. This work produced a variety of results, but those that best capture the key contributions of this era were his papers with Walt between 1979 and 1982 (Kling & Scacchi, 1979b, 1980, 1982). These papers evolved the concept of the "computing package" that incorporated the computer hardware, operating systems software, applications software, and data communications components that normally were thought of as computing systems, but also the technical staff required to support the systems, the organizational protocols and practices in which computing takes place, major elements of the task domains to which computing is applied, and the institutional context surrounding the whole phenomenon. This view was elaborated in detail in the 1982 paper that articulated the concept of the "web of computing" that became widely known as a key perspective on computing long before the World Wide Web was created.

In many ways, the idea of the web of computing captures the essence of the Irvine School. The Irvine School embodied Rob's research perspective, which was both critical and empirical. The critical perspective shows up in Rob's deeply skeptical view of unsubstantiated claims about the glories of computing technology. Rob was a technologist at heart, and a true believer in the potential of technology for good. Yet he refused to substitute ideological biases for fact. The search for facts drove Rob toward empirical research, especially research done in vivo, inside real organizations populated by everyday people doing routine work using IT designed by regular system developers.

Rob's departure from UCI for Indiana University in 1996 can be seen, in retrospect, as the beginning of the transformation of the Irvine School from a UCI enterprise to a global enterprise. Rob's work within the Irvine School played a key role in establishing and legitimating critical and empirical studies of sociotechnical phenomena involving information technology. The Irvine school produced an important legacy: the transformation of traditions of research and instruction in the fields of computer science, information systems, and information science. This, in turn, has led to the emergence of a whole new class of academic programs that bring together diverse research and pedagogical traditions.

Rob's legacy cannot be captured only in his papers, his students, or his programmatic efforts at UCI or IU. These all play a part in a larger legacy, the creation of a vital *point of view* about information technology in the world that gave rise to the Irvine School.

NOTES

1. More detailed expositions of the Irvine School and Rob's role in it can be found in Kraemer and King (1994) and Iacono et al. (2003).

2. PPRO changed its name to the Center for Research on Information Technology and Organizations, CRITO, in the early 1990s, and remains an important research center.

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