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Analysis of Assessment and Learning Strategies for a Logistics Undergraduate Education Programme

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THE ANALYSIS OF ASSESSMENT AND LEARNING STRATEGIES FOR A LOGISTICS UNDERGRADUATE EDUCATION PROGRAMME

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ABSTRACT

It is recognised that in today's global competitive marketplace, where outsourcing continues to grow at an exponential rate, Logistics and Supply Chain Management (SCM) have grown in importance [1]. Research suggests that as logistics moves from being viewed as a stand alone discipline to one viewed as integrating the management of supply, the duties, managerial skills and knowledge of the Professional Logistician have changed [2] [3] . The challenge for logistics educators is to design and develop curricula, learning, teaching and assessment strategies that can support wide-ranging and integrative learning objectives. Research also states that universal logistics management skills must include people, analytical, communication, flexibility and computer skills [4].

This action research paper presents the second stage analysis of the teachers experience when designing and implementing a PBL strategy in a third year module of an undergraduate logistics degree programme, (paper one, [4]). The experience of the students is recorded in a post module survey. Problem based learning (PBL) requires the student to be self directed and responsible for their own learning as they seek to solve a 'real life' problem, within a group. Group dynamics, group assessment and interpersonal challenges which were noted by students in phase 1 [4] were addressed, however, project and group management are still problems. An important overall finding was the need for greater training for the students in PBL methods, as well as group work and project management. The research paper also identifies and analyses other constructively aligned learning and assessment strategies for use in the students final year. These strategies seek to integrate the three distinct SCM skill constructs, and enhance the student's development of people, analytical and communication skills. The students experience is recorded in a learning log which they develop as they complete each of their assignments. This is submitted for analysis after they complete their exams.

Key Words:
Graduateness and Learning Outcomes, Assessment strategies, Logistics and Supply Chain Management skills and competences, Problem Based Learning, Group work

1.0   Introduction

In light of the 'extraordinarily rapid pace of social, technological, cultural, economic, legal and educational change throughout the world, combined with the increasing global interconnectedness of societies and economies, emphasises the need for people who are adaptable and responsive; in short who are capable of continuing life long learning'. [5]

In order meet these new learning paradigms, Maier and Warren state that the OECD have placed increased emphasis on the production, distribution and use of knowledge, believing that the knowledge economy is dependent on peoples ability to adapt to situations, update their knowledge and know where to find knowledge. [6].

It is recognised that in today's global competitive marketplace, where outsourcing continues to grow at an exponential rate, that Logistics and Supply Chain Management (SCM) have grown in importance [1]. 'What is more, many companies are not prepared for coping with sharp and unpredictable price changes...every function from purchasing to the chief financial officer is a little blind sided….Rising prices can force companies to rethink the way in which they manage their supply chain, particularly the extent to which they are wiling to hold physical stocks of commodities and other materials.' [7]

This paper sets out to outline the meaning of graduateness, constructive alignment and its implications for teaching, learning and assessment strategies. It then examines assessment and learning strategies adopted on a Dublin Institute of Technology (DIT) Logistics Supply Chain Management programme to meet industry's criteria. The effectiveness of these assessment strategies is examined using a qualitative analysis of the students reflective journals, as well as feedback from work-placement companies. Recommendations for further study are also presented.

2.0 Literature Review

2.1   Lifelong learning, essential for the modern Logistics Supply Chain graduate

Logistics education in Ireland needs cross-functional training[8]. They identified the key competences requiring development as skills and capabilities in communications, people management, problem-solving, problem identification, analytical methods, project management, and information technology. These findings are similar to those highlighted in International supply chain management literature. There is a global need for the supply chain(SC) professional to develop additional management competences and skillsets; such as teamwork, supply chain awareness, problem solving, prioritising, seeing the "big picture", communication and decision making [4]. These lifelong learning skills should be placed at the heart of every undergraduate degree programme [5].

A 1992 report by HETAC stated that if higher education is to enable graduates to operate effectively in a range of activities over a period of time, a lifetime in effect and not just immediately after studies are completed, then it must develop the characteristics that support learning throughout life. Discipline specific skills in many areas have only a short life, and what will be needed in even the medium term cannot be predicted with any great precision [5]. In 1996 MacDonald Ross [9] developed 3 broad categories of graduate achievement; **Field Specific**, **Shared** and finally **Generic**. At the same time UNESCO's developed four pillars of lifelong learning; learning to be, learning to know, learning to do and learning to live together. Similarities can seen in recent research by English and Armstrong [10], who developed four categories of skills that all courses should address in order to ensure that the Graduate develops lifelong learning skills. The **Practical skills, Intellectual Development; Informational** and **Personal Development** can be mapped onto similar templates developed by Murphy and Poist highlighting the Logistics graduate learning requirements [2].

2.2   Learning Outcomes and Qualifications – the road to lifelong learning

In order to address the issue of 'graduateness', the European Qualifications Framework (EQF) [11] for Lifelong Learning developed an eight stage educational framework, which is seen as contributing to 'modernising education and training systems' In tandem, the NQAI [12] developed the National Framework of Qualifications for all Irish educational bodies, setting out a range of learning outcome standards of knowledge, skills and competence for each of its ten stages in the framework.;
"knowledge" means the outcome of the assimilation of information through learning;
"skills" means the ability to apply knowledge and use know-how to complete tasks and solve problems.
"competence" means the proven ability to use knowledge, skills and personal, social and/ or methodological abilities, in work or study situations and in professional and personal development.
In line with the shift in higher education from the learner as a passive recipient of knowledge to a more autonomous, diverse, learner group, the Dublin Institute of Technology (DIT) [13] developed a strategy

'Building Towards the Learning Paradigm'. This strategy aims to establish a learner-centred culture where openness and flexibility to learning are paramount. The programme and module re-designed, centred around learning outcomes, with assessment playing an important role, including judging level of achievement, monitoring development and progress. It can also be used as a tool to assist learners in becoming more autonomous learners particularly in reflecting on their approach to achieving stated learning outcomes.

This research paper is centred around a level 8, B.Sc., 4 years Logistics and Supply Chain Management (SCM), honours degree programme. NQAI, level 8 programme requires innovation as a key feature of learning outcomes(LO). LOs relate to being at the forefront of a field of learning in terms of knowledge and understanding. They include an awareness of the boundaries of the learning in the field and the preparation required to push back those boundaries through further learning. The outcomes relate to adaptability, flexibility, ability to cope with change and ability to show initiative and solve problems within their field of study. In a number of applied fields the outcomes are those linked with the independent knowledge-based professional. In other fields the outcomes are linked with those of a generalist and would normally be appropriate to management positions.

2.3   Constructive Alignment; outcomes, learning and assessment

Biggs [14] highlights that to satisfy learning outcomes it is necessary to have an integrated curriculum design system, where assessment is constructively aligned to drive the learning conditions for quality learning, represented in figure 1 below . Bourner [15] goes further stating that the question of "are aims appropriate for the award being sought" needs to be answered.

Figure 1; Constructive Alignment, adapted from Biggs
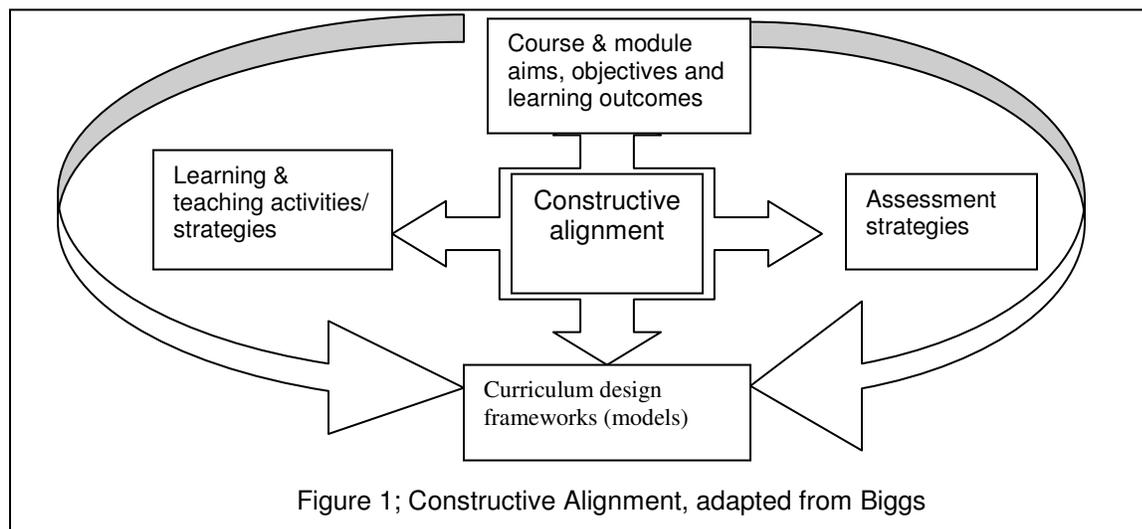
Learning takes place through the active behaviour of the student: it is what he/she does that he/she learns, not what the teacher does [6]. Kolb [15] see learning as the process whereby knowledge is created through the transformation of experience. 'Knowledge results from the combination of grasping experience and transforming it.' Learning is not about teaching content, it is about failure and learning by correcting mistakes. It is the failure that triggers emotions which act as a catalyst to help individuals to become more motivated [17]. Motivation for learning is enhanced when the learning situation is personalised, socialised and made relevant and engaging, where the student chooses the method, has the authority and is accountable for their own learning [17] [18].

Assessment tasks that are designed to encouraging deep learning should be performance based, holistic and allow plenty of scope for students to input their own decisions and solutions [9] [14] [19]. It is suggest that the following teaching / assessment approaches are most likely to encourage lifelong

learning skills and orientations; those which encourage students to engage in self-directed and peer assisted learning; those which involve experimental and real-world learning; methods which make use of resource based and problem-based learning; and those which include reflective practice and critical self awareness [9] , as reflected in the table 1, adapted from Bourner [15].

Table 1: Teaching and Assessment Methods for Learning Outcomes

Learning Aims for Students					
Disseminate up-to-date knowledge	Develop capabilities to use ideas & information	Develop the students ability to test ideas and evidence	Develop students ability to generate ideas and evidence	Facilitate the personal development of students	Develop capacity to plan and manage their own learning
Teaching Methods					
Lectures	Case studies	Seminar and tutorials	Research Projects	Feedback	Learning Contracts
Up-to date textbooks	Practical's	Supervision	Workshops on techniques of creative problems solving	Action Learning	Projects
Reading lists	Work experience	Presentations	Group Working	Learning Contracts	Action Learning
Handouts	Projects	Essays	Action Learning	Role Play	Workshops
'Guest Lectures	Demonstrations	Feedback on written work	Lateral Thinking	Experiential Learning	Mentors
exercises require find up-to-date knowledge	Group Working	Literature Reviewing	Brainstorming	Learning Logs	Reflective Logs and Diaries
skills in using library & learning resources	Simulations (computer based)	Exam Papers	Mind Mapping	Structured Experiences in Groups	Independent Study
Directed private study	Problem Solving	Critical Assessment	Creative Visualisation	Reflective Documents	Dissertation
Open leaning materials	Discussion & debate	Peer Assessment	relaxation techniques	Self Assessment	Work placement
Use of the internet	Essay Writing	Self Assessment	Problem Solving	Profiling	Portfolio development

Brunton [20] highlights the importance of **assessment criteria** and their measurement of the learning outcomes. What quality of work will be awarded an A through to a D. She recommends that students are issued a set of assessment criteria and believes that Biggs (1999) 'Structure of Observed Learning Outcomes' (SOLO) taxonomy has much to offer.

2.3   Group Processes in Problem Solving Assessment Strategies

There are many procedural guides to completing a problem solving process such as PBL [4], including Hammer Chiriac's [21] **'Seven Jump'** procedure. It is essential when using problem solving assessment strategies, to welcome group dynamics in the tutorials. It is the starting point for learning. Working with the dynamic interplay is a part of the task and educational process in tutorials. PBL group processes are

supposed to contain important determinants for the process and bring about good problem solving, as well as conflicts or even inter-group dynamics. [21]

Traditional research on group and group work have found that group variables such as roles (in particular leadership) interaction, communication, development and productivity as well as size, composition, supervisory style, climate and interaction might provide an important link to the understanding of group work and processes within and between groups. However, to date, Hammer believes that investigators have paid too little attention to the demands that different tasks impose upon groups [21] She cites Steiner's theory on the integrative role of task demands and processes in the group and how these factors influence the group's actual productivity. Steiner considers that a groups performance depends on three classes of variables;

Task demands encompass all the prescriptions listed in a complete job manual. They are the requirements imposed on the group by the task itself. The nature of the task also specifies the kind and amount of resources that are needed and the utilisation for optimal group performance.

Group Resources consists of all relevant knowledge, abilities, skills or tools and specify the resources actually possessed by the group. It includes the distribution of resources among group members. If the group wants to obtain maximum productivity resources must be combined and utilised in the best possible way.

The Processes in the group include all interpersonal dynamics of the group. They include all intrapersonal and interpersonal actions by which the group transforms its resources into a product, but also non-productive actions prompted by in-adequate understanding, frustration, competing motives, inappropriate group size or group composition. Consequently, the groups actual productivity consists of potential productivity minus losses due to processes within the group (eg social loafing)

Hammer Chiariac [21] also examines Bion's theory of the professional work group. Bion postulated that groups act on two different levels.
Level 1; **the work group -** the group acts in a mature task oriented way. Their purpose is manage the task in a rational and effective way. The leader serves the groups purpose and feelings like responsibility and co-operation are predominant. The work group handles changes and conflicts in a rational way.
Level 2; **basic assumption group** - is characterised by the group acting in an immature and regressive mode. When the group is disturbed or threatened it will act in a regressive way as a collective defence. The group can act in three basic assumption modes; Dependency, Fight / Flight and Pairing mode.

3.0 The Study
Research has proven the need for Logistics graduates to develop the softer, more managerial skills and competences, in line with a level 8 (NQAI) programme. The aim of the B.Sc. in Logistics and Supply Chain Management is to produce graduates with a through understanding and knowledge of all aspects of logistics and supply chain operations and management; capabilities, trends and applications of information technology; management of operations, quality and change. In addition the course also seeks to give the students specific skills in oral and written communications, personal development, team work, computer skills, analytical skills and problem solving skills – in other words lifelong learning skills.

This longitudinal action research paper presents the second stage analysis of the teachers experience when designing and implementing a PBL strategy in a third year procurement management module of an undergraduate logistics degree programme. (Paper one was presented at the INTED 2008 conference in Valencia[4]). The learning was made up of face to face teaching and PBL assessment, where PBL was used to access 50% of their learning outcome. This is facilitated by DIT's intranet facilities which allowed for presentation of notes, links to sites and readings, as well as continuous communication with the students. The experience of the students is recorded in a post module survey. There is a level of trust involved in writing the reflective journals, which has been gained though regular lecturing interaction. The mark they gain for the journal is based on their ability to critically reflect.

Problem based learning (PBL) requires the student to be self directed and responsible for their own learning as they seek to solve a 'real life' problem, within a group. Group dynamics, group assessment and interpersonal challenges, which were noted by students in phase 1, were addressed [4]. However, project management is still a problem, even though the PBL process is seen to prioritise co-operative learning and group management of tasks. Group size and membership were also explored and large groups were found to be less effective. An important overall finding was the need for greater training for the students in PBL methods, as well as group work and project management.

Following five content based semesters, the students spend their 6th semester in paid industrial placement, where they are expected to put their earlier learning into practice. Their learning outcomes are now recorded in their professional business reports, beginning 2007-08. The companies are also required to provide feedback on the students learning and development. The findings are presented below.

Subjects in the final two semesters, in year 4, set out to further develop the more strategic and cross functional learning and competences in the business, logistics and management skills. This research paper identifies and analyses a number of constructively aligned learning and assessment strategies for use in the students final year (4th year). It is vital at this stage that the learning strategies seek to integrate the three distinct SCM skill constructs, and enhance the student's development of people, analytical and communication competences and skills. The students experience is recorded in a learning log which they develop as they complete each group of assignments. This is submitted for analysis after they complete their exams.

3.1   Research Methodology

This is a longitudinal action research project, where the methodology adopted was qualitative in nature. Action research is a group process by which change and understanding can be pursued at the one time. It is usually described as cyclic, with action and critical reflection taking place in turn. The reflection is used to review the previous action and plan the next one, thus allowing understanding to be shared and change to be pursued with commitment, [23]. This action research paper presents the results of a critical analysis of a series of reflective journals for 2007-08, across a number a range of modules, see table 2. It is the *critical systematic reflection* which enables the action research methodology to achieve its research outcomes. The research design of this study has already been refined as a result of critical reflection by the facilitator and the students. It considered students learning and PBL, the PBL process, management skills and group assessment. Generally the design gets better and fits the situation better as you proceed [23].

3.1.1   The Process;
Procurement Management; On day one, students are randomly assigned to four groups, of 7 members each. The first lecture introduces the students to their new procurement management module and to Connemara Foods, their 'real life' problem. Time is spent explaining the PBL ideals, the targeted learning outcomes, its process, the role of facilitator, reflective learning and journal and group work. Analysis of earlier work by Farrell [4] have lead to improvements in the PBL process. There are a number of introductory sessions, as the students had difficulty absorbing the new information. The written report has been split into 4 smaller learning outcomes, where feedback is given immediately so that any errors or problems can be addressed immediately. Each report will have an element of peer assessment . Each group is expected to keep a group diary to monitor attendance, decisions, progress, targets and responsibilities. I have done a lot more research and training in order to improve my facilitation role. Students were given time at each of traditional teaching classes to ask questions and an additional 2 hours was scheduled weekly for the semester to allow for further tutorials. In addition, the students could contact me on-line, by phone or call into my office.
Industrial Placement; Preparation for their placement begins in September of their fifth semester, while their placement in during the sixth semester. They receive coaching on careers direction, CV and interview preparation. A number of professional logistics managers make presentations on what they

expect from the student when they are on their paid industrial internship. As manager of the internship programme I will outline the whole process and help them to get their jobs. It is my role to ensure that they get only accept a suitable placement as well as act as mentor to them while they are in the company.

Table 2; Primary Data Sources

Subject	Year	Assessment type		Reflective journal
Procurement	3rd year semester 1	PBL written report 80% presentation 5% reflective journal 15%	Large groups 50% LO	2006-07** 2007-08
Industrial placement	3rd year, semester 2	15 weeks applied logistics work Report & presentation Feedback report on performance	Individual 100% LO	2007-08
Global Supply Chain Management (GSCM)	4th year, semesters 1 & 2	Consultancy (PBL style) and presentation Selected topic analysis, presentation or debate Case Reflective analysis of all	Group of 4 20% LO Two 5% LO Individual 10% Individual 5%	2007-08
Partnerships and outsourcing	4th year, semester 1	Case Readings and presentation Negotiation Reflection	Group 4. LO15% Three LO 10% Large group 10% Individual 5%	2007-08

** findings presented at the INTED conference, Valentia, March 2008

Global Supply Management
Building on from their procurement PBL assignment, this first GSM assignment is a consultancy type project where they have to analyse and select a suitable international market and also present the means by which they will the product available. In line with literature the LOs allow them freedom to choose their product, the company as well as the potential markets.
Their second assignment aims to get them either debating or presenting on a chosen topic in groups of two. Their last assignment is an individual case, where they analyse a real life situation.
Outsourcing and Relationships
They have three key assignments; a group case analysis to help them get to know the subject area. The second assignment is a critical analysis of outsourcing readings; 4 are given and they have to choose another two. The final assignment was preparation for and actual mock negotiations.

4.0   FINDINGS AND ANALYSIS, 2007-'08 REFLECTIVE JOURNALS

4.1 PROCUREMENT MANAGEMENT
The findings presented here are the result of a critical analysis of 28 reflective journals, a 100% response rate. A content analysis was conducted using Farrell's [4] common themes and categories. This was done initially for each group and then across all groups. The same seven consistent themes were identified, however some of the problems were much reduced, in line with the findings of the literature.
1.   **Role of Facilitator;** Thirty percent of the students identified the lecturer's new role of facilitator difficult to adjust to and expect her to answer questions right through to end. Literature highlights that the facilitator should guiding the students in their iterative learning process to solve the problem, but gradually fading out over time. 50% of the students recognised that they did not make enough use of the given tutorials as they were not prepared. Timely feedback on reports is essential.
2.   Facilities; Rooms, with white boards were provided once a week
3.   **Group work and Assessment;** With the introduction of peer assessment, Farrell [4], the majority of the group tensions around assessment and carrying someone disappeared. There was evidence of the Bion's group behaviours. Literature identified group dynamics as influential on the learning experience,

motivation and the outcome. 80% of the students recognised their role in the learning experience and expressed that they and their group had matured in the process. Two of the groups failed in their second learning outcome. Feedback was given on both their process and task. Both groups learnt from this and turned their work around. Another group fell at the first LO when they did not complete the required work. This did not happen again and they finished top of the class. This mirrors the literature on learning from our mistakes and the motivation to do it better.

4.   **Group Work - organisation and management of the meetings;** The group size of 7 was on the upper end of that suggested in the literature and was formed taking account of the student population diversity; each group has a mix of Irish national, mature, Erasmus and Chinese students, and students who enter in third year from other courses. I have observed that different groups have different personalities which affects their process outcomes.

An issue raised in all journals, was their lack of organisational, co-ordination and project management skills, which ties with the literature on graduates and their lack of soft skills. However what was more promising was that their organisational skills improved with each iteration of the next LO. Similar to phase 1 [4] all groups experienced the iterative nature of a PBL assignment. Each group split the project up into sub-groups, then assigned work to individuals, before bringing it back to the sub-groups. The final step happened because they realised that they needed to manage the meetings and sub-groups in order to ensure that there was coherence through their company, their chosen problems and the learning outcomes. Many did not use their diary effectively.

5.   **Communication, motivation and leadership;** Students, in their critical reflection, identified many of the softer management skills identified in the literature. 25% of the students were not motivated when they started the PBL process. However their motivation grew as this 'different way of learning the subject, a real way of understanding how thinks work'. For another student PBL was a catalyst that helped to make them realise that they can achieve rather then just get by. As before Leadership was an issue, with some mentioning their regret that did not come forward in their group to manage meetings, ensure all were heard and delegate tasks.

6.   **The Task and Timescale;** Timescale became an issue with the last LO due to a tight deadline. The piecemeal approach to the LOs however allowed the students to adjust to the iterative nature of PBL. They learnt that it was part of the learning process to go down blind alleys, discard information and restart. This is how it happens in real life. Some found it hard to identify what the problems were, for others the problem was linking the learning outcomes, company's problems, knowledge available on-line and the lectures. the tutorials, shorter deadlines and early feedback all assisted here.

7.   **PBL reflection;** PBL was seen by all as a positive experience, with only one dissenter, due to the large group. They could see the link between procurement knowledge, PBL, the exam and the real world. As stated by Farrell[4], the students feel they would be able to tackle any assignment in the real world.

4.2 INDUSTRIAL PLACEMENT

There were 29 students on placement; part one analyses the students feedback on their learning outcomes(100%) and part 2 analyses the placement companies reports (4 companies did not reply). All students worked as logisticians in their company, but in a variety of roles. The placement companies varied from 3PLS, to transport companies, airfreight to shipping companies, army through to production companies. This meant that each student had unique experiences which were not solely due to the individual characters. An interesting observation is that most of the reflection by both the students and the companies, like the literature, is based around the softer, higher level learning.

1.   **Student reflection learning outcomes and subjects used**

All students enjoyed their placements, however 3 remarked that their placement jobs would not be their future choice of career. They commented on the fact that the placement provided them with the opportunity to **put theory into practice** as well as providing them with **practical on the job knowledge** that could not be learnt in the classroom. Six students expressed an increased level of confidence now.

In terms of Communication, 14 students commented on the fact that they have learnt the importance of communication, particularly inter-personal communication, while 4 specifically mentioned their fear initially of e-mails and telephones. 20% of the students had to improve their ability to deal with people. While another 20% had to develop good teamwork skills. One mentioned leadership, 1 assertiveness and one patience. One third of the students believe that their ability to solve problems and make decisions has

improved. Their ability to better manage tasks was mentioned by 8 students, with 2 observing effective management of conflict and another 2 management of meetings. Small numbers of students commented on their increased learning skills and their ability to gather information.

Information Technology skills were improved by 7 students, while 5 state that they understand Marketing / customer service better now. An interesting outcome when the students were asked to outline the subjects used, was the division between management subjects, logistics subjects and IT subjects. Eight students referred to PBL as a subject, even though it was an assessment /learning method.

2. Company Feedback

There was little or no comment on knowledge issues. All the companies complemented the students on their ability and willingness to take on any task, small or large, their flexibility and adaptability. They were able to hit the group running and integrate into the teams and take on a variety of real logistics tasks. They all demonstrated a willingness to learn and the majority demonstrated a capacity to understand the processes very quickly. Many were commended on their management skills, their planning and organising skills. Some were commended on their ability to work on their own initiative. However, on the negative side, the majority of the companies highlighted that the students need to develop more leadership skills. They need to have the confidence to put forward their own ideas, to have confidence in their own decision making skills and have a willingness to take the initiative.

4.2 GSCM AND PARTNERSHIPS AND OUTSOURCING

Peer assessment and the diaries are used for all group projects. The reflective journal analyses their learning using the different methods. The population for GSCM was 29 with 23 reflective journals received, while Partnerships had a student population of 26, with 23 journals received. The analysis for the group work in both modules had similar themes to PBL above.

The qualitative analysis of both modules noted that the class recognised that different skills were needed for each assignment. For GSCM they liked the move from group, to smaller group and finally to individual assessments. All the students enjoyed the GSCM consultancy type project, even though 'they found it a lot of work'. They believed that it allowed them to be creative and to link theory and practice. It also helped them in their analytical ability. They recognised the need to put the report together early to ensure cohesiveness and presentations were practiced. Task Process – groups and time management of meetings and work progress was an issue for 2 groups as they perceived that they had a long period of time. However they also learned to chair and lead in meetings and recognised the importance of the meetings diary.

All, bar three students, enjoyed the debates as a means of learning knowledge on a diverse range of topics. They realised the importance of developing arguments on a topic, listening to others counter argue and then come up with a rebuttal. Once completed the topic was opened up to the class as whole. The student noticed that as the year progressed they became better at arguing their points and were more willing to get involved.

The negotiation assessment involved preparation and execution. The learning journals stated that the preparation side was not effective and caused some confusion. This was partly due to poor specification management and large group sizes. However all students got very competitively involved in the actual negotiation and enjoyed it. They also enjoyed their discussing wining strategies from an Irish and a Chinese perspective.

5.0 CONCLUSION

As in any action research project, more knowledge has been gained and lessons have been learnt which will lead to further changes and developments in the application and management of the PBL strategy, case analysis, negotiation, and debates for this group of Logistics and Supply Chain Management Students. This action research has highlighted the need to align the curriculum, assessment and students learning with the changing industry requirements for Supply Chain Management graduates. In practice,

DIT maintains industry, curricula and assessment alignment for its SCM degree programme through feedback with an industry questionnaire.

PBL/ consultancy type assessments, debates, negotiation and case assessment strategies are proving to be a suitable means of achieving higher level learning. They help the students to address their creativity, communication, leadership and management skills whilst developing SC knowledge. Changes are being made, based on results from these two studies. These include using smaller groups, managing LO time frames, more self direction regarding the assignment brief, peer assessment, more training in project and meetings management. A lot more thought on the use of negotiation.

This research has developed around knowledge gathering and there has been no cross tabulation between any of the results developed above. It is proposed any future analysis should include cross tabulation of the feedback from both the students and the companies.

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