Meaningful Information Systems Internships

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ABSTRACT

Internships play an important role within education by providing on-the-job experiences to students prior to graduation. The consensus in the literature is that meaningful internships should be based upon formal learning objectives. However, shortage of information systems workers, especially in rural areas as well as those smaller and start-up companies which have difficulty competing with larger and more-established companies in metropolitan areas, often has resulted in a blurring of the distinction between internships and part-time jobs. Hence, the nature of the internship looses its meaning to employer, intern and school. Forging a thorough, more aggressive plan for information system internships requires considerable effort. Yet such a plan can result in meaningful internships that lead to part-time apprenticeships during college, and full-time post-graduation employment, hence overcoming shortages of information systems workers. This paper presents such a proactive plan successfully implemented by far-sighted enterprises.

Keywords: internships, information technology, cooperative education, partnerships

1. INTRODUCTION

The positive impact of an internship on a new IT graduates's employability and starting salary and the resulting growth in popularity of internships are well documented (Berman 1998, Devier 1999, Mariani 1997, Sovilla 1998).   The ninety-three year old founding principles of cooperative education (Sovilla 1998) stress that the economic impact should be on employers as well as on graduating students. Some employers report more economic impact than others.

Recently popular experiential learning movements in higher education embrace internships and other similar experiences as among the many categories of service learning (Cantor 1995). All such work experiences should focus on learning objectives like all other higher educational experiences. Those learning objectives should blend into the overall set of learning objectives of a complete curriculum.

The fullest potential of an internship results when the internship work experience is an integrated part of a student's total educational experience (Cantor 1995, Jackson 1996, Devier 1999, Mariani 1997, Sovilla 1998). That is best accomplished by integrating a work-based experience into the overall curriculum design of a major program as well as into specific courses.

The very best cooperative learning experiences are those that grow out of formal partnerships between businesses and an educational institution (Jackson 1996, Devier 1999, Sovilla 1998) where expectations and responsibilities of all parties are precisely defined. An intern should know what job duties s/he is required to perform and the intern should be supervised toward fulfilling those job duties. An employer should know how an intern best fits into the business.   Such knowledge increases the meaningfulness of the internship for both student and employer.

One critical psychological state that leads to motivation in the workplace occurs when an individual experiences meaningfulness of that work (Hackman 1980). Those involved with computer-related work, such as system analysts and programmers, have particularly high needs for internal motivation (Couger 1983).

Arguably, students in information systems internships are likely to have the same high growth needs strengths as computer professionals. This author has encountered ample anecdotal experience to support that argument and is in the process of supporting it through an empirical study intended for future

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publication (Carpenter 2003). Hence, the motivational power of clearly-stated expectations for both intern and employer should not be underestimated, as the added meaningfulness should serve to increase motivation.

This paper first sets the context for a case study by elaborating on the challenges facing many internship programs today. That establishes that there is a need for a better approach and that need has been verified by informal interviews by the author with faculty at institutions in similar settings. The article then presents a case study of a successful partnership for information systems internships between one business and a university in a rural setting, which has already served as a model for other organizations. The setting for the case study is presented, including the university program, the participating business and the new approach to internships and apprenticeships (job descriptions are included in the Appendix). Also discussed are the positive impact the program has had on worker retention and the chosen resolution to the question of whether interns should be paid. The article concludes with section describing the transferability of the approach used in this case to other businesses.

2. THE CHALLENGES

Despite those well-documented prescriptions for formally stated objectives and formally-stated partnerships, one observable trend seems to be that many information systems internships do not have those well-designed, integrated objectives. Often, an information systems internship starts as a part-time job for which a student petitions faculty to allow internship credit and, consequently, for which learning objectives are created after the fact. This is a tempting solution in a period of declining enrollments in many institutions, as it creates credit hour production while it satisfies students' requests.

Of course, anecdotal evidence suggests this scenario often leads to either hastily stated learning objectives or no learning objectives at all for such internships. Similarly, but even less often, the objectives that might exist are not integrated into the complete curriculum. Without formally-stated learning objectives, the meaningfulness of the internship is less than what it could otherwise be both for the intern and for the employer.

With reduced meaningfulness comes reduced motivation and, in turn, reduced productivity. Hence, the economic importance of the internship is less to the employer. This perhaps increases the reluctance to participate in future internships for some employers.

There is another driving force for the above scenario that must be considered as it is a self-perpetuating

problem. The shortage of qualified information technology (IT) workers and the resulting escalation in starting salaries is widely discussed. Also known is the brain drain impact on those geographic areas that lack major IT employers. Smaller communities, especially those in rural regions, are particularly adversely affected.

Similarly affected are those small and new companies in metropolitan areas which so not have the same manpower resources as the larger and longer established companies with whom they regularly compete. The industrial revolution question "How you gonna keep 'em down on the farm …?" has given way to the information age question "How is my small business going compete with larger companies without an IT staff?"

Many employers have found that college and even high school students have enough knowledge and skills to install and maintain computer workstations and to connect them to networks. Many high school students also know how to create web pages. Moreover, if they don't yet have the knowledge and skills, they have a fearlessness of failure and a high motivation to learn as they accomplish the task. Hence, small business managers are quick to hire such workers for such tasks. The same is true of many college age students who find themselves working in such computer-related part-time jobs.

Unfortunately, that typical worker does not yet have maturity and experience to assist their employers to use technology to automate many routine business functions or to use technology for strategic advantages. Furthermore, the normal pattern is that those workers depart rural regions for greener pastures upon graduation from high school. Their education has made them worth more than their employers can pay. Hence, employers are left to retrain new part-time workers and the cycle continues.

Many of those students receive internship credit for their efforts. One very common occurrence is for part-time information systems student workers in small businesses to ask college or university faculty if the work they are already performing would qualify for internship credit. Certainly they are learning something on the job, so there is some justification for the internship credit. Both students and faculty have heard or read how participation in internships can increase a graduate's worth in the job market. Consequently, it is easy to comply with the request.

However, in this manner, participating businesses contribute to their own future IT staffing dilemma. By sponsoring such cooperative education ventures, companies assist student workers to become worth more than those same companies can afford. This is especially true in rural regions where wages are

typically less than in urban areas.

Undoubtedly, other factors -- such as the lure of metropolitan areas -- are also part of the mix. However, even those who desire to return to their rural roots after a few years in a large city cannot find viable employment at salary levels to which they have become accustomed. The result is hindrance of the economic development of individual firms as well as rural regions and certain entire states.

Several questions arise from the above scenario. How can this situation be reversed? How can rural employers participate in internship programs that will benefit them more in the long run? What role can such cooperative education experiences play in positively affecting economic development in rural areas? Part of the answer to this dilemma and the rural region information systems brain drain problem might be to rethink the classical approach to internships that is used by many employers in rural areas.

3. A MODEL PARTNERSHIP

3.1 The Setting and the University Program
The University of Nebraska at Kearney is designated as a residential Comprehensive I teaching institution in the predominately rural Central Nebraska. UNK offers several strong information technology programs that attract high-quality students from all of Nebraska and from surrounding states. There is also a large and growing international student population, many who study in the information technology disciplines. UNK's academic programs include management information systems, telecommunications manage-ment, computer science, computer information systems, and multimedia systems.

However, there are relatively few large information technology oriented businesses between Omaha and Denver. Furthermore, there are also very few other organizations with large information technology shops. Firms in the region pay considerably lower salaries for information systems workers than in large metropolitan areas. Consequently, most information technology students leave the immediate rural region after graduation from UNK.

Fortunately, UNK has recently been able to develop a strategy to begin to address this rural region's information technology brain drain problem. UNK's externally-funded Global Sources Information Technology Program builds partnerships with local businesses to use internships and mentoring to improve the lot of students and businesses and to foster regional economic development. An initial goal was to establish a solid partnership with a local firm that could serve as a model for others. The aim was to rethink the way internships are used in the company

so as to create a means to retain student workers as full time employees after graduation. The first partnership was with Kearney-based IntelliCom Computer Consulting, Inc.

3.2 The Participating Business
Dan Shundoff was a typical new information technology worker who left Central Nebraska for the lure of greener pastures. When he chose to return to his roots in Kearney years later, the lack of information technology positions in the region led him to found IntelliCom Computer Consulting, Inc. IntelliCom provides many "information technology services delivered by information technology professionals." IntelliCom began by outsourcing help desk, local area network design and installation, and other technology services to a nationwide clientele, although their primary market is in Central Nebraska.

Intellicom is growing very rapidly. Within the past several months, the company became an authorized agent for that primary local provider of digital subscriber line (DSL) services providing sales, installation and help desk support for a new customer base. Subsequently, that DSL support was expanded to include the same levels of support for all voice telephone services. More recently, IntelliCom has become a value added reseller (VAR) of the full lines of hardware and software products for one of the largest international personal computer manufacturing and marketing firms.

Dan Shundoff attributes much of IntelliCom's success to the model internship program. Indeed, had it not been for interns, his business would not have had the flexibility to grow as it has. Through the years, IntelliCom had hired several UNK students as part-time workers. Many of those part-timers had used their work experience to earn internship credit.

Most of those interns left the company and the region for greener pastures after graduation. It was a great challenge to retaining trained workers. Another great challenge had been recruiting students who had the right level of knowledge early in their university education to make a real contribution yet have enough time left in their college stint to justify the time IntelliCom spends training them.

3.3 A Changed Approach to Internships
After a conversation with the director of UNK's Global Sources Information Technology Program, Shundoff has reorganized his use of interns to better address his company's needs. His first task was to separate the notion of an "internship" from that of an "apprenticeship" and to use more traditional definitions for each. Then, he created five separate and distinct cooperative learning positions through which he can rotate student workers. Each of the five positions has a stated set of learning objectives in

addition to a list of job duties and responsibilities.

IntelliCom now considers an internship to be a specific entry-level learning experience of a short finite term. Students rotate through the positions, remaining only long enough to accumulate the proper number (120) of on-the-job hours to earn three university credit hours for the internship course. During a semester, that could be a matter of putting in ten hours a week for twelve weeks, for example. If a student interns when classes are not in session, the internship might only last four weeks of thirty-five hours per week. Since students know the internship is of a limited duration, they consider it to be a learning experience rather than a part-time job.

Furthermore, there are now two distinct internship tracks in the company. One is a Help Desk Intern who receives and logs incoming phone calls, performs any research needed to more clearly identify the problem, and routes the problem to more knowledgeable and skilled personnel. The other is a PC Support Intern who receives and prepares incoming computer equipment for bench work, logs and researches problems, and performs certain basic repair functions under the supervision of a more skilled and knowledgeable worker. An important function of each internship position is to thoroughly document activities.

Students who have completed only the most basic computing courses can fill each of the two internship positions. The definition of each of the two positions allows a worker to be productive in short order. Hence, even some first year students can and do fill IntelliCom internships.

The number of internships in either category can vary depending on IntelliCom's workload. That flexibility provides scheduling benefits to the company. The short finite nature of the positions allows both student and employer a "try and buy" posture. The very best of the interns may be invited to continue at IntelliCom as apprentices.

Full job descriptions and learning objectives of both types of internships are contained in the Appendix. The reader can note that the required qualifications are minimal for a student to fill those job descriptions. Consequently, interns can be first year students. Learning objectives for the internship course in which the student enrolls are built around the "skills learned" statements in the job descriptions.

3.4 Apprenticeships as Part-time Jobs
After a student has successfully completed an internship, the student might be invited into an apprenticeship position which is intended to teach a student worker a larger portion of the overall business of IntelliCom. After a student has accomplished all

of IntelliCom's training, he will have gained a broad knowledge of the company and its operations. Like classical apprenticeships in other professions, the very best apprentices are likely to be invited to be hire on as permanent full time employees.

Shundoff also defined three distinct apprenticeship positions through which student workers can progress. Each of the positions carries an additional set of duties and responsibilities. The first apprenticeship is a PC Technician Assistant who will shadow an experienced PC Technician working on PC problems on their clients' premises. The apprentice documents the call, thereby freeing the more valuable regular employee to be more productive.

After completing the PC Technician Assistant apprenticeship, a student apprentice can then progress to become a Network Engineer Assistant, who performs in a similar manner. This apprentice also shadows a full-time Network Engineer who works with networks rather than just PCs.

The third apprenticeship is a Project Management Assistant. A student in this position will help PC Technicians, Network Engineers and customers to plan and set milestones for projects and will deliver information and updates to all parties. Documenting the progress of a project will be an important part of the job duties. This apprentice will also conduct any research necessary to support projects.

As stated previously, an IntelliCom internship is for a short finite duration, only long enough to earn the required 120 hours. Conversely, a student who is invited to participate in an apprenticeship with IntelliCom will be required to demonstrate proficiency on stated work objectives, in contrast with the intern who is not expected to demonstrate proficiency. Rather an intern is only expected to accomplish simpler assigned tasks. The length of time that it takes for an apprentice to master a proficiency will vary with the apprentice. Hence, the duration of an apprenticeship will vary.

Each apprenticeship will align more with business cycles rather than the university calendar. A student actually performs as an ongoing part time worker. The nature of the work at hand might enable a student to master that particular apprenticeship in, say, six months. On the other hand, another student in the same apprenticeship might encounter enough experience to master the expected outcomes in a much shorter or longer time. University credit might be available for those apprentices who want to pay tuition and make the necessary arrangements with the faculty.

Full job descriptions and learning objectives of all three types of apprenticeships are contained in the Appendix. Obviously, the required qualifications for

apprentices are greater than for interns. Consequently, apprentices are not first year students. Indeed, each level of apprenticeship might correspond to the next higher level of schooling. If a student enrolls for course credit for an apprenticeship, learning objectives for that course center on the "skills learned" statements in the job descriptions.

3.5 Retention of Interns and Apprentices
Like the best of the interns who will be invited into the apprenticeship program, the best of the apprentices might be invited to become full-time employees after they graduate. There are several reasons to cause Shundoff to think IntelliCom will have better luck retaining those graduating students than they have had in the past.

First, those who will be invited into permanent positions will be "known commodities" to IntelliCom and vice versa. The company will be willing to pay larger salaries as they have already experienced the person's skills, knowledge base, work habits, and work ethic.

The student employees will have gained a sense of contribution to an important effort. They will have full advanced knowledge of the expectations of their new full-time positions. That should result in an increased motivation for the work and a motivation to stay with IntelliCom.

The graduating student who has worked his way through IntelliCom's internship and apprenticeship program will have encountered many customers. That will create bonds between worker and customers and will contribute to the worker's sense of being an important part of the Kearney and Central Nebraska communities. The sense of belonging within a warm personable environment should result in ties that will be difficult to sever.

The apprenticeship program is only a couple years old. In that time, several students are in or have completed the internship and apprenticeship programs. The predictions related to retention appear to be accurate.

3.6 To Pay or Not to Pay Interns
There has been considerable discussion between IntelliCom and UNK as to whether the interns should be paid employees. The classical thought is that, if interns are not paid, their time is less likely to be respected. Both employer and intern are likely to think of an unpaid position as less meaningful. Plus, when supervisors become busy, they tend to neglect volunteer workers.

That had been the experience of internship directors at UNK. Moreover, a majority of students need to work in part-time in order to meet their financial obligations. For all those reasons, internship directors

have found it to be very difficult to recruit interns into unpaid positions.

Conversely, when Dan Shundoff did the budgetary projections for IntelliCom's new internships and apprenticeships, he realized that the program would not be profitable unless the interns were unpaid workers. If interns were paid workers, they would have to be directed to meet current business needs. Since IntelliCom is in a very dynamic business, that would mean that interns would quite often be diverted away from the formally stated learning objectives. If that occurred, the meaningfulness of the academic experience would be less.

Even if it was acceptable to divert interns from their stated learning objectives, there is another problem associated with the prerequisite knowledge and skills levels. As designed, interns do not need much background. If paid, such inexperienced workers are less valuable to be redirected to other tasks as needed. Hence, either the plan would have to be changed to hire more experienced interns or IntelliCom would have to engage in costly training. Both would drive the cost of the internship program even higher. Paying interns simply was not a workable proposition for IntelliCom.

Sensitive to the challenge of recruiting interns for unpaid positions, Shundoff devised a compromise. Students who both need a part-time job and want an IntelliCom internship are accommodated. Similarly, students with tight time constraints in their class schedules are accommodated. In both instances, the accommodation is to allow student interns to work in as short as two-hour shifts with the possibility of multiple shifts in a day. So, a student can put in a shift between classes or on the way to a separate part-time job.

This flexibility has yielded dividends in addition to the obvious benefit to students. Interns now more readily recognize that their IntelliCom internships are truly learning experiences just like any other class. Furthermore, as word of the nature of IntelliCom internships has spread, the traditional challenge of recruiting students into unpaid internships has waned. Indeed, there are now more applicants than positions.

To increase the flexibility for students even more, UNK could provide on-campus cubicles in which students could perform their IntelliCom internship duties. In that manner, a student could eliminate the time required to walk to the car and drive across town. The help desk internships would lend themselves to this approach, while the repair desk jobs would not. From the university's perspective, the cubicles could be used by students in internships with other employers when not in use by IntelliCom interns. To date, this has been discussed but not implemented.

4. SUMMARY AND APPLICATION

Individual components of this UNK/IntelliCom cooperative education model are <u>not</u> unique. Indeed, there is anecdotal evidence that the approach outlined in this article most likely exists elsewhere between other universities and corporate partners. However, it is unique in the way it blends unpaid interns and paid apprenticeships. Also, it is unique for Central Nebraska and probably rare among small businesses in general, and in most rural areas specifically, as well as among small or start up businesses in metropolitan areas. Shundoff's and IntelliCom's contributions have recently been recognized with the Nebraska Diplomat's 2003 Nebraska Business Innovation Award presented by the governor's office.

Potential is high that the knowledge learned from this partnership will be transferable to many other settings, not only in rural areas, but also in metropolitan areas by small companies to more effectively compete. The process begins with discussions among university personnel (MIS faculty or Internship Director) and prospective business partners. Perhaps this article could serve as an information piece for all parties to read to insure that they are talking about a new approach, rather than what has become an easy approach, to internships. Ultimately, personnel from the business must design the job descriptions to fit its operations, while personnel from the university recruit student interns and work on curricular issues. Periodic reviews and evaluations of the partnership are highly recommended.

Indeed, the model has recently been implemented in a relatively similar manner by the local Educational Service Unit, which provides similar help desk and other technical support for the K-12 educational community. Such has been the success of ESU #10, which has a service area that spans several counties centered in Kearney, that the organization has been able to expand its staff to support on a contract basis the clientele of several other ESU's across Nebraska.

Other similar partnerships are in the works. The model has also been used on a more limited basis without the benefit of a formalized partnership. For instance, the local city government's information technology staff now relies heavily on interns for its help desk functions. Those efforts will be discussed in subsequent articles.

The IntelliCom partnership has been very important to UNK's MIS program. It serves as an attractive recruiting tool and an opportunity for students to apply in realistic settings that which they study in the classroom. A step that has not yet been taken is for the internship and apprenticeship experiences to be integrated into the MIS curriculum at UNK. Once the internship/apprenticeship program matures and

expands, that will be undertaken. There must first be a sufficient number of interns/apprentices for the experiences to fill the place of a required course. Meanwhile, the MIS major has been recently modified to include these cooperative experiences as an elective. Also examined has been the potential for the internships to qualify within a potential Microsoft A1 training program as many of IntelliCom's employees do successfully sit for that exam after they have completed the series of experiences described in this article and shown in the job descriptions in the Appendix.

The transferability of this model is proven and its potential is assumed to be great for the right employer and school. The approach outlined in this paper creates meaningful internships both for the employer and for the intern. The meaningfulness results in greater motivation, increased productivity and the enhanced economic impact promised for cooperative education nearly a century ago.

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APPENDIX I: INTERNSHIP AND APPRENTICESHIP JOB DESCRIPTIONS

6a. Help Desk Internship
Position Objective:
Support Help Desk Staff in managing telephone support to users of PC hardware and software.

Qualifications:
The qualified candidate will have strong interpersonal and telephone skills, and the ability to work in a busy environment. The ability to maintain multiple tasks and see them to completion is important.

Prerequisite: None.

Primary Job Duties:
Receive incoming calls from customers. Data entry of problems into Helpdesk application. Provide research support on open Work orders as needed. Maintain documentation for support processes. Other duties as necessary.

Skills Learned:
Customer Service skills. First hand experience with industry leading Helpdesk application. Standard IT practices for reporting, documenting and resolving problems. Standard IT practices for diagnosing and trouble shooting problems. Exposure to business and IT challenges. Exposure to business use of software application suites.

6b. PC Support Internship
Position Objective:
Support PC Repair Staff with diagnostic procedures and problem resolutions.

Qualifications:
The qualified candidate will have some basic understanding of PC hardware and operating systems including Win9x. The ability to maintain multiple tasks and see them to completion is important.
Prerequisite: None.

Primary Job Duties:
Receive and prepare incoming equipment for bench work. Perform repair work as directed by Support Services

Manager. Data entry of problems into Help Desk application. Provide research support. Maintain documentation for support processes. Other duties as necessary.

Skills Learned:
Customer Service skills. First hand experience with industry leading Help Desk application.
Standard IT practices for reporting, documenting and resolving problems. Standard IT practices for diagnosing and trouble shooting problems. Exposure to hardware problems and resolutions. Exposure to standard business application installation and support.

6c. PC Technician Apprenticeship
Position Objective:
Support PC Technicians with onsite troubleshooting and repair.

Qualifications:
The qualified candidate will have strong interpersonal skills and the ability to work in a busy environment. They will also have experience working with PC hardware and operating systems including Win9x. Experience with Microsoft Office 97 or later is a plus.

Prerequisite: Previous Support Services Internship

Primary Job Duties:
Work with PC Technicians to resolve problems at customer premises. Data entry of problems into Help Desk application. Provide research support on open Work Orders as needed. Maintain documentation for support processes. Other duties as necessary

Skills Learned:
Customer Service skills. First hand experience with industry leading Help Desk application. Standard IT practices for reporting, documenting and resolving problems. Standard IT practices for diagnosing and trouble shooting problems. Onsite exposure to business and IT challenges. Onsite exposure to business use of software application suites. Onsite exposure to information technology applied to business applications. Onsite exposure to LAN and WAN technology.

6d. Network Engineer Apprenticeship
Position Objective:
Support Consulting Network Engineers with current customer challenges.

Qualifications:
The qualified candidate will have strong interpersonal skills and the ability to work in a busy environment. They must have a solid understanding of PC hardware and operating systems including Win9x, and basic understanding of networking strategy and protocols. Experience with Microsoft Office 97 or later is a plus.

Prerequisite: PC Technician Apprenticeship.

Primary Job Duties:
Help Engineers and PC Technicians to resolve problem at customer premises. Help deliver information and updates to the customer. Interact with vendors as necessary. Data entry of problems into Help Desk application. Provide research support on open Work Orders as needed. Maintain documentation for support processes. Other duties as necessary.

Skills Learned:
Customer Service and Vendor relationships. First hand experience with industry leading Helpdesk application. Standard IT practices for reporting, documenting and resolving problems. Standard IT practices for diagnosing and trouble shooting problems. Onsite exposure to more complex real world business and IT challenges.   Onsite exposure to more complex business use of software application suites. Onsite exposure to information technology applied to business applications. Onsite exposure to LAN and WAN technology. Exposure to preparation and delivery of customer presentations. Exposure to complex deadlines and project commitments.

6e. Project Management Apprenticeship
Position Objective:
Support Consulting Network Engineers and Project Managers with new projects.

Qualifications: The qualified candidate will have strong interpersonal skills and the ability to work in a busy environment. They must have a solid understanding of project deadlines and dependencies. Experience with Microsoft Office 97 or later is a required and experience with Microsoft Project or Microsoft Visio is a plus.

Prerequisite: Network Engineer Apprenticeship.

Primary Job Duties:
Work with multiple parties to develop solid project milestones. Help deliver information and updates to all parties. Interact with vendors and customers as necessary. Data entry of progress into Helpdesk application. Provide research support on projects as needed. Other duties as necessary.

Skills Learned:
Customer Service and Vendor relationship skills. First hand experience with industry leading Help Desk application. First hand experience with industry leading Project Management software. Exposure to more complex business and IT challenges. Exposure to more complex business use of software application suites. Exposure to preparation of customer presentations and project updates. Exposure to complex business analysis and cost justification processes.

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