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Summer Faculty Internships: An Attractive Faculty Development Alternative

ABSTRACT: The objective of any faculty development program is to provide an environment, an opportunity for growth and renewal. At Tarrant County Junior College South Campus, an imaginative program has been established as a partnership between the College and local businesses and industries. Since the summer of 1992,computer science faculty members have participated in summer faculty internships in which they are placed in a local organization for six weeks and work along side the computer professionals of that organization day by day. This internship program provides faculty opportunities for reviving technical skills, learning new skills,observing first-hand the impact of the computer revolution, and rekindling the flame of enthusiasm for their profession and discipline. Results of the first two summer programs are summarized and payoffs both to the host organization and to the academic institution are described.

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BACKGROUND

The literature of information systems and computer science education is replete with accounts of real-life work experiences for students. Student-centered programs such as cooperative education and student internships are well documented; an interesting student account of one 'co-op' experience at the Superconducting Super Collider facility near Dallas, Texas is given by Harrison [1]. However, for the information systems or computer science educators themselves, few similar opportunities are described.

For the community or junior college faculty in vocational/technical program areas, the technological aging of skills has become ever more critical as the pace of the computer revolution continues to accelerate. In a rather unflattering evaluation, Kelly [2] discusses the problem of "deadwood" among mid-career community college faculty members. Her treatment of this issue and its possible solutions includes reference to faculty internship programs from the early 1980's. Kelly argues the lack of vitality among junior college faculty may be even more pronounced than at four-year institutions; she identifies the heavy teaching load at a junior college as leaving the faculty virtually no time for direct involvement in their discipline. Both Lee [3] and Hendricks [4] tie the need for an experiential faculty development program to the accreditation guidelines of the American Assembly of Collegiate Schools of Business; Lee's paper is based on experience with CPA internships, while Hendricks reported from a managerial accounting perspective. The requirement to combat, or at least to slow, the rate of technological aging among vocational/technical junior college faculty members seems to be well recognized but not well addressed; we will now describe a recent program that holds promise.

PROGRAM CREATION

At the March 1992 meeting of the Tarrant County Junior College (TCJC) South Campus Computer Science Advisory Committee, an idea for a new faculty development mechanism began to take form. This idea and the resultant program that gave it life were conceived not only to combat the technological aging of faculty skills, but also to allow faculty members to experience first-hand the exploding computer revolution and its impact on local businesses and industries. The Advisory Committee, a group of computer professionals who volunteer to serve two-year terms, was asked by the Computer Science Department to participate in a jointly-sponsored, jointly-funded summer faculty internship program--characteristics that make this program atypical, if not unique. The goals envisioned for the internship were the following:

- To allow full-time faculty to sharpen, to re-hone, their technical skills.
- To place those faculty in an environment where they might acquire new technical skills and knowledge.
- To provide those faculty with opportunities for rejuvenation and renewed enthusiasm for their profession and the discipline of computer science.
- To better acquaint the department with local business and industry, thereby allowing the department to better serve their training needs.

As Driggers [5], Lee, and Hendricks all point out, faculty internships have existed, in some form, since at least 1981; their personal experiences took place in 1981, 1988, and 1990 respectively. While most of the programs described in the literature were typically funded entirely by the educational institution, the TCJC internship is based on equal cost-sharing by the industrial host organization and the College; this arrangement is seen as one opportunity to provide a strong incentive for true partnership. Further, although Kelly's paper focuses on the community college, the literature contains few references to

programs such as that developed at TCJC. In fact, the TCJC program may be one of the first internships for junior college vocational/technical computer science faculty members.

From among the several businesses and industries represented at the 1992 meeting, three expressed an initial interest in the proposed internship program. A few weeks later, in early April 1992 at a meeting between the department and Tandy Information Services (TIS), the data processing component of the Tandy Corporation, arrangements for such an internship were detailed. After two follow-up meetings, and with the full support of TCJC and TIS management, this first agreement was completed. The internship arrangements negotiated with TIS for 1992 (and with Meridian Oil Company for 1993) correlate highly with implementation suggestions offered by Lee and by Hendricks. The general issues they identified as important were addressed in the planning and/or conduct of the TCJC internships, including the following:

- Written objectives for the internship were developed.
- Specific projects were identified, with specific persons to contact, including a senior official to serve as program liaison.
- Confidentiality of data and non-disclosure agreements were executed.
- Periodic meetings were held at which progress was reviewed and problems resolved.

Exit interviews, both oral and written, were completed.

The following specific provisions were included:

- Specific faculty areas of interest would be identified and learning objectives established prior to the start of the internship. To the extent possible, the host organization would then match these areas and objectives in their selection of work unit, supplemental training experiences, and work assignments for the intern.
- The faculty member(s) participating would spend six weeks with the industry host organization, a period of time approximately equal to the length of a single summer term at TCJC. However, the participant(s) would be expected to work a nominal forty-hour week to correspond with the normal work schedule of the host.
- The participants would be compensated at a rate equivalent to the salary they would receive for a full teaching load (six hours) during a single summer term; the equivalence would include both base salary and fringe benefits. Funding of the program would be equally shared by TCJC and the host institution.
- Actual payments to the interns by TCJC and by the host organization would be made through normal payroll procedures (note: the host payment method was changed for the 1993 program participants, as will be discussed subsequently).

One of the primary considerations identified above, the length of the internship (six weeks), represented one of the principal constraints related to establishing the program. Participation in such a program was offered to the computer science faculty as an alternative to summer school teaching. If the program had required a longer period, it is very likely that no faculty members would have elected to participate. The requirement that an intern work a nominal five-day, forty-hour week with the host organization already represented a significant concession, and a real commitment on the part of the faculty participant for whom a nominal summer school term consists of a four-day, twenty- to twenty-five-hour work period. The internships reported in the literature have been of varying lengths. Hendricks program with Caterpillar lasted for five weeks during the summer of 1990. Driggers 1981 experience as a technical writing intern with NCR Corporation was conducted as the equivalent of one-fourth of his teaching load for one semester; therefore, one might logically conclude his period of direct involvement totaled about four weeks. Thus, although the TCJC internship length was constrained by administrative and staffing considerations, it was not radically different from others, and, in our view, was sufficiently long to allow reasonable objectives to be obtained.

THE 1992 INTERNSHIP EXPERIENCE

With arrangements in place, then, the first internships took place during June-July 1992 at Tandy Information Services. Two faculty members were able to participate in this pilot program thanks to the generosity and support of TCJC and TIS. One of the interns was assigned to a Local Area Network (LAN) support group; the second to a retail store support programming unit. A summary of lessons learned and highlights from this first summer program follows. It is important to understand that these lessons were shared with the four other department full-time faculty, as well as with the department's twelve adjunct faculty. In addition, the intern experiences had an immediate impact on the content or pedagogy of several fall 1992 course offerings.

- Network support activities require strong interpersonal skills and solid basic software skills (e.g., knowledge of MS-DOS; Lotus 1-2-3; Microsoft Windows) – perhaps equal in importance with actual LAN knowledge. The majority of trouble calls received by LAN Support were NOT problems related to the network, per se, but rather problems related to machine configuration, system setup, and basic software installation issues.
- The software aspects of LAN Support notwithstanding, persons working in LAN support areas need be knowledgeable of microcomputer hardware both with physical devices and with fundamental concepts of computer organization – especially as related to interrupts, memory management and addressing, and hardware installation and setup procedures.
- The solutions to user problems encountered in the LAN environment are as varied as the backgrounds and prior successes of the LAN support team. On numerous occasions, discussions of how best to resolve a user report yielded not one, but several, guaranteed solutions. The significance of this, we believe, is that there is simply no substitute for experience, experience that can only partially be provided in an educational environment.
- Within the TIS programming unit, emphasis is placed on structured design and programming concepts. The development of large programs needed in industry would be unmanageable and the resultant software unmaintainable if it were not for structured design. Teaching this method of program development is clearly of benefit to local industries who hire our students. In addition, structured program design techniques show students how to break all problems (not just programming) into manageable pieces for quicker and easier solutions. Having seen first-hand the large programs used within TIS, we

can relate better to our classes why structure is of paramount importance.

- The opportunity to work in a networked environment and to develop software at a workstation for subsequent uploading to a mainframe provided valuable insights. When compared to the mid-1970's when programs were designed on paper and punched into cards, the style and programming method of today's environment where programmers sit at a workstation and key in everything they do are very different – and even different from working at a stand-alone computer.
- The opportunity to create COBOL file conversion programs that accessed one or more enormous data sets reinforced the absolute necessity of stressing data validation as an integral part of intro to programming and programming language classes.
- After observing the in-house training classes at TIS, laboratory (programming) assignments have been modified to reflect the pedagogical techniques and styles used. As a direct result of the experience at Tandy, laboratory assignments are now written to include the beginning of a program and/or enough of the pseudocode to get the student started on the right track. By helping the students be more successful in completing these assignments, we are reinforcing techniques and building self-confidence that should allow those students to be more successful participants in the work force.

One procedural lesson resulted from the 1992 experience as well, and has resulted in a modification of the payment arrangements for the 1993 and subsequent programs. The principal motivation for this change was to ensure proper accounting of faculty benefits, especially retirement plan contributions. Rather than have the host organization separately dispense its share of the intern's compensation, it has been determined that all payments should be made by the academic partner, TCJC in this case. Thus, beginning in 1993, the industry host will make a lump-sum payment of its portion of program costs to TCJC for disbursement to the faculty intern through normal payroll procedures.

THE 1993 INTERNSHIP EXPERIENCE

The Meridian Oil Company of Fort Worth, Texas, was approached in the spring of 1993 to be a partner with TCJC for the 1993 internship program. Working from the 1992 experience, arrangements for the summer program were completed with Meridian and one department faculty member selected by mid-May 1993. The internship began immediately after the end of the spring 1993 semester in mid-May and concluded in June 1993. In addition to the faculty program, and as a direct result of the conversations which established the internship arrangements, three South Campus Computer Science students were provided summer employment by Meridian as well. Lessons learned and highlights from the second summer internship program include the following.

- New technologies were experienced first-hand. The following products and tools were used daily: Microsoft's Visual Basic, Windows, and Q+E (SQL query language); Banyan Vines local area network; database servers; file servers; electronic mail; and voice mail. Exposure to other emerging technologies was gained by assisting in projects involving: a DOS/Microsoft C++ system for a pen-based Grid notebook computer; and, a Unix and C++ system for an IBM RISC-/6000 computer. Daily observation and exploration of the host organization provided additional opportunities for familiarization with: OS/2; Knowledgeware (the CASE product); Adabas and Natural; hand-held data collection devices; wide area networking; an automated tape storage and retrieval system; a central help desk for customer support; document imaging on optical disks; and telemetry for automated control and monitoring of an actively-producing gas or oil well.
- The qualities valued by this organization in information systems professionals include, interpersonal skills, communication skills, the ability to learn new technologies, flexibility in changing work assignments, a willingness to help co-workers with a hot project, an understanding of the organization's primary purpose, a commitment to the organization's (and department's) goals, and a sense of humor.
- The management principles widely used throughout the Information Systems Technology Department included, teamwork, multiple assignments to teams, emphasis on training (both managerial and technical), special recognition of outstanding performance, and formulation and use of departmental long-range plans.
- A classroom, with 16 student workstations and one teacher's station with a large-screen monitor (all part of the corporate network), was used to teach an introductory C programming class to ten professionals.
- The three students employed by Meridian each worked in a different area within the Information Systems Technology Department and with differing technologies. Each learned immeasurably and each enjoyed the experience tremendously. They all hope to return to Meridian at the next opportunity.
- The 'immersion' in a proactive, leading-edge corporation after 10 years' absence was a richly rewarding and highly informative experience.

SUMMARY

The jointly-sponsored, jointly-funded summer faculty internship program has yielded real benefits during its first two years of existence, benefits both to the host organizations and to the academic institution. As characterized by Lee and by Hendricks, the general benefits accruing to a faculty participant include:

- Increased respect for, and appreciation of the professional practitioner.
- Increased understanding of the differences between classroom theory and practical implementation.
- Acquisition of up-to-date knowledge for classroom use based on practical examples and actual practices.
- Enhanced status of the intern with peers.
- Improved relations with the business community.

Similarly, both Lee and Hendricks suggest the payoffs to the industrial partner in an internship include:

- Temporary availability of a subject-matter expert, a critic, and an educator.
- Positive community relations and increased campus visibility for the firm and its products.

From the TCJC experience, specific benefits which resulted include the following:

- During both 1992 and 1993, the interns were able to make positive contributions to the completion of current projects of the host. Additionally, during the 1993 program, the faculty intern taught a short course in C programming for the benefit of the host's programmers.
- During the fall 1993 semester, one

section of a C++ programming four-hour credit class was taught at a host facility; the enrollment in this credit class was comprised exclusively of employees of that organization.

- Also during the fall 1993 semester, two professionals (one each from TIS and Meridian) served as adjunct faculty members with the department. One of these developed and presented the first offering of a Visual Basic programming course.
- The three computer science students who participated in the 1993 summer activities at Meridian Oil are all currently employed part-time within the department's computer laboratory complex. Through their direct contact with the 1,200 students currently enrolled in computer science classes, the important and highly significant lessons they learned are being passed along to countless others.
- Most importantly, the three faculty internship participants have returned to their teaching responsibilities with new skills, new insights, and renewed enthusiasm.

CONCLUSION

A summer faculty internship program offers an attractive, rewarding alternative to traditional faculty development activities or summer teaching – for about the same cost to the academic institution. Personal initiative, industry cooperation, and administrative support are the necessary ingredients your institution will need to add – the formula for a successful internship program is that given here.

REFERENCES

1. Harrison, William S. "Co-oping at the Super Collider," *SIGCSE Bulletin*, Dec 1993, Vol. 25, No. 4, p. 50-60.

2. Kelly, Diana K. "Reviving the 'Deadwood:' How to Create an Institutional Climate to Encourage the Professional Growth and Revitalization of Mid-career Faculty in the Community College," Graduate Seminar Paper, Claremont College, 2 May 1990, 53 pages. ERIC No. ED318518.

3. Lee, Patsy L. "Management of an Accounting Practice," *The CPA Journal* 0732-8435, Sept 1988, Vol. 58, No. 9, p. 84-86.

4. Hendricks, James A. "The Company and the Professor," *Management Accounting*, April 1993, Vol. 74, No. 10, p. 47-50.

5. Driggers, Stephen. "An Instructor Internship in Technical Writing," *ADE Bulletin*, No. 83, Spring 1986, p. 46-48.

Authors' Biographies

Elmer Raydean Richmond is an Associate Professor of Computer Science at Tarrant County Junior College South Campus in Fort Worth, Texas. Raydean holds B.S.I.E. and M.S.I.E. degrees from the University of Pittsburgh, Pittsburgh, Pennsylvania, and a Master of Software Design and Development degree from Texas Christian University, Fort Worth, Texas. He joined TCJC in 1982 after a career in the United States Air Force. Raydean is a 1992 summer faculty internship participant. He was one of three nominees as South Campus' Outstanding Teacher for 1994. In both 1993 and 1994, Raydean was selected as a NASA/ASEE Summer Faculty Fellow at the Johnson Space Center in Houston, Texas.

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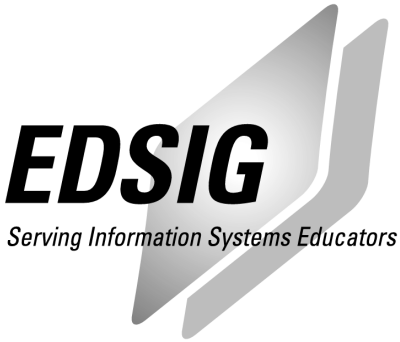

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