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Students As Academic Computer Center Personnel

William Moressi

C. Brown McFadden

The employment of students as assistants and support personnel in academic computer centers is not at all unusual. Not quite so common are students in essential positions. The academic computer center at Winthrop College, Rock Hill, South Carolina, uses students in both essential and non-essential categories. This article discusses issues that need to be considered when employing students in such positions and assesses some of the advantages and disadvantages of the practice.

William J. Moressi is Director of the Academic Computer Center and an associate professor of computer science at Winthrop College, Rock Hill, South Carolina. In addition to his duties as the computer center director, he teaches in the computer science/quantitative methods area and does consulting through the Small Business Development Center at the College. Prior to his three-year association with Winthrop, he was the director of data processing and an associate professor of computer science at Johnson C. Smith University in Charlotte, North Carolina. Dr. Moressi has over twenty years' experience in data processing, four of which included responsibility for an analog computer facility at the University of Illinois College of Medicine. He received his B.S. from the University of Illinois at Champaign, and earned his M.S. and Ph.D. degrees in physiology, with research emphasis in biophysics, from the Iowa College of Medicine in 1963. It was in his analysis of life science data that his interest in computers became manifest.

C. Brown McFadden is currently Systems Engineer in the Academic Computer Center at Winthrop College, where he is also pursuing his M.B.A. He teaches in Winthrop's School of Business Administration and does consulting through the Small Business Development Center. He has six years' experience in process computer systems at Duke Power Company's Design Engineering Department in Charlotte, North Carolina. His background covers networking, telecommunications, robotics, and process control. Mr. McFadden holds a bachelor's degree in electrical and computer engineering from Clemson University.

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The employment of students as assistants and support personnel in academic computer centers is not at all unusual. Not quite so common are students in essential positions. The academic computer center at Winthrop College, Rock Hill, South Carolina, uses students in both essential and non-essential categories. The essential positions are middle-level managerial positions that allow for an interface between an upper level (the director and his associates) and a subordinate level, as well as the community of users derived from the college body: 4,100 undergraduate students, 900 graduate students, 340 faculty, and 400 staff.

The current personnel situation in the academic computer center is a result of a process of evolved, rather than planned, development. The center began in 1978 as a remote workstation to the computer center at the University of South Carolina. Included were key punches, card readers, and printers for remote communications to USC's computers. The primary architects of the center were the dean of the school of business administration and several faculty members from the business and computer science areas. A faculty member, as part-time director, and several very dedicated and highly motivated students undertook the responsibilities of running the center. In an informal manner, these students, under the direction of the faculty member, played key roles in the ensuing development of the center.

Since then, a director and systems engineer were hired on a full-time basis in 1984 and 1986, respectively. All other personnel support is provided by twenty-five to thirty-five students. Except for two MBA candidates in the administrative areas, most of the other positions are staffed by undergraduates. These personnel support the following physical plant:

- a renovated 6,300-square-foot building
- a 32-bit minicomputer with associated communications hardware (modems, data switches, and multiplexers)
- over eighty stand-alone microcomputers
- three Local Area Networks (LANs) with over eighty-five nodes
- mainframe access (interactive and batch) to the University of South Carolina

The LANs are primarily used in the teaching of business and computer science courses that range from computer literacy through such advanced courses as graphics and computer networking. While other departments on campus use microcomputers in their academic programs, computer center systems are intended for the general purpose of academic computing by the college.

Service To Users

In serving the information resource needs of students, faculty, and staff, the academic computer center functions to:

- sustain the operational integrity of all information systems under the computer center's direct control
- assist users in determining computer terminal requirements and compatibility with existing systems
- assist users in defining and evaluating the feasibility of new time-sharing, data transmission, and data capture applications on computer center systems and the systems with which they communicate
- assist users in resolving system-oriented operational problems
- assist users in system-oriented programming requirements

Except for regularly scheduled down time and emergency situations, host computers are operational twenty-four hours a day. Building access by users is daily for a total of eighty-three hours a week. However, those access hours are extended beyond the eighty-three towards the end of each semester. Operator duty hours for the host system are sixty hours a week and for the microlab LANs are sixty-three hours a week. One LAN, located in the academic computer center building, is available for walk-in access on evenings and weekends.

The level of computer center services that users currently enjoy would not be available without the employment of students in both essential and non-essential positions. Several prominent issues that need be considered when providing computer services to users under these conditions are student personnel resources, duties, training, and compensation. These issues, together with an assessment of the advantages and disadvantages of employing students in the academic computer center, are discussed in the remainder of this article.

Personnel Resources

The organization chart in Figure 1 describes the structure by which personnel effort is coordinated in performing the above functions. A three-level hierarchy allows for effective vertical and lateral communication. As may be seen from the illustration, some student positions are held at Level 1. Levels 2 and 3 are supported entirely by students. Student managers at Levels 1 and 2 are considered to be in "essential" positions.

On many occasions, students are also hired for technical support for such special projects as the development and ongoing maintenance of a policies/procedures/guide manual or for minor diagnostic evaluation and maintenance of microcomputers. Technical support students are hired under Level 1 positions and are considered non-essential.

Personnel Duties

A brief description of the duties of each position follows. Italicized titles are those positions held by students.

Level 1

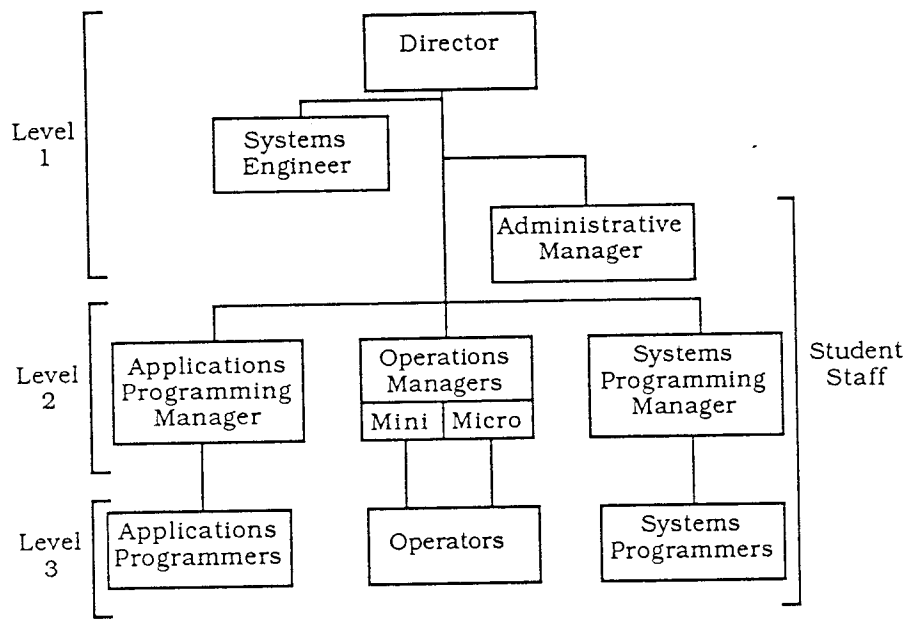
The director of the academic computer center plans, organizes, actuates, and controls activities of the computer center in coordination with appropriate administrative officials. The director reports to the dean of the school of business administration.

The systems engineer maintains the operational integrity of all information systems under computer center control.

"Ordinarily, applications programmers are not kept on staff, but hired from a pool of computer science undergraduates for specific projects."

Figure 1

Academic Computer Center Organization Chart



Evaluation and installation of systems and application software and hardware are also prime functions of this position.

The *administrative manager* assists the director in the management and control of the daily administrative operations of the center. Duties which directly involve the administrative manager include hiring student employees, maintaining inventory and budget records, preparing material for annual reports, and processing equipment and supply requests for purchase. Two MBA candidates jointly fill this position, each on a part-time basis. Their work periods are scheduled to cover most standard business hours, with some overlap for a coordination of their activities.

Level 2

The *applications programming manager* is responsible for developing, maintaining, and updating in-house code and for code conversion. The applications programming manager, in coordination with the director and systems engineer, supports users in their development of code and supervises applications programmers. Maintenance of an applications programming manual is the responsibility of this person.

The two *operations managers* oversee microcomputer facilities and the remaining general operations of the computer center, including the host system. Each operations manager hires, supervises, and trains (with the assistance of the systems engineer) ten to fifteen operators. Minor maintenance is also performed on equipment and notice given to the director or systems engineer when equipment failure occurs. Maintenance of an operations manual is the responsibility of this person.

The *systems programming manager*, in close coordination with the systems engineer and director, is responsible for day-to-day maintenance of the host system's integrity. Responsibilities include development and maintenance of system macros, installing updates to system utilities, and monitoring system performance. Maintenance of a systems manual containing listings of systems macros and procedures is the responsibility of this person.

Level 3

Applications programmers, micro-system and host-system *operators*, and *systems programmers* are Level 3 personnel. Ordinarily, applications programmers are not kept on staff, but hired from a pool of computer science undergraduates for specific projects. They are usually assigned to a user and work in close coordination with the applications programming manager. Micro-system and host-system operators perform such duties as keeping scheduled hours for user access, taking supplies inventory, performing minor maintenance such as changing paper and ribbons, noting systems and terminal problems, and performing back-ups. On occasion, a systems programmer is employed to help in reviewing space usage on the host system, reviewing unused or undocumented macros, and performing other similar functions. This person is usually selected from the pool of host-system operators.

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Student Training

Training for student managers is provided by both the director and the systems engineer and occurs in both structured and extemporaneous sessions. When outside consultants are provided for special services, student managers are encouraged to attend as observers and, at times, as participants. Staff conferences/training sessions are conducted every two weeks with required attendance for all managers.

Structured sessions for administrative managers are conducted primarily by the director and concern the use of computer software tools such as data base, spreadsheet and word processing to control such internal processes as budget, inventory control, and personnel. The systems engineer assists and trains the administrative managers on computer hardware, terminology, and microcomputer software installation. The administrative managers confer with the director on a day-by-day basis on computer center operations and upon completion of assigned projects.

In much the same way, Level 2 managers meet with the systems engineer. At a specified time each week, host systems are taken down for minor maintenance and updates. The systems engineer discusses operations before the scheduled down time and allows the student managers to perform the tasks under supervision. These student managers also meet with the director on personnel and policy matters.

Level 3 training is conducted primarily by student managers. When a classroom type of session is planned, all personnel are required to attend as their academic schedules permit.

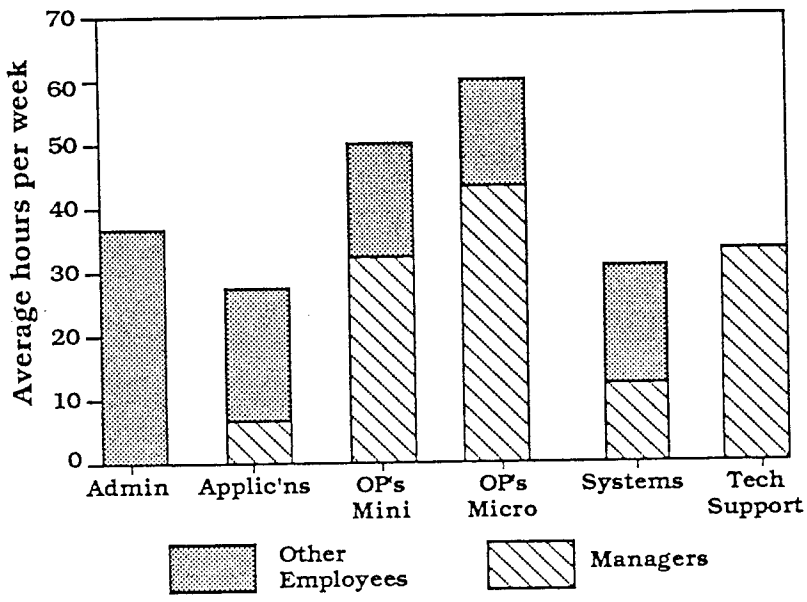
Student Compensation

Student compensation is in several forms: training on a personalized basis, access to special facilities, and monetary stipend.

Student employees are provided with a considerable amount of personalized training and assistance. They are given real responsibilities and provided with as much free rein as possible. Some student employees find cooperative positions in industry, which are joint ventures between the school and the corporate world. They are eager to add to their resumes their training and experience with both the computer center and external agencies.

All student managers have office facilities with no more than two students per office. Each office has desks, supplies, a telephone, and a computer terminal or microcomputer. Student managers are expected to be at the computer center as much as possible beyond their scheduled hours. These facilities make it conducive for them to stay at the center. Student personnel other than managers share facilities and have a faculty/staff conference room in which to work when off duty. Special network and host system accounts also are provided for computer center personnel for work-related usage.

Figure 2



Because student pay scales are necessarily low, monetary compensation is not the major incentive for students. Four grades of pay exist in the following order:

- MBA-candidate administrative managers (Level 1)
- undergraduate student managers (Level 2)
- technical support and student manager trainees
- applications programmers, operators, systems programmers (Level 3)

Total student hours for the fiscal year of 1986/1987 are 12,256 hours. Figure 2 illustrates the student hours per week by personnel area averaged over fifty-two weeks. Values in the figure vary from semester to semester.

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Assessment

The following discussion is an assessment of the more obvious advantages and disadvantages of employing students as personnel in the academic computer center. The primary focus is from the perspective of the institution/computer center, but implicit in the remarks are assessments from the student perspective, as well.

Disadvantages

Consistent, high turnover of trained personnel. On the average, a trained student employee of the computer center graduates after the first or second year of experienced service. The heaviest impact on the computer center is from Level 2 (undergraduate managers) and technical support personnel. It is to this group that the greatest concentration of effort, time, and resources is expended by upper (Level 1) management. Thus, two to three years of providing experience, training, and resources are usually input for one to two years of service.

Long academic vacation-time absences. For students who attend school throughout the year, long vacation times (such as Christmas holidays, spring break, and the break between the last summer session and fall semester) are welcome reliefs to the academic rigors. To those also employed in the computer center, they are especially welcome. However, during these occasions, many faculty and staff make rigorous use of the computer facilities for research and "catch-up" report writing, and the computer center uses these times for updating system and application software. Level 2 (student managers) and technical support people are those most needed but are usually those most in need of a vacation. Student vacation times cannot be staggered to allow for some knowledgeable staff, other than the director or systems engineer, to be present during the academic holidays. This is a fixed disadvantage, one that results in a great deal of pressure on the non-student staff during these times.

Priority conflicts with students' academic programs. At the least, it is a difficult task to schedule a student's classes for the semester. It is doubly difficult to intersperse work hours. For both micro-system operations and host-system operations, fifteen to twenty students' hours must be scheduled to fill the operating hours of the computer center. When changes are made to the student operator's schedule, changes usually have to be made in several other schedules to cover the released time periods. Other events such as mid-semester and final exams, class outings, and campus social activities also disrupt operating hours. Although students are required to work among themselves to cover absent hours, they find it very difficult to find someone who doesn't have similar time commitments. These and other conflicts require constant work schedule refinements.

Student peer-related problems, especially for managers. Students invariably face a great deal of peer pressure with respect to potential loss of emotional and social support. This pressure becomes especially prominent when they are "removed" from the student body and placed in positions of authority as managers (Level 2) by the college administration—in this case by the director of the academic computer center. In these positions, they delegate responsibilities and enforce computer center policies. Reporting fellow students for infractions of computer center policy and recommending dismissal for student operators who are not performing their assigned duties responsibly are two major actions which result in a loss of peer support. Yet it is in this capacity that a maturing process evolves in the students.

External faculty/staff pressure for job favors. As a result of their respective roles in the academic environment, faculty and administrative staff have power to influence transactions without direct authority. This is acutely sensed by the students. Students, especially high achievers, are under constant stress to perform well academically for good grade point averages, letters of recommendation, and a smooth academic process to graduation. On many occasions, student employees in responsible positions in the the academic computer center are asked directly by faculty and staff to give their jobs priority, perform functions without work requests, or undertake other tasks not entirely consistent with computer center policies and procedures. Although it is not always intended, the student employee may feel under pressure to grant the "favor." This perceived pressure can negatively affect students' attitudes towards their roles in the computer center and affect their performance.

Student lack of professional and diverse experience. Most students starting their freshman year of college have little experience in the business world and are tempered neither psychologically nor behaviorally as professionals. What experience they may have obtained has been from a part-time job during summers or the school year, on which occasions they were treated as part-time student help. Modifying their behavior to reflect an attitude of functioning as a professional in a business environment is a difficult task—one that is not always accomplished.

Difficulty in obtaining documentation. Students tend to resist developing documentation, and when documentation is first produced, it is usually comprehensible to only the student who wrote it. It is, at times, difficult to get students who are experienced computer users to write for those not so computer literate. Documentation is eventually produced, but not without great persuasive efforts. (This particular disadvantage is not unique to student employees—many non-student technical workers may exhibit the same deficiencies!)

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Advantages

Savings for the center. The budget line item for personnel in many computer centers is a significant recurrent expenditure. In Winthrop's circumstances, where the computer center is in the developmental growth phase, funds for additional personnel are not yet available. Students are compensated at lower wages than full-time professional staff because of their lack of training and experience and part-time status. The use of student employees reduces or, at least, stabilizes personnel costs. Fringe benefits are not paid to student and temporary help, providing for even greater savings.

Employment/training opportunity for students. Particularly for students who plan to enter the field of data processing, but even for those who are planning other professional careers, the opportunity to learn a variety of information technology and management skills in an actual "workplace" is an invaluable experience. In addition, the work experience gives the student an edge when seeking employment upon graduation. It is not only an advantage to the student, but a plus for the institution to offer this educational experience to its students.

Fresh outlook, enthusiasm and driving interest of students. Most students who decide to work in the academic computer center are intensely motivated by gaining more access to information technology available to them. Some students have had some exposure to microcomputers through secondary school education or to computers at home or through friends and associates. Whatever their original sources of exposure and interest, they have not formed any organizational resistance. The students are eager to spend whatever time they have available learning and working on the systems, and they bring a refreshing enthusiasm to their responsibilities.

Student living quarters in close proximity to the computer center. The majority of student personnel live directly on or in close proximity to the campus. When emergencies arise in the computer center and staff must be called in for support, the ability to access personnel is enhanced. Also, many students have class and work schedules spread over the entire day. Living close to the computer center allows them flexibility in their schedules. Thus, it is mutually advantageous for the student employees and the computer center to be located close to each other.

Large local pool of potential new employees and replacements. There is always a large number of students available from which employees may be selected. In many cases, faculty in computer science, physics, mathematics, and business are asked to recommend special students who show a great deal of industry in their study habits and an interest in computer systems. However, employee search activity is not limited to these areas. Students majoring in English with an interest in technical writing are also considered prime candidates for technical support personnel. Hence, the academic environment offers a substantial pool of potential high-calibre student employees with multidisciplinary interests.

Conclusion

In circumstances of limited resources, there is no question that the advantages of using students in essential and non-essential positions in the academic computer center far outweigh the disadvantages. At Winthrop College, without student managers, Level 1 personnel would have extreme difficulty in coping with the many users of the facilities and numerous operators within the center. This would detract from the functions the director and systems engineer must perform by way of planning, evaluating, developing, and implementing computer center tasks.

Furthermore, it has been the experience at Winthrop that the quality of the work performed by student employees in the academic computer center at all levels, in both essential and non-essential positions, has been very good, in spite of some of the disadvantages described above.

Even without budgetary constraints, a strong argument for student employment as described in this article is the tremendous opportunity it affords students—primarily in the form of access to facilities, training, and experience. There is a great deal of satisfaction and pride when a computer center student graduates and enters into a highly desired position in graduate school, industry, or government. At Winthrop, there is a tendency to feel that the student's experiences in the academic computer center played a major role in his or her successful venture. For example, recently the director was interviewed personally by a personnel officer relative to a student's ability to work with and manage or direct people in a special career program. When information on the student's management role in the computer center was provided to the interviewer, the student was chosen for the position.

In the final analysis, when considering the employment of students as academic computer center personnel, each institution must weigh the relative advantages and disadvantages within the framework of its own mission and needs.

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