Industry-based learning and variable standards in workplace assessments

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Assessment of industry based learning (IBL) takes various forms. Invariably, this involves assessment of the actual work done and the 'product' of a student or a group of students during an IBL placement in the industry. Three stakeholders (organization in the industry, provider of education and training, and the student) are involved in one of the assessments which is known as collaborative assessment. During the assessment process the host mentor (i.e., workplace supervisor) and the academic supervisor represent the industry organization, and the provider of education and training respectively. From my experience as an academic supervisor for students majoring in computer-based information systems, I have become aware of variable standards in collaborative assessments. In this paper I will attempt to highlight some of the variations in assessment that I have personally experienced as a participating member of assessment teams. I will describe four instances of placements in order to delineate the variations. That variations in the standards in collaborative assessments exist is a reality. Should they exist? If not, then how can the situation be alleviated? Answers to these questions should be found as it makes sense that the grades that the students are awarded for their IBL represent as fair and accurate assessment as possible. Variations in standards in collaborative assessments have serious implications on the value of the grades and the credits that the students are awarded. Practitioners of cooperative education must strive to minimize the variations with a view to achieving more consistent collaborative assessments. Asia-Pacific Journal of Cooperative Education, 9(2), 129-139.

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The value that IBL adds to the quality of graduates is well recognized. For example Walo (2001) draws from the works of (Barron, 1999; Barron& Maxwell, 1993; Casado, 1991; Emenheiser, Clayton, & Tas, 1997; Petrillose & Montgomery, 1998) to note that "internship provides opportunities for students to practice what they have learnt in the classroom, gain a greater understanding of the industries' requirements, test career choices and develop important hands-on workplace skills" (p. 12). Nofemela and Overmever (2006) believe that a clear benefit was that when students knew that opportunities existed for permanent employment, it "motivated them to do their best in order to make a good impression on their supervisors" (p. 7). According to Tanaka (2006) off-campus internship gives students "an ideal opportunity to think about what more they should learn when they go back to university" (p. 13). Tayebjee and McGovern (2006) point out that while there are the obvious benefits that include putting theory into practice, various skills development, and socio-cultural learning, many other "unexpected benefits such as increasing confidence, developing useful contacts and obtaining ongoing or casual work" (p. 13) enable the students to gain an edge in the competitive job market.

However, the quality of IBL itself and its assessment are of vital importance in determining the levels of achievements of the students. Knight (1995) observes that when drafting validation documents claims are made for "a wonderland of concepts, skills, competencies and the like of which our students are to be made citizens. But, for those who want to know about the quality of a course, program or institution, the test is whether these goals are

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assessed and how well they are assessed" (p. 13). Eames (2006) believes that "learning in placements in particular has been difficult to assess by traditional quantitative means" (p. 3). Coll, Taylor and Grainger (2002) contend that "there are no simple solutions to the assessment of holistic learning experiences such as work placements" (p. 5), and suggest that while it is of paramount importance that purpose of work-based learning is defined, it is not straightforward to do so because of the difficulties involved. They go on to caution that "Assessors therefore need to be wary of tending to assess the more easily labeled technical competencies, as this can be at the expense of important characteristics such as tacit knowing (Polanyi, 1969), intuition (Rubin, 1985) and artistry (Schon, 1983, 1987)" (p. 5). Jorgensen and Howard (2006) believe that "Assessment problems arose from the fact that the learning experiences were not being assessed but rather the 'technical outcome' of the experience" (p. 1).

Ideally placements in the industry should be relevant to the students' majors and the workplace activities should engage them fully for at least the minimum number of hours demanded by the number of credits prescribed for the course (e.g., for an 18-credits IBL course a student majoring in accounting should find a placement that provides opportunities for application of knowledge and use of skills in this area of study for at least 180 hours). The importance of the work environment cannot be over emphasized. Suffice it to say that the work environment should be conducive to the students' learning experience. This environment includes the work-space provided for the students, their fellow employees and the work-place supervisor. In order to be effective in their role the academic supervisors should be well versed in the subject area of the placement (e.g., in accounting). When the above conditions are satisfied then the students' learning experience can be expected to be fruitful and valuable. Finally the assessment of the learning must be done accurately so that the pass grades awarded to the students reflect their true levels of achievements.

BACKGROUND

Competition for Placements

Ram (2006) observes that there is competition for a limited number of opportunities that exist in the industry for IBL placement, as "students from all tertiary institutions compete for the places that are available" (p. 81). Hence there is often real difficulty in finding work or a project that matches up exactly with a student's area of study.

Suitability of Placements

When a placement does not provide the opportunity for the application of the relevant knowledge and the use of appropriate skills, the student's learning experience may not be the desirable optimum. Assessment in these situations would be misleading as to the true capabilities of the student as a future practitioner in a particular profession. Bowden and Marton (1999) discuss the importance of performance-based assessments to be 'authentic' so that students are "tested on the very tasks of their future professions. So nurses should be tested in 'nursing situations', engineers should be tested in 'engineering situations' and so forth" (p. 13).

An insight gained from research conducted by Hayden, Dowell and Saenger (2001) "concerns the importance of a strong and productive collaboration between the higher education and industry partners in achieving course relevance to the workplace needs and requirements of students" (p. 7), while Coll et al. (2002) pose the question: "How can

academic and industry staff work collaboratively to assess student success, and is this measurable in terms of externally referenced criteria?" (p. 10). Tynjala, Valimaa and Boulton-Lewis (2006) discuss the strength of collaboration between employers, industry and educational institutions for design, curriculum and delivery of a foundation degree and the need for "educational institutions to progress beyond a work-related curriculum to a work-based curriculum" (p. 62). They further explain that the latter, according to modern pedagogical thinking, would emphasize the integration of theory and practice rather than these being carried out separately as has been the case in traditional education. Radel (2004) ponders on the difficulty of "attaining a balance between content provision (traditional education) and practical application" (p. 311). Yashin-Shaw, Buckridge, Buckridge and Ferres (2004) think that "there are different mechanisms for helping students to become aware of the full range of their skills. The most obvious is to embed them within the curriculum and to explicitly identify, teach and assess them" (p. 400). Brown and Knight (1995) believe that "Instead of theory being divorced from practice with the course providing the theory and the workplace providing the opportunities to put it into practice, they are seen more holistically, with theoretical and practical elements being joined as praxis" (p. 89).

Appropriate Supervision

Appropriate supervision in the workplace and subsequent accurate assessment of the achievement by the student of the learning outcomes of IBL are also crucial factors that cannot be overlooked. While the qualifications, experience, availability and commitment of the host mentors will determine the appropriateness of the supervision that they will provide, their ability to rigorously measure the achievement of the learning outcomes by the student on IBL placement will affect the accuracy of the assessment.

Accurate Assessment

There are measurement tools and techniques that are being used to measure the level of achievement of the student. If these tools and techniques are found to be lacking then new and appropriate approaches to assessment need to be explored and implemented. Hence, it seems logical to examine the existing tools and techniques and thereby find out their effectiveness in providing accurate measurements of the learning outcomes of IBL.

Assessment Tools and Techniques Being Used Currently

Some of the assessment tools and techniques that are currently being used in IBL include: written submissions of personal learning goals and objectives, reflective journals, reflective essays by the student, and collaborative assessment. The latter is carried out in a meeting held at the site of IBL placement by the student, the host mentor and the academic supervisor. Each one of them fills in a collaborative assessment form which becomes the basis for discussion and awarding of marks during the meeting. The form requires views on the achievement of professional, interpersonal, intellectual, project/time management, and value of work/project completed by the student. The final grade in this assessment is the result of negotiation of the individual assessments done by the student, the host mentor and the academic supervisor.

ISSUE

The learning and personal development of a student during an IBL placement should be appropriate and measured as accurately as possible. The accuracy of the measurement depends not only on the tools and techniques used, but also on the on qualifications and experience of supervisors and the student.

When the placement is not appropriate, the qualifications and experience of the supervisors and the student are lacking and the tools and techniques used are unsuitable, then collaborative assessment grades of students are not true reflections of their achievements of the learning outcomes of IBL. Therefore the issue really is the inaccuracy of the collaborative assessment. When the value of this inaccurate assessment is combined with those of the written submissions of personal learning goals and objectives, reflective journals and reflective essays, the overall grade for the course becomes distorted.

Some Examples

From the several IBL placements that I have supervised during the last five years, I have chosen four to show the variations in collaborative assessments. I have also chosen to keep the industry organizations and the students, involved in these placements, anonymous. In the first of these placements the student was required to enter and store data on a personal computer – this student was supervised by the owner of the business who was using Outlook Express to send and receive e-mails. In the second case the student was required to create and implement a Microsoft Access database and was supervised by the managing director of the organization who had little knowledge of computing. In the third case a network diagram was required for an existing system for a private training establishment (PTE) and the supervisor was knowledgeable in the subject area while in the fourth case the student was required to complete a feasibility study on iterative development lifecycle in information systems for an organization under the supervision of two highly qualified and experienced computer professionals. These four examples would cover the range of variations that exist in work place assessments and illustrate some of the points that I have highlighted above.

Data Entry

A manufacturer of games products required an IBL student to enter and store contact details of customers and suppliers in electronic form using the software Outlook Express. This would provide a "database" for quick access to information needed in the running of the business. The student spent many long hours gathering and entering data in a standard format. At the end of the placement, the host mentor was very happy with the student's work and gave marks liberally during the collaborative assessment meeting. In this case the student gained experience only in data gathering and data entry and the business now had the data stored in one location in an electronic form – a "database"! The student was capable of creating a proper database using Microsoft Access, which is a database management system software. Such a database would have given the business a powerful tool for creation and efficient retrieval of necessary information. However, the owner of the business could not afford to buy the software and did not know how to use it. This was an example of a real world situation where the host mentor was not knowledgeable and skilled in the subject area of the student's placement. So the owner was more than satisfied with what the student had delivered and to use the free and familiar software (Outlook Express). The student managed

to get good marks, but did not gain adequate experience in the use all areas of information technology (IT) learned at the tertiary institution.

Database

A small business organization provided an opportunity for an IBL placement for a student. The organization's data were captured on printed forms and processed manually to create reports that were needed in the running of the organization. This manual process took three to four weeks. The IBL student worked with the work place supervisor to understand the business processes involved and then designed and created a Microsoft Access database. The objects in this database included tables, forms, queries and reports. The student trained the employees of the organization to use the forms to enter and edit data in the tables. When all the data were entered in the tables, queries were used to view specific data and the reporting capabilities of Microsoft Access were used to create the required reports. Now well-presented reports of professional standards could be obtained within one week. What was the reaction of the work place supervisor? Overwhelmed! This supervisor just would not give anything less than full marks for the product during the collaborative assessment meeting. This student gained experience in business analysis and the use of a database management system software to create a product (a database). However, the host mentor being mainly computer illiterate was not in a position to evaluate the database in terms of the principles that the student had used to create it and its overall efficiency and robustness.

Network Diagram

A PTE providing computing courses had a local area network (LAN) of computers and related equipment. However, the LAN was not documented. The student on IBL placement was assigned the task of studying the existing LAN and to draw a diagram, of a professional standard, to document the network. The supervisor, although knowledgeable in the subject area, was not an expert on computer networking.

After studying the existing LAN the student used Microsoft Visio software tool to draw a network diagram that was of a professional standard and was very impressive. During collaborative assessment meeting the workplace supervisor had no reservations in praising the student for the fine product that he had delivered, but being computer literate, was able to point out some areas of improvement and therefore was more realistic in awarding marks to the student. In this case again, the student could use only networking knowledge gained from courses at the tertiary institution and was awarded marks that were closer to an accurate assessment of the student's technical abilities. The host organization was happy that their LAN was now documented at little cost.

Feasibility Study

A large insurance company required an IBL student to complete a feasibility study on the implementation of iterative development life cycle in information systems within the organization. This was a major project that demanded knowledge and skills in systems analysis and design. In this case the student was supervised by their senior project manager. This student was young and diligent. He worked consistently and was always punctual to attend weekly meetings with me at 8 a.m. during cold winter months. He wrote his learning journals in real time and worked according to plan.

During collaborative assessment meeting I found that his work place supervisor and another stakeholder (project owner) were so critical and stringent with awarding marks that the

student nearly failed the course! It was an eye-opening experience for the student! This placement provided an opportunity for the student to realize exactly what knowledge and skills were required to complete the feasibility study – the values and benefits of supervision by experts cannot be over-emphasized! So, although the student was awarded a low grade, I believe the quality of this student's experience is superior to those of the previous three cases.

DISCUSSION

Some examples of work experiences/projects that students majoring in computer-based information systems are required to complete include data entry, writing up of user manuals, carrying out feasibility studies, drawing network diagrams for existing networks, creating databases, recommending computerized system to replace manual systems, and creating and implementing websites.

Workplace Supervisors

Qualifications

Qualifications of workplace supervisors may not be in the field of study in which the students gain work experience or complete projects. Those that have the relevant qualifications are able to guide the students better through their placements while those that don't rely on the student and the academic supervisor for the successful completion of the work experience or the project.

Experience

Although a workplace supervisor has experience in running of the business of an organization, that experience may not be in the area of study of the student. For example, a supervisor may not be computer literate, but be supervising an IBL student majoring in computer-based information systems.

Availability

There are instances of workplace supervisors being too busy to give enough of their time to guiding the students through their placements. Some of them have to go overseas from time to time for business purposes and may be away for a few days or weeks. In this situation the students on placement suffer a setback – they do not get the information, support and guidance they need to achieve the learning outcomes of IBL. The fact that the placement has a start date and an end date should not be overlooked. This time constraint and the unavailability of information when needed can put undue stress on the IBL student.

Commitment

The commitment that workplace supervisors give to the IBL placements depends on their own business priorities. It is likely that if the work or projects that the students are doing are of critical and immediate value to the organization, then greater commitment from the workplace supervisor can be expected.

Academic Rigor in Assessment

Workplace supervisors do not bring the same rigor in the assessment of learning outcomes achieved by the students as the academic supervisors do. Their assessments are usually more qualitative than quantitative and is often more generous than that of the academic

supervisors. This generosity may spring from the relief felt when a student clears a backlog of work or completes a project that adds good value to the organization at little or no cost.
The cultural differences between the academic world and enterprises may also be a contributing factor in this respect as Tynjala et al. (2006) point out that while the perspective that "critical discussion is an essential precondition for the advancement of knowledge" is highly valued in academic cultures, "in business cultures one is not expected to be critical of one's own products or enterprise" (p. 45). Richardson (2001) observes that "industry and educators need to respect each other's talents. This must include an unequivocal recognition that educators have particular expertise in guiding students towards constructing their own knowledge" (p.23). (Coll et. al., (2002 , p. 10) cite Stones (1994) as saying that the "The flawed nature of assessment should be recognized and the…common practice of awarding finely graded assessments be abandoned". Zegwaard, Coll and Hodges (2003) believe that "it makes sense for assessment, and therefore learning outcomes, to be based on employers' desires. However, deciding the weight given to employers' views is one of the greatest challenges facing placement coordinators" (p. 12).

Student Expertise

Subject Knowledge

At a minimum, the student takes the knowledge and skills gained in classroom/laboratory teaching-learning environment to the workplace. The academic performance of students can range from mere passes to passes with distinction. These factors will affect the quality of the work done and the outputs produced by individual students. However, the knowledge and skills gained from curricula are mostly based on the predetermined objectives and measured by means of criteria which are known in advance. Bates, Bates and Bates (2007) believe that "Such curricula have a relatively narrow focus and a limited scope; they are utilitarian in nature and they form a base level from which professional learning can emerge later" (p. 122). Consequently the students are not adequately prepared to enter the world of work where they have to cope with new situations that may arise from time to time.

Commitment

Some students take the placement opportunity very seriously and make the most of the opportunity. Such students are diligent and eager to learn from their work experience and their supervisors. Again a range of levels of commitments can be identified amongst the students in placements.

Work Experience

Not all IBL students have previous work experience. For some of them IBL presents their first opportunity to enter into the real-world work environment. Being new to the environment, they take more time to settle down to steady work than those that have previous industry experience.

Experience in Assessment

It is very rare that students have experience in using formal assessment tools and techniques. According to Brown and Knight (1995) many students will initially "resist attempts to involve them in assessment of themselves because they lack confidence in their own powers, and feel that they are not capable of making judgments about their own work" (p. 52). As such their assessment of their own work during the collaborative assessment process are

usually inaccurate – mostly they award themselves much higher grades which therefore are not an accurate measure of their true worth. Brown and Knight report that while in some studies it is found that students usually give themselves lower marks, in others indications are that they give themselves higher marks; for example, "Falchikov and Boud reported that in a meta-analysis of 57 qualitative studies, they found that students graded themselves higher than 68% of tutors marking their work" (p. 54). Knight and Yorke (2003) believe that "The student interprets the assessment task and criteria according to background characteristics that include their current state of educational development … and their self-theories, and perform accordingly" (p. 41). Milne (2007) believes that many students find it difficult to do self assessments and therefore need guidance in order to understand what it entails and how it can be done.

Role of Academic Supervisors

Academic supervisors usually play the role of facilitators of the learning experience. They help the student organize their placement activities, monitor the students' adherence to plan, provide advice and feedback on their progress and, should the need arise; try to alleviate any problems that may be encountered during the placement. The nature of IBL is such that the academic supervisor gets only second hand information on the actual practical work the students does on site in the industry. However, not even the workplace supervisor would know exactly what the student has achieved. Apparently, only the student will really know how much he or she has learned during the placement.

Deliverables and Expectations

Product Delivered

Some of the products that students majoring in information systems are expected to deliver include: a database, a network diagram, a user manual, a website, or a report on business analysis and recommendation of a computerized information system that is aligned with the goals and objectives of the industry organization.

Work Completed

Students majoring in information systems are usually required to complete data entry, update existing databases, and do filing and backups.

Reactions to Outcomes

Overwhelmed!

Some workplace supervisors become overwhelmed by the work done or product delivered by the students. Such supervisors usually award full marks to the students during collaborative assessment meeting; for example as it was in the case of Microsoft Access database that was delivered by the student, as described above.

Realistic Rationalization

There are those workplace supervisors who try to rationalize and understand the real circumstances under which the students complete their placements. They do not award top marks, but still may be a bit liberal in their assessment.

Strict Scrutiny

Workplace supervisors who are qualified and experienced in the field of study in which students undertake a project or work experience are very strict in their assessment.

CONCLUSIONS

From the above discussion it is evident that some of the factors that affect students' grades in collaborative assessments include: qualification and experience of workplace supervisor, students' experience in assessing their own work, qualification and experience of academic supervisor, and agreement between the three stakeholders. Awarding of marks as percentages in collaborative assessment process seems not to be a rigorous and accurate measure of the learning outcomes of IBL as very well illustrated by the four examples given above. It is not satisfactory to award a pass grade which is based only on the technical knowledge and skills that a student uses to complete a piece of work or deliver a product of good value to an industry organization. It is difficult to find a single IBL placement in which a student majoring in computer based information systems could use all the areas of information and communications technology (ICT) prescribed in a tertiary program of study.

IMPLICATIONS

Practitioners of cooperative education should be aware of the nature of placement opportunities that exist in the industry for students of different majors. While in some areas, like nursing, engineering and sport the placement may match up exactly and completely with the theory components covered in tertiary institutions, in others, like information and communications technologies this may not be the case. Bearing in mind the diversity of tertiary qualifications, inexact matches between theoretical subject knowledge of students and the industry experience their placements provide, the range of variations in the knowledge, skill and experience of the workplace supervisors, academic supervisors, and the students, the need for an assessment strategy that would lead to a more accurate reflection of the achievement of the learning outcomes of IBL by a student cannot be overemphasized!

The implications are that the marks that students are awarded during collaborative assessment meetings are highly variable and are not a true reflection of the quality of industry experience and the achievement of the learning outcomes of IBL by a student. When these marks are weighted and combined with other assessments for the course, like formulation of learning goals and reflective essay, the final grade turns out to be better than it really should be! We need to find out as to what can be done to alleviate this situation. Tynjala et al. (2006) suggest that:

> To be able to assess the acquisition of practical job experience, the implementation of innovative kinds of performance assessment is necessary, for example, methods that facilitate testing of whether the competencies acquired during the work processes can be applied. (p. 189).

However, assessment of performance may not be a complete indicator of what a student is capable of. Eraut (1997) sees the need for obtaining evidence of capability which could "supplement performance evidence, sometimes it was to ascertain the candidate's potential to perform in the future" (p. 200). Bowden and Marton (1999) contend that "any assessment system developed to test student performance should reflect the full range of purposes for which the learning program was developed" (p. 161). Such an assessment system should be

able to discriminate between the students who have achieved the learning outcomes of the program and those that have not.

Moulton and Lowe (2006) believe that there is an increasing demand for "engineering graduates that have broader professional skills, as well as highly developed technical skills. If educators are to demonstrate that they are meeting these demands, new methods for measuring student and graduate attributes are required" (p. 9).

New ways of assessing the learning outcomes of IBL should enable students in placements to not only realize what they know and what they are able to do, but they should also discover for themselves the areas in which they are lacking. With such a realization they can motivate themselves to fill in the holes in their knowledge and deficiencies in their skills. It is encouraging to know that Hodges and Ayling (2007) had proposed a portfolio model for assessing the achievement of four learning outcomes of IBL in which the students are required to "produce evidence of their learning" (p. 51). According to Milne (2007) "Portfolios are designed to provide tangible concrete evidence that learning has taken place" (p. 10). As a result of a successful implementation of the portfolio model and research Hodges (2008) is able to assert that "Initial analysis of stakeholder feedback indicates positive support for the portfolio model introduced" (p. 31).

Finally, we may now have a model, the portfolio model, that alleviates all the deficiencies of previous tools and techniques that were used to measure "accurately" the achievement of the learning outcomes of IBL by the student on placement in the industry**.**

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ABOUT THE JOURNAL

The Asia-Pacific Journal of Cooperative education (APJCE) arose from a desire to produce an international forum for discussion of cooperative education issues for practitioners in the Asia-Pacific region and is intended to provide a mechanism for the dissemination of research, best practice and innovation in work-integrated learning. The journal maintains close links to the biennial Asia-Pacific regional conferences conducted by the World Association for Cooperative Education. In recognition of international trends in information technology, APJCE is produced solely in electronic form. Published papers are available as PDF files from the website, and manuscript submission, reviewing and publication is electronically based.

Cooperative education in the journal is taken to be work-based learning in which the time spent in the workplace forms an integrated part of an academic program of study. Essentially, cooperative education is a partnership between education and work, in which enhancement of student learning is a key outcome. More specifically, cooperative education can be described as a strategy of applied learning which is a structured program, developed and supervised either by an educational institution in collaboration with an employer or industry grouping, or by an employer or industry grouping in collaboration with an educational institution. An essential feature is that relevant, productive work is conducted as an integral part of a student's regular program, and the final assessment contains a work-based component. Cooperative education programs are commonly highly structured and possess formal (academic and employer) supervision and assessment. The work is productive, in that the student undertakes meaningful work that has economic value or definable benefit to the employer. The work should have clear linkages with, or add to, the knowledge and skill base of the academic program.

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Research reports should contain; an introduction that describes relevant literature and sets the context of the inquiry, a description and justification for the methodology employed, a description of the research findings-tabulated as appropriate, a discussion of the importance of the findings including their significance for practitioners, and a conclusion preferably incorporating suggestions for further research. Essays should contain a clear statement of the topic or issue under discussion, reference to, and discussion of, relevant literature, and a discussion of the importance of the topic for other researchers and practitioners. The final manuscript for both research reports and essay articles should include an abstract (word limit 300 words), and a list of keywords, one of which should be the national context for the study.

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