Assessing the Benefit of In-House Work Experience for University Students

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ABSTRACT

The Department of Management Studies, (DOMS) has had a Computer Laboratory for a decade. DOMS IT environment has become increasingly complex. From having less than 20 standalone PCs and workstations in 1991, the Lab evolved to have responsibility for a departmental network of roughly 100 computers by 1999. This network is a subnet on the Campus WAN. Further, the Lab staff of 1996, undertook to network the entire Faculty of Social Sciences. Grossly understaffed, with only a Computer Lab Manager and one full-time Computer Lab Technician to serve a minimum of 3,000 students, 50 academic and administrative staff members; student computer lab technicians (LTs) have been relied on over the years, to research, install, configure, design, build, repair and maintain computers and network infrastructure. The increasing dependence of staff and students on computer technology has increased the demands made on LTs. LTs have benefited by effectively serving as apprentices for a range of IT positions. This brief paper reflects on LTs experience discussing:

1) Whether LTs felt they had an advantage in the job market because of this work experience.
2) A bid to award LTs academic recognition for their work.
3) LT recruitment to ensure that those most likely to thrive in the environment are selected.
4) The relationship between academic performance and performance as a LT.

Keywords

Student apprentices, computer labs, academic recognition.

1. AIM

To demonstrate the value of the paid work experience to undergraduates in terms of what they learned by means of the study case of Department of Management Studies (DOMS) student computer lab technicians (LTs) at the University of the West Indies (UWI).

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2. METHOD

I have collated the views and opinions of over 30 past University students who served as computer LTs over the period that I myself have been Computer Lab Manager between 1991 and 2000.

The questionnaire solicits the views and opinions of ex-LTs who held this position, typically while reading for a degree, for an average period of 2 years. However, the significant number of returns and the spread over time help to ensure the relative robustness of the collated data. Whilst there are some in-built subjectivity, I believe that the data is sufficiently reliable to provide a picture of general trends. Further, as the supervisor and project instigator I am reasonably well acquainted with the scope of their acquired technical abilities and related skills during the time they worked in the Lab.

This brief paper focuses on what LTs felt they learned while working in the Lab. Rather than attempting to tackle all the issues this study explored as listed in the abstract, this short article drew upon one sub-set of questions in the questionnaire. Namely, consideration of what ex-LTs believe they learnt from their Lab work experience coupled with their own assessment of the effect that has had on their careers since. This summarily addresses the first question as to whether LTs may have acquired useful skills suited for positions in the information technology (IT) job market, and secondly, if so, what benefit can be derived from official recognition by the University of in-house student apprenticeships. Emphasis has been put on the technical strand of questioning because it less given to the subjective views of the respondents, i.e. the estimation of technical skill development is likely to be more accurate than personal assessment of interpersonal skills.

Through analysis of other sets of questions within the questionnaire I shall test the hypothesis that academic performance alone does not reliably identify the students who thrive as apprentices. In this context, the word “thrive” is intended to convey the notion of a student who is primarily self-motivated to acquire knowledge relating to their work and who seeks to creatively apply that knowledge to serving clients. However, space limitations prevent further discourse on this matter here.

This paper and the set of questions and data on which it relies, provide one of the building blocks for constructing a view on the value of formalizing an existing practice of employing students to work on campus in professional areas of interest typically related to their academic area(s) of study.

3. CONCLUSION

The evidence adduced by means of the data accounted within tends to show that students who acted as LTs felt that this experience in nearly all cases greatly enhanced not only their technical/applied computing skills, but also their knowledge of IT and its application, generally. As a consequence of these gains, they felt they were better equipped for entry into the job market even if they weren't necessarily seeking high-tech positions [1].

4. INTRODUCTION

One of a tertiary institutions most valuable and under-utilized resources, is its large body of undergraduate students. Harnessing the intellect and industry of select members of this pool on an on-going basis, generation after generation, to serve as apprentices on campus, in professional vocations such as library studies, accountancy, human resource management, and IT, etc., can be a mutually beneficial practice. Especially where there may be a deficit in skilled support of this kind in departments and units who can ill afford the market rate of professionals in these areas. This practice of giving students meaningful and useful work experience can be designed to pay out big dividends to both the specific, University employer and the student employees.

5. CONTENTS

Tabulated below in **Table I.**, are some of the advantages to be derived and considerations to be taken into account, when exploring the possibility of engaging so-called student apprentices to work for their University (or College) in specialist areas. Support for instituting such a programme at UWI and other similar tertiary institutions comes from the findings of a study to be discussed shortly. This study sought to have graduates, who as undergraduates worked in DOMS Computer Laboratory as Computer Lab Technicians (LTs), evaluate their experience in this capacity and its impact on their careers.

The terminology commonly applied by Universities to their programmes which give students work experience include:

- Internships
- Work-study programmes

Undoubtedly, each institution will interpret and implement these terms somewhat differently. However, both mechanisms typically involve the student working for an external organization. While internships may tend to entail work done by the student in addition to a full course load, work-study schemes may be designed to substitute for particular courses and count towards a University qualification such as a degree. Work-study programmes are often implemented in such a way that they tend to be of a shorter duration than an internship. Either way the University generally confers official academic recognition on the successfully completed practical exercise usually to the student's advantage in the job market.

Either of these approaches can be used where the student works for his or her *own* University. The main point being however, that UWI, and probably other tertiary institutions in similar circumstances, should set out to formally develop its major Computer Laboratories as employers of student apprentices. Here the concept of an "apprentice" may incorporate features of either, or of both, internships and work-study programmes. Academic recognition of a so-called apprenticeship is feasible where the Labs can provide a sufficiently stimulating, rigorous and engaging learning environment for students to work in on a part-time basis. The brief description of the evolution of the DOMS Computer Lab followed by its IT concerns/projects as tabulated below in **Table II.**, demonstrate why I believe the DOMS Lab can classified as one such. Many LTs were required to attain high levels of competence in order to execute the projects specified which depended almost entirely on their input.

DOMS, UWI, has had a Computer Laboratory for a decade. DOMS IT environment has become increasingly complex. From having less than 20 standalone PCs and workstations in 1991, the Lab evolved to have responsibility for a departmental network of roughly 100 computers by 1999. Grossly understaffed, (with only a Computer Lab Manager and one full-time Computer Lab Technician (as of 1996) to serve a minimum of 3,000 students, 50 academic and administrative staff members), student LTs have always been relied on to maintain computers and network infrastructure. The increasing dependence of staff and students on computer technology has increased the demands made on LTs.

From the information concerning the nature of the work done by LTs and the summation of findings regarding the knowledge students derived from their work experience as tabulated in **Tables III.**, it would appear that the experience did benefit many LTs. What is particularly striking here is the broad scope of technical knowledge as well as problem-solving skills most LTs believed they attained. This suggests that the Computer Lab could offer select students opportunities to gain work experience for which academic recognition could reasonably be accorded based on the student's adherence specific criteria to be established.

It is also worth noting that related interpersonal skills developed through the management of, and coordination with colleagues to achieve a specific end, is just another aspect of what LTs learnt. Other sections of the questionnaire explore this and problem-solving skills gained [2]. Emphasis on the importance of being customer oriented in service delivery is also indicated by the finding that 93% of the respondents consciously aimed to provide good service to clients. Organizations preparing to take graduates on staff may welcome indications of this kind that confirm that technically proficient operators are also able to communicate effectively and positively with clients and work in team. Hence, instituting academically recognized mechanisms that encourage students to creditably develop their skills in the practical application of their discipline(s) should benefit employers both on and off campus as well as the students themselves. The views of many ex-LTs listed in **Table IV.,** attest to this claim.

More information on findings in these areas will be on display at the poster presentation at the SIGUCCS Conference 2000. Alternatively, direct comments or inquiries may be directed to the author's e-mail address.

6. ACKNOWLEDGMENTS

My thanks to: Kiesha Sherman, who worked tirelessly to locate ex-LTs, dispense and retrieve questionnaires and do painstaking data entry; Tom Black, mentor; Garvin Gordon, for furnishing academic data; ex-LTs for their loyalty, time and kind regard demonstrated in many ways including their active participation in this study; and the varied support of many DOMS and UWI staff.

Table I: A quadrant summarizing the pros and cons of apprenticeships to both students and the University

	Benefits	Constraints/Handicaps
Student apprentices	**Relevant practical experience:** The opportunity to engage in practical work, especially in subject areas where one is in the process of building a theoretical foundation, can be very illuminating. The basis for some theoretical aspects of a discipline, their interpretation and their real world application, may be much clearer in practice and further the student's understanding. **Cash in hand:** However little the monetary rewards may be, most students welcome them. **Promise of greater rewards after graduation:** Most prospective employers of graduates welcome those with work experience whose learning curve is liable to be shorter and therefore less costly to them. Hence, graduating apprentices can expect to get the best pick of the jobs on offer in their areas of specialization and experience and should make faster progress in the organization that hires them. **Convenient location:** Working for the University often simplifies potentially awkward issues concerning transportation to and from the work-place, time off for classes, labs and exams, proximity to classes and other student services, etc.	**Unmanageable distraction:** Some students may have difficulty managing their time to give the job its due, while remaining on top of their academic studies. **Unfavourable typecasting:** The student may be typecast for a particular type of job on graduating based on the kind of work experience they have had. This could be undesirable or limiting for those students whose apprenticeship served to demonstrate the kind of work they would now want to avoid rather than base a career on. **No academic recognition:** In the situation where the University fails to credit work done by a student apprentice, the student may feel resentful and that their time could have been spent.
University	**$avings:** Otherwise costly expertise can be engaged for far less than market rates. Even if some professional expertise is required, the quantity of professional man-hours can be reduced, by supplementing them with specialist "student apprentice-hours". Hence, the overall cost of project design, implementation and maintenance can be minimized. **Affordable readily-accessible help:** In spite of seasonal fluctuations in student apprentices' availability, their overall commitment to a project and pride in being among the elite entrusted with important work for the University can compare with, or even exceed that of external professional consultants. Resulting in more readily available and relatively inexpensive maintenance and troubleshooting personnel. **Familiar terrain:** Apprentices may have the advantage of being both creators and users of the service they are working to provide or enhance. Even if they are not, or won't be users themselves, it is likely that they may be closer to understanding and appreciating the needs of the on campus user population than external consultants or professionals. **Industrial/commercial recognition:** By monitoring the apprentice programme and giving official recognition to high achievers in a particular domain, external employers may be greatly appreciative and supportive of efforts by the institution to provide students with practical, on-the-job know-how and skills. This effort should go some way to quell complaints by the business sector that graduates are inadequately prepared for the jobs they have on offer, by a standard University education. **Effective monitoring of the academic rigor and quality of work done:** A University may have a problem with work-study programmes or internships implemented in partnership with external organizations, namely, ensuring that tasks assigned to students are sufficiently rigorous to warrant academic recognition by the University. It should be much easier to insure this, when the work is being done within and for the University.	**Internal management input required:** Ensuring consistency in the quality of the work and continuity throughout the complete life cycle of a project is likely to be a challenge. Especially where a lot depends on the fluctuating availability of a number of student apprentices who may not all be equally proficient in all the desired areas of competence. Typically, at least one full-time University staff member will need to have a management role and ultimate responsibility for the project. **Policy support framework necessary:** Satisfactory policy and practice needs to be devised to curtail or minimize the possibility of security breaches, ethical misdemeanors, and threats to systems integrity. In addition, workable regulations need to be formulated and monitored to ensure students are not exploited to the detriment of their academic programmes. **Academic recognition:** Some way must be devised to officially recognize the work of student apprentices who perform creditably within the parameters set to assess and measure student performance. This is important to help sustain and nurture the most productive levels of enthusiasm and motivation throughout the life cycle of the project. **Easily led:** Student apprentices would

	Benefits	Constraints/Handicaps
	Better student vs. University staff relations: Students may perceive the University as failing to serve student interests for selfish reasons. But, when students have an opportunity to work for the University and see things from the perspective of an employee, a better understanding of the why's and wherefore's of University operations may result, with mutual benefit.	typically be less experienced than consultants and would be invested with less authority. Thus they may be more susceptible to influences that may lead to poor project related decisions being taken.

Table II: A sample of the tasks and responsibilities LTs are required to undertake on the job

IT Project	LT Range of Responsibilities
- Networking and completely re-networking the Lab, 4 times in all, with new Ethernet technology - Networking DOMS, twice with new Ethernet technology - Networking the Faculty of Social Sciences	The preliminary network cabling design, making cables, cabling, installation & configuration of various network devices, server set up & configuration, setting up network services
- Developing new customized on-line computer reservations system for student Lab users – twice	Systems analysis and design, programming in a number of languages, implementation, testing, documentation, training
- Building and repairing personal computers	Identifying and sourcing hardware components, preparing requests for quotation, justifying proposals to the manager

Table III: Feedback on the issue "Do ex-LTs think that they learnt a lot more about IT from being a LT than they would have otherwise?"

Topic	Perceived Competence Level Attained
Hardware	
Developed a general understanding of the purpose and operation of personal computer components.	86%
Attained a fairly advanced/intermediate level of competence in troubleshooting hardware microcomputer related problems.	83%
Software	
Developed a general understanding of the operation and functions of at least one microcomputer operating system (O/S).	100%
Attained a fairly advanced/intermediate level of competence in installing, configuring, manipulating and troubleshooting at least one microcomputer operating system.	ADV.=76% INT.= 93%
Further developed computer programming skills and/or skills that supported programs that were built in-house. (E.g. database maintenance).	79%
Gained or enhanced knowledge and competence regarding the use of productivity tools—application software, e.g. spreadsheets, word processors, etc.	79%
Local Computer Networking	
Developed ability to design a LAN.	72%
Developed ability to install physical hardware components to create a LAN.	86%
Developed ability to configure servers in at least one O/S to deliver one or more advanced network services.	83%
Familiarity acquired to understand and relate to practical computer networking concepts and acronyms.	69%
Demonstrated a fairly advanced/intermediate level of competence performing relatively complex installations, configurations, and troubleshooting in at least one technical area in the Lab.	62%
The Lab was an environment where I consciously tried to provide our clientele with good service.	93%

Table IV: Feedback on the issue "Did ex-LTs believe that they had more to offer their employers as a direct consequence of having worked in the Lab, than they would have otherwise?"

Topic	Perceived Competence Level Attained
The technical knowledge I gained while working at the Lab was invaluable and was put to very good use in the job I got when I left the Lab.	97%
Because of my work experience in the Lab I was more confident about my abilities and worth to a prospective employer, than I would otherwise have been.	97%
I believe that the work experience I got as a LT gave me a "head start" in my chosen career relative to others who	93%

Topic	Perceived Competence Level Attained
graduated/left UWI around the same time as me with similar qualifications but **NO** LT experience.	
I think I am essentially still ahead career-wise, of where I might otherwise have been without LT experience.	86%
After working in the Lab I found that the Lab experience effectively prepared me for work in the real world.	93%

7. REFERENCES

[1] Schaffer, W. A., *High Tech Careers for Low-Tech People*, 2nd ed., Ten Speed Press, Berkeley, CA, p. 18-80 (1999).

[2] Bransford, J. D., and Stein, B. S., *The Ideal Problem Solver*, 2nd ed., Freeman, New York, p. 19-41 (1993).