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Keywords

CAHRS, ILR, center, human resource, job, worker, advanced, labor market, satisfaction, employee, work, manage, management, training, HRM, employ, model, industrial relations, labor marke, PC based, Cornell University, management curriculum, IBM, student, computer, computer technology

Comments

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**Building A PC-Based Human Resource
Management Curriculum at the
School of Industrial and Labor Relations,
Cornell University**

Working Paper 90-03

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This paper has not undergone formal review or approval of the faculty of the ILR School. It is intended to make the results of Center research, conferences, and projects available to others interested in human resource management in preliminary form to encourage discussion and suggestions.

Abstract

In September, 1984, the Department of Personnel and Human Resource Studies at the School of Industrial and Labor Relations, Cornell University entered into the first three-year Joint Project with IBM corporation to bring personal computer (PC) technology to the human resource classroom. This paper summarizes the goals and implementation progress of this Joint Project, its evolution into a second three-year phase, and its effects on students, faculty and the School in general. The project now serves as a prototype for eight similarly-structured projects at business schools and industrial relations centers including Michigan State University, Purdue University, Rutgers University, University of Illinois, University of Michigan, University of Minnesota, University of South Carolina, and University of Wisconsin. This description will be useful to those contemplating the introduction of PC's into industrial relations and human resource management programs at colleges and universities.

The Purpose of the Project

In the early 1980's the faculty of the Department of Personnel and Human Resource Studies at Cornell University's New York State School of Industrial and Labor Relations began to see the inevitability of the reliance on PC technology by human resource management (HRM) and industrial relations (IR) professionals. The increasing pace of change, increasing globalization, greater recognition of the importance of HRM to achieving competitiveness, increased desire for new forms of industrial relations, and increased demands for accountability by professional managers of the employment relationship were combining to change the nature of HRM and IR. The future would require HR managers to work with less resources, but to accomplish more. Industrial relations centers and some business schools generally provided little training in computer technology, and the entire area of automated human resource information systems was in its infancy.

In September, 1984, IBM corporation, through the office of Walton E. Burdick, then Vice President of Personnel, agreed to jointly support an experiment to determine the effects of introducing PC technology into the HRM and IR classroom. Cornell's Department of Personnel and Human Resource Studies and the School of Industrial and Labor Relations was chosen for the experiment because of it was the only school of its kind containing 50 faculty devoted to studying the employment relationship, with 10 of these faculty comprising the Department of Personnel and Human Resource Studies. The School's degree programs encompass 640 undergraduates and 100 graduate students, and offer as many as 20 introductory and advanced elective courses in human resource management every semester. The Joint Project would be coordinated by the Department of Personnel and Human Resource Studies, in cooperation with IBM executives.

The Joint Project set the following six goals:

1. Evaluate the PC Network Concept as an ILR Teaching Environment
2. Evaluate the HRM Applications Implemented on the PC Network
3. Evaluate System Performance Relative to HRM Subfunctions, User Knowledge, and HRM Course Content
4. Evaluate Student Use of the PC System Over Time and Experience
5. Evaluate PC Usefulness for HRM Data Collection and Analysis

6. Evaluate How PC's Affect the ILR School

Year One: Initial Implementation

Physical Implementation

The first semester of the project involved initial set-up and design activity. The School provided classroom space. The original design included two general types of computer-based installations. The first was a decentralized set of installations placing computers directly in faculty offices. Faculty were chosen based on their commitment and written proposals to develop classroom-based materials relevant to the six goals of the project. We have found that faculty develop research and educational materials more readily when they have access to the PC as a tool in their offices.

The second type of installation was the ILR-IBM Personal Computer Learning Laboratory. This facility was housed in a former classroom, and thus was readily accessible to students. Faculty, students and the School's existing computer consultants worked together to set up 18 workstations consisting of IBM PC's with dual floppy disk drives, 512 kilobytes of RAM, color monitors, and graphics printers. These 15 workstations were linked in a local area network using IBM's first network software, "PC Cluster." Though rudimentary by today's standards, even this early network arrangement proved valuable because it allowed educational applications to be "served" from a central PC which was maintained and monitored by the staff of the computer laboratory. This greatly reduced the need for distributing floppy disks with software, and thus enhanced reliability and security. The network concept also enabled the lab to create a standard menu that would appear whenever students started up the machines. This menu not only gives students an immediate road map, but it lists all of the applications available in the laboratory. Even novice computer users found that they could quickly start up and run the applications easily using this menu system. Because the menu system is centralized, it is also easy to update and change the applications by simply storing them on the central file server.

The laboratory was staffed through the offices of the School's existing group of computer consultants. These consultants had previously been primarily concerned with assisting faculty and graduate students in their use of mainframe computer statistical packages. They quickly became familiar with the PC technology, set up and organized the arrangements for laboratory staffing and security, and then hired part-time students to staff the laboratory. The lab is available from roughly 8:00 AM to 11:00 PM. When necessary, software manuals (but not software disks) are available on two-hour loan as library reserve books, through the Martin P. Catherwood library of Industrial and Labor Relations, housed in the same building as the ILR School.

"Personal Computer Applications in Human Resource Management" Course

With the laboratory up and running in the Fall of 1984, a primary objective for the Spring semester of 1985 was to begin the educational activity in the classroom and monitor its progress and effects. The first course we developed was called, "Personal Computer Applications in Human Resource Management". The objectives of this course were formed through interviews with leading executives, as they responded to the question, "What would it mean to you to be able to recruit 'computer-literate' human resource professionals?"

The executives' answers to this question suggested the following guidelines: (1) While understanding programming logic is important, we do not need individuals who simply have learned a variety of programming languages; (2) The key qualification remains thorough analytical training in theories and processes of human resource management; (3) A computer-literate HRM professional will identify goals and tasks using analytical skills, but will know enough about computer tools to apply them in ways that enhance job and organizational performance; (4) Rather than requiring specialized software and hardware, the most useful professional will be able to use readily-available configurations of PC's with standard generic software packages.

Based on these findings, we designed the first PC course to be an upper-level elective, with enrollment available only to seniors and second-year graduate students who had completed statistics,

basic personnel management, and at least two elective courses in a specialized HRM elective (such as Compensation, Staffing, Training, Planning, and Cost-Benefit Analysis). Thus, the students in this first class were already highly-qualified professionals, and the class was designed to give them the generic computer tools needed to bring computer literacy to their professional preparation. The one-semester course was divided into two parts--the first dealing with LOTUS 1-2-3, a spreadsheet software, and the second half dealing with Dbase, a widely-used relational data base management software. Each half of the course was devoted to about four weeks of intensive instruction in the software itself, using examples specifically constructed from important human resource management issues. Following this intensive training, students groups were formed, with each group tackling a different human resource issue of the group's choosing. The objective of the group project was to construct a menu-driven program using either Lotus or Dbase, that addressed a realistic HRM issue, and that could be used by a novice computer user. Groups produced not only program applications, but also detailed technical descriptions of the program and User's Manuals designed for hypothetical future users.

Results from this class have been unexpectedly sophisticated. Student applications frequently rival those available from consulting firms and software organizations. Over the six-year project, this class has evolved into a "live case" format, in which the student groups work with representatives from leading organizations to identify and design their programs. The resulting programs often become prototypes for actual tools used by those organizations. Students report that they use their "portfolio" of classroom-developed computer applications in interviews, just as an architecture or art student might bring a portfolio of their work. The response from recruiters was enthusiastic from the beginning, and students who have experience in this class continue to command attention and attractive offers from organizational recruiters.

Developing PC Applications in Other Classes

Faculty in the Department of Human Resource Studies, and in other departments within the

ILR School, began developing computerized educational applications in "Compensation," "Human Resource Planning," "Cost-Benefit Analysis for Human Resource Management," and "Staffing". Such applications are most effective when they proceed from clearly-defined analytical models, and when they are used to enhance understanding of topics which would otherwise involve tedious and time-consuming mathematical computations. For example, using merit increase grids to express policies related to incentive compensation is a standard concept in virtually every compensation course. Fully understanding the concept requires the recalculation of a matrix of salary increase percentages applied to samples of workers with varying performance and salary-grade positions. Ordinarily, instructors must settle for describing the process in general terms, or assigning the computations as homework. Either way, students tend to become distracted by the effort needed to keep the computations accurate, and may lose sight of the important theoretical and policy principles underlying such grids. The personal computer can accomplish the computations quickly, allowing the students and instructors to put aside the computational worries and concentrate on the important learning objectives.

Overall Effects on the School

After only one year the dramatic effects of injecting PC power into the HRM curriculum were apparent. Faculty in other areas began to explore new applications of the teaching lab, and requests increased for hardware and software to develop new applications. Students with as little as one semester of PC experience demanded ever more sophisticated software and hardware applications in such areas as graphics, communications, and statistics. Finally, the School's external constituents such as recruiters, faculty from other schools, students considering enrolling in the program, other schools at Cornell University, etc. became aware of the project and began requesting information on its institutional arrangements and effects.

Year 2: Growth and Enhancement

In the Fall semester of 1985, we began a constant process of upgrading and improving the

project. IBM's commitment to keeping the initiative at the state-of-the-art was invaluable to this process.

Upgraded and Improved Teaching Environment

The computer laboratory was upgraded to include more powerful Local Area Network (LAN) software and hardware, greatly increasing speed and efficiency. Moreover, the arrangements for staffing and running the laboratory were improved as we learned from the first-year experience. Consultant staff was expanded, hours of operation were lengthened, and a more efficient process for tracking student and faculty usage was initiated. Communications capability was added, and an agreement was reached with the Human Resource Information Network (HRIN) providing student and faculty access to this on-line news service. Students could now use the computer to gather facts and background information in preparing their classroom projects. Enhanced graphics capability was added with IBM's *PC Storyboard* and hardware such as plotters and color graphics printers.

Faculty support was also enhanced by providing faculty who were developing new applications with more powerful computers including faster processors and hard disks. It became apparent that faculty who wished to stay current had to advance more quickly than students. Thus, faculty members teaching a class that made use of a particular software or hardware feature would first master it, and then bring it into the classroom. Often, students were instrumental in this process, serving as useful colleagues in the learning process.

Implemented PC Applications in Additional Classes

With the "Personal Computer Applications" class well underway, other elective classes incorporated PC's. Software applications under development in Year 1 became real classroom tools in the second year, especially in elective courses in Compensation, Planning and Cost-Benefit Analysis. These classes encountered some duplication of effort, as students were given the same introductory familiarity with PC's and the laboratory in all classes.

Continued Enhancement of the ILR School's Visibility

Though the initial reaction to the project in the first year had been strong, it was during the second year that awareness began to build rapidly. Large numbers of organizational recruiters now were asking students about their computer literacy. Early graduates, now employed as human resource management professionals, were returning to report on their experience, and their employers were now returning in an effort to increase the number of professionals with these skills. We began to assist others interested in developing their own program in this area. Presentations at National meetings as well as at specific schools helped to spread the word.

Year 3: Consolidation and Integration

By the Fall of 1986, the final year of the project agreement, it had become apparent that PC's and computer-based instruction were a necessary and permanent part of the HRM and industrial relations curriculum. Activity focused on consolidating what we had learned into an institutional arrangement that could be maintained over the long term.

The PC-Based Human Resource Management Curriculum

The unique educational opportunities afforded by the PC in virtually every HRM function convinced us that we needed to incorporate the use of PC's throughout the HRM curriculum in the ILR School. We had already developed the capstone elective, "Personal Computers Applications in Human Resource Management," as well as software applications on the PC to support most electives, such as "Compensation," "Human Resource Planning," "Human Resource Information Systems," "Cost-Benefit Analysis" and "Staffing." Students needed strong introductions to PC-based thinking earlier in their academic career, and a focus on PC education throughout.

The "PC Basics" Class

To alleviate the need for all professor to teach the basics of computers and the use of the computer lab, we initiated a half-semester course in "PC Basics for Personnel Management." The objectives of this course were to bring an understanding of PC's and the use of the ILR-IBM PC

laboratory to entering undergraduate and graduate students. Like a basic course in statistics, "PC Basics" is a required prerequisite for all upper-level HRM electives. This class builds student awareness of PC's and comfort with rudimentary spreadsheet, data base and graphics skills. Every upper-level elective can now assume students have a foundation in PC skills, just as such courses have required a basic foundation in statistics or economics for many years.

Specialized Software for Introductory Personnel Management

Students in introductory HRM classes had expressed interest in PC's as managerial tools. However, the software we had developed in our classes was simply not suitable for introductory students because it dealt with specialized topics or required high-level computer skills. During 1986, we developed several mini-cases based on a menu-driven Lotus spreadsheet system that was simple enough for even novices to use, yet addressed issues common in introductory classes. These cases eventually were published as an educational supplement available to all professors, *PC Exercises in Personnel and Human Resource Management* (Boudreau & Milkovich, 1988). This provided an initial PC-based experience to students with no previous training in either PC's or personnel management. The exercises motivated students to gain further skills as they progressed through our curriculum.

Expanded Use of PC's Throughout the Curriculum

Virtually every course offered through the Department of Human Resource Studies now featured a PC-based component. Thus, students would first use PC's as part of their introductory course. Then, they would take the "PC Basics" course. Their elective courses, such as "Compensation," "Human Resource Planning," "Human Resource Information Systems," "Cost-Benefit Analysis" and "Staffing," each uses specialized PC exercises illustrating how PC-based analysis enhances HR manager's productivity. Finally, the capstone elective, "PC Applications to HRM" offers the opportunity to develop advanced programming, spreadsheet and data base skills. Students develop realistic PC-based tools addressing important human resource issues. The

specialized software for "Compensation" was published as an educational supplement, *Salary Survey Analysis Package* (Milkovich & Associates, 1989). In addition to the use of PC's in courses offered by the Department of Personnel and Human Resource Studies, professors in other departments of the ILR School had begun to develop their own applications. Students used PC's to understand the financial implications of personnel policies, to evaluate group interactions, to calculate costs of labor contracts, and to apply statistical diagnostic techniques in multiple regression.

PC's as Integral Parts of the ILR School

With PC's in the educational environment, their use as research tools also grew. Virtually every professor was using PC's for word processing, mainframe connection, and PC-based data entry and statistical analysis. As faculty adopted PC's, it was imperative to provide compatible PC's to secretarial and other support staff. Thus, what had begun as an educational experiment had become a catalyst to advance the School into the PC age. Articles appeared in leading newsletters and magazines (e.g., Smith & Boudreau, 1987).

Phase 2: Extending the Cutting Edge

The first joint agreement contract with IBM expired in August, 1987. The project's success clearly argued for continuing the relationship. A new contract was established on the foundation of the first three years. The new agreement continued the process started with the first contract, but encompassed new technology, and extended beyond the classroom to the ranks of practicing executives. Thus, the new project equipped the School with PC's and software based on IBM's new PS/2 concept. The project's goals included:

1. Study how the PS/2 technology can be adapted to the P/HRM function.
2. Evaluate hardware and software for applicability to the P/HRM area.
3. Develop sample materials using PS/2 technology to demonstrate its ability to increase P/HRM effectiveness.
4. Explore how P/HRM professionals can best use PS/2 technology in their work.

Year 4: Enhanced Technology and Expanded Outreach

The fourth year of the project saw the renovation of the PC laboratory by the ILR School, to incorporate PC-compatible lighting, electronics, carpeting, projection systems, climate controls and furniture. Into this laboratory was placed 24 PS/2 "Model 60" workstations, linked together using the IBM Token Ring Network, and connected to a PS/2 Model 80 file server. This dramatically enhanced the efficiency and friendliness of the laboratory and contributed to a large increase in its use. With the new equipment and software, existing classroom tools were upgraded, and new ones developed in virtually every area of human resource management.

The Center for Advanced Human Resource Studies

During 1987, the ILR School established the Center for Advanced Human Resource Studies. This organization, contained within the ILR School and affiliated with the Department of Personnel and Human Resource Studies, provides a partnership between researchers studying HRM issues and practicing professionals using research to improve personnel management. Though not exclusively devoted to PC's and PC-based activity, the Center nonetheless embraced the automation in HRM as one of its primary research endeavors. With more than 30 corporate members from Fortune 100 companies, the Center provides the opportunity to bring the fruits of over three years of educational development to executives.

Specialized PC-Based Executive Classes

Several courses were developed and offered to executives. All emphasize analytical understanding of the competitive advantage offered by human resource management. The computer is a tool in the hands of HRM executives, and one vehicle through which they can attain a strategic partnership in the organization. Tools and techniques first developed through university student education were now adapted and applied to provide unique learning opportunities for practicing human resource executives. The classes were conducted in the same laboratory used by ILR students, which required that they be offered during periods when classes were not in session.

Development of Compensation Training with the American Compensation Association

A team of ILR professors, Sara Rynes, Barry Gerhart, George Milkovich and John Boudreau developed the first PC-based executive training course in compensation, in partnership with the American Compensation Association (ACA). The course uses a comprehensive series of menu-driven Lotus spreadsheets that illustrate the relationships between compensation decisions involving pay level, pay form, pay structure and benefits. Once again, the learning principles embedded in this course were first established through classroom-based instruction with university students.

Year 5: Extending Beyond Cornell**Prototype for Projects at Other Universities and in Other Disciplines**

The 1988-1989 academic year saw the project's successes lead to replication at other major universities. Using the model developed at Cornell's ILR School, IBM created the University College Systems unit whose mission was to extend such projects to eight other U.S. universities with ILR centers or business schools. The eight centers were Michigan State University, Purdue University, Rutgers University, University of Illinois, University of Minnesota, University of South Carolina, University of Michigan, and the University of Wisconsin. Each school has developed its own unique set of objectives, and is in the process or has already established student and faculty PC-based workstations and laboratories. In addition to the ILR-related projects, IBM has also used this model to establish similar joint projects with leading university centers in other key disciplines, such as the Rhode Island School of Design, Cornell's School of Hotel Administration, and the University of Missouri School of Journalism. Technical and academic coordinators at Cornell's ILR school have actively assisted these schools by providing information and documentation describing the Cornell experience.

The ILR-IBM Extension Executive Computer Education Laboratory

Also in Year 5, Cornell's ILR School established the first executive computer education

laboratory exclusively devoted to the field of industrial and labor relations. This laboratory is similar in its configuration to the student laboratory established in Year 4, but it is located in a separate building housing the ILR School Extension Division. With its own director, this laboratory will become the focal point for an integrated executive curriculum using computers to enhance HRM and industrial relations. The executive computer education laboratory will build upon what we have learned through our experience with college students, and it will also foster a closer link and partnership between executives and academia.

Human Resource Management Research

Studies of the effects of information and technology on HRM decision making are underway, using the student and executive laboratories to gather and analyze data.

Conclusion and Implications

The ILR-IBM PC Learning Project has produced revolutionary changes in Cornell's School of Industrial and Labor Relations. It has transformed the curriculum, research, and relationships with key constituents. The School now has a PC-based HRM curriculum, ongoing courseware development in several HRM functional areas, and relationships with several major corporations using computer technology to manage human resources. To summarize all that we have learned would be impossible, as the lessons range from the most detailed and technical to the most strategic. However, the following suggestions that may help guide others as they strive to exploit computer technology in HRM and industrial relations education.

1. Obtain strong support from the Dean or other top officials as soon as possible. These projects always involve more resources than originally forecast, and require that the top School and University officials feel ownership and have a personal stake in the project's success.
2. Set project objectives in areas of faculty interest, to assure support and genuine development activity.
3. Choose a project coordinator carefully, preferably a faculty member with a strong interest and experience with PC's, and whose teaching and research interests can make use of computer innovations.

4. Capitalize on the full range of available resources in the academic program. If your program already employs computer consultants, librarians, or other support staff, attempt to get them involved in the project. Try to structure the project so that it fits their needs as well.
5. Construct the educational program to best take advantage of your particular student body's unique training and qualifications. The ILR School has the largest student body and the most diverse set of course offerings in human resource management and labor relations. Our project has been designed to capitalize on these factors, but other programs will identify different factors which they can exploit.
6. Maximize the project's connection to external constituents, including recruiters, other University units, local communities, etc. Though the project's basic direction should remain focused on academic goals, the more its results have implications for external constituents, the more likely it will continue to justify support.
7. Don't expect to reach everyone. There will always be faculty, students and external constituents who simply don't choose to become involved. We have found that it is most effective to create an environment that makes participation worthwhile for most people, and then to let individuals make their own choices.

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