Evaluating Postgraduate students' Perceptions of Activity Led Learning: Findings from a longitudinal study

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INTRODUCTION

The benefits of active learning approaches have long been advocated with research [1] identifying increased engagement and better recall of information amongst the advantages. In addition, research [2,3] found that this type of approach developed employability skills such as problem solving, communication and team working. Authors [4,5], advocate that active learning aligns with "learning by doing". Mainstream active learning techniques such as problem based learning, project based learning and enquiry based learning have gained increasing popularity and it was against this backdrop that Coventry University, Faculty of Engineering and Computing developed its' own approach called Activity Led Learning (ALL).

This longitudinal study on the effects of implementing ALL in the masters module Management of Quality started in 2010 and focused on improving the engagement of the mainly international students studying this module. A passport system was introduced [6,7,8] which needed the students to bring with them to class notes from private study so that they were suitably prepared to contribute to the seminar.

This research study continued as part of the ALL for Masters Project funded by a Higher Educational Academy Teaching Development Grant (HEATDG) [9]. The earlier research was one of the principle inputs towards the HEATDG project, which investigated how ALL could be integrated in master's programmes in Engineering and Computing. This HEATDG project enabled a third consecutive year of ALL delivery in the master's module to be evaluated. The module team believed this format was working well, but this opportunity to evaluate the approach from the students' perspective allowed their assumptions to be tested.

This paper reports on the findings from the third and final evaluation of this longitudinal study. It reflects on how the approaches to ALL evolved in the postgraduate context and particularly how this impacted on the research results. The overall findings from the three year study are considered and as far as possible more general conclusions are drawn about the potential for ALL implementation at masters' level.

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1 LITERATURE REVIEW

1.1 Active Learning

Active Learning has been simply defined as “involving students in doing things and thinking about the things they are doing” [10] and the essence of the approach has been advocated for many years. Research [11] identified one of the four key elements for fostering a deep approach as “learner activity” in which the students were active (doing) and actively involved in their learning. Similarly research [12] advocated “learning by doing” and suggested students should become involved in real world tasks. Whereas Ramsden [13] proposed six principles for effective teaching and one of these was “active engagement”. In identifying active learning as a key ingredient for encouraging students to adopt a deep approach to learning, these authors [11,12,13] also identified other supporting factors. Common themes emerged regarding the students’ learning environment particularly: learning from students; independent group work; facilitating learners (in group work); and interaction with others.

Methods which facilitate active learning that are popular within engineering education include problem-based learning (PBL) and project-based learning (PjBL). A useful overview [14] of these techniques identifies that both approaches: require academics to take the role of facilitator; they normally require students to be responsible for their own learning; and often involve students working in groups.

It is clear that active learning is a key ingredient of effective learning as a recent study [15] suggested that lecturers need to particularly develop a course design which “encourages and requires the active involvement of students in the learning process”.

1.2 Activity Led Learning (ALL)

It could be argued that ALL is a response to this challenge. It has been defined as: “a pedagogic approach in which the activity is the focal point of the learning experience and the tutor acts as a facilitator. An activity is a problem, project, scenario, case study, research question or similar in a classroom, work-based, laboratory-based or other appropriate setting and for which a range of solutions or responses are appropriate.”[16]

This definition of what constituted an ALL approach was deliberately left flexible and open to interpretation to allow for the wide range of disciplines included in the faculty. Each department or course team was encouraged to adopt a strategy within the spirit of the ALL approach that best suited the nature of the topics and skills students needed to master. There have been a number of investigations and evaluations of ALL implementation across a range of undergraduate modules [17,18]. The main advantages emerging through the evaluations at module and programme level were increased student retention, clear improvements in student engagement and attainment and exceptional levels of transferable skills, particularly confidence in oral presentation and group working that had very positive outcomes for employability.

Initial evaluations focused on undergraduate students; however the move to a purpose built new building prompted consideration of postgraduate taught programmes (PGT) and whether ALL could be applied at this level, given the diversity of the PGT population compared to the undergraduates.

1.3 Student Diversity

Student diversity is increasingly a topical subject. Morgan [19] has argued that modern students are “not one dimensional but multifaceted” and that this complexity is due to a range of factors which could be used to group the students including part time, minority ethnic groups, disability, mature, international, to name a few.

International students have been the focus of many recent studies as they represent a significant proportion of students particularly at post graduate level in the UK. Cultural diversity of students without previous UK educational experience has been found to impact teaching and learning methods [20]. A guide [21] for staff working with international students within engineering courses that provides exemplar strategies for teaching a diverse range of students, noted that in labelling these students ‘international’ it “hides the diversity between the students” [21]. Whilst optimising the learning process has been identified as a challenging task [22] it has been suggested that by recognising

commonalities between all students and adopting a practical approach then all students will benefit from changes to teaching and learning processes [21].

Although international students comprise the majority of the full time cohort on the Management of Quality module, the part time cohort comprises entirely mature, mainly UK students who are also in full time employment. In common with the international students, they are "not a homogenous group" [19] and face challenges adapting to study, particularly balancing the demands of employment alongside those associated with their studies.

1.4 Module Operation

Therefore, in developing ALL approaches suitable for international students [6,7,8], in theory the principle could be applied to part time students. The module team amended the module structure to suit the 6 week, twice a week delivery mode of the part time students but kept the ALL content the same as the 11 week full time mode. In both cases the contact time consisted of a one hour lecture which was complemented by a two hour tutorial. Whilst the full timers had several days between the two sessions enabling them to complete the "passport", the part time mode students had both sessions on the same evening, which required the passport to be completed before the lecture and therefore in a few cases it required adjusting and supplementary information provided by the lecturers.

2 METHODOLOGY

2.1 Research strategy

The research was based on a single case study design [23], where the context for the case is the Faculty of Engineering and Computing and the adoption of ALL. The case is the masters' module "Management of Quality". In this evaluation study the unit of analysis is the annual operation of the module and therefore a longitudinal approach has been adopted, which covers the first three years in which ALL was implemented. A weakness of single case design occurs when only the sub unit is focused on and the larger unit of analysis (the case) is not analysed [23]. The purpose of this paper is to review the findings from the final running and then evaluate the whole research, in order to draw module level (case wide) conclusions about the adoption of ALL.

Within the single case design, an embedded case study approach [23] has been selected. This approach relies on a holistic data collection approach to establish information about the main case (the module) and then uses other data collection techniques to find out information about the unit of analysis (the annual occurrence). This is known as a mixed method approach. Participant–observation was used to collect data regarding the module and a questionnaire was used to collect data about each occurrence. In selecting this methodology, a weakness of the single case approach is overcome, as access to evidence has been maximised through the embedded cases.

2.2 Data collection and analysis

In order to collect data which described the case and captured the evolution of the module design, participant observation was used, specifically the type of "participant as observer, who forms relationships and participates in activities but makes no secret of intention to observe events" [24]. This approach was considered suitable as it provided in-depth information across the longitudinal duration of the study as the module team were immersed in the teaching and learning. Participant observation is suitable when a "variety of roles" are used, it is necessary to "participate in events" and there is also the opportunity to "manipulate minor events" [23]. This covers the role of the academic staff that designs, delivers, facilitates and assesses within the module. Whilst an acknowledged weakness of this data collection approach is that the participant element of the role is demanding (thus detracting from the observation) and it is not always possible to be an objective external observer. These limitations were addressed by the module being double staffed so that ALL could be observed and time demands shared. In addition, given this technique was also being used to inform the case overview, this data could be corroborated against module documentation such as lesson plans.

A qualitative survey was developed [6] and administered to each of the cohorts along with the module evaluation survey, at the same period within the module delivery. The survey consisted of mainly open-ended so that the students could freely express their opinions around these deeper questions, and as researchers this meant that "unanticipated perspectives" [25] could be obtained.

The survey was administered in November 2010, 2011 and 2012 to the full time cohorts. The 2012 survey was also used for a part time cohort of students and this was administered late October 2012.

A within case analysis for each cohort (unit of analysis) was conducted. This comprised Content Analysis of the survey responses which according to Flick [26] is suitable for analysing any text-based material, regardless of the source. Content analysis also enables an objective and deductive approach to the analysis whilst seeking for clarity and unity of messages [26]. The content analysis was based on Miles and Huberman [27] and involved searching the survey responses for content which aligned to the themes of ALL or more generally teaching and learning. The content was coded, counted and tabulated in matrices. Where appropriate multiple codes were allocated to a response if it referred to multiple themes. The matrices have enabled key themes to emerge and be easily identified. Three stages of data analysis were followed: data reduction, data displays and conclusion drawing/verification [27]. The final stage was completed within each unit of analysis (each cohort's response) and then across the units in order to gain the conclusions for the whole longitudinal study.

3 RESULTS

3.1 Summary of 2010 and 2011 Findings

The first study based on the 2010 full time cohort found that the ALL approach was significantly different to the prior learning experience of the majority of students. The students found the most helpful elements of the approach were guided learning and the use of the passport. Other helpful elements that the students identified were the in-class interactions, group work, and learning by doing. The main challenges and difficulties identified by the students were mainly associated with being given too much work, although a small proportion identified learning by doing and guided learning as a challenge. A detailed analysis and set of results were presented and published [6]. Based on these results incremental changes were made to the module; the most significant was the reduction in the number of coursework assignments from 4 to 3, in order to alleviate the perception of too much work.

The second study in 2011 [7] found that the students still considered learning by doing and the guided learning a challenge yet commented positively about these approaches and identified them as helpful, along with the interaction with staff and students. There were significantly less comments regarding too much work. Overall there were more positive comments particularly identifying that the use of the passport enabled them to better prepare for class. However, a new issue emerged concerning poor English language ability and issues about struggling with language comprehension.

3.2 2012 Data Analysis and Results: Full Time Students

For the autumn 2012 occurrence the 94% response rate consisted of 80% non-European international and 20% European students with just 30% having studied in the UK previously. The main challenges and difficulties identified by 18% of respondents were: language and understanding; and time-management aspects. The short time between contact sessions was probably the main reason for the comments about time pressures. Unlike 2011, due to the evening occurrence the timetable had been adjusted for the full time students giving them one less day between the lecture and their tutorial. It is considered that this is the cause of the re-emergence of this challenge. Around 10% of the students referred to challenges with presentations, but this also featured commonly in responses to other questions, with many students saying this was a new type of assessment and very useful new skill.

The responses, *Table 1*, provide an encouraging message about the way the students were taught and expected to learn, particularly regarding the engagement of students studying the module. The number of comments about scholarly pursuits highlights how students enjoyed the research aspects of the module. . One comment made reference to the interaction and sharing of viewpoints:

"what I consider helpful most is in the seminar section where we all have the apportunity [sic] to express your views and share others". ***(Respondent 2012 survey)***

Table 1. Evaluation of autumn 2012 full time responses: helpful top 5

What do you find helpful about the way you are taught and expected to learn?	No. comments
Engaging, stimulating, interactive, dialogue, inclusive, sharing	14
Passport, obliged to do homework, understand everything in class	9
Presentation skills	9
Linking theory with practice, integrating case study	6
Teachers enthusiastic, encouraging, available, helpful, easy to understand	5

Reinforcing that what has been learnt was seen as an important aspect of the delivery, and despite some students finding the presentations a challenge, the finding that students find them helpful supports the continued use of this approach. This enabled the interactions and dialogue between students and lecturers which in turn created an engaging and active learning environment.

3.3 2012 Data Analysis and Results: Part Time Students

Although, fewer students were on this module occurrence, a similar response rate for the survey was achieved. The comments were analysed thematically and those concerning challenges or difficulties are presented in *Table 2.*

Table 2. Evaluation of autumn 2012 part time responses: challenges top 5

What do you find challenging or difficult about the way you are taught and expected to learn?	No. comments
Time, pressure, pace	10
Preparation, reading, [like going] back to school	9
Discussions, sharing, group work	8
Would like longer/more lectures	3
Presentations	2

Unsurprisingly the most common topic was about time constraints, pressures and pace of the learning. The research aspects, including requirements for preparation and reading and discussions, group-working and sharing were the next most difficult elements. Given half the cohort were new to postgraduate study, then these difficulties could be linked as the research and preparation would have been a new experience whilst the discussion element could be perceived difficult in a new environment, particularly if the students lack familiarity and therefore confidence. In the comparison to previous learning experiences most responses mentioned greater interaction, involvement from students and contact in their current course, whilst a few said there was less lecturing. Five responses concerned their lack of recent experience of study, less practical content before and being new to UK study methods which supports the comment concerning familiarity previously noted.

Students found a range of the teaching and learning practices helpful. Responses related to effective teaching and learning, interaction and how the classes were structured, for example:

"short lectures allow time to digest information and understand it as a group, sharing experiences is useful" ***(Respondent 2012 part time survey)***

"the breakout sessions make you think more and help to get message across of each lecture" ***(Respondent 2012 part time survey)***

Unsurprisingly, there were no issues reported by the part-time students about language skills and understanding lectures. However there were some suggestions for more lectures and more assimilation time for difficult topics, particularly because of the more intensive delivery format for part-

time modules. The other major difference was the focus by part-time students on how group-work is managed, particularly when contact requirements fall outside scheduled class time.

One important positive finding common to both cohorts is that on this module at least, almost all part-time students and full-time students welcomed and saw the benefit of an ALL approach to learning.

3.4 Results from the 3 year study

Routine module surveys were conducted to capture student satisfaction at each operation of the module. The survey questions were not specific to this research, but did provide a comparative measure of how the module was viewed by different cohorts over time. The results, *Table 3,* confirm how the views of part-time students have improved since the last evening operation in 2010. The data shows similar high mean scores in 2011 and 2012 where the ALL approach was used and notably the low mean scores are within 0.5 of the high mean score. This suggests that across the cohorts there are similar levels of high satisfaction and there has been a positive impact on student perception.

Table 3. Formal module survey results

Formal EM module surveys 2011-12, using Likert with scale 1=low 5=high	Mean Scores		Number of responses
	Low	High	
evening Dec 2010	2.58	4.21	19
daytime Dec 2011	4.33	4.87	88
daytime Dec 2012	4.62	4.88	78
evening Dec 2012	4.57	4.86	21

During the study, students identified time pressures, whilst initially arising associated with too much work this was designed out for 2011, yet the finding remerged in the 2012 full time cohort due to a timetable change. This suggests that sufficient time to complete the guided learning work is important to students. This is emphasised by the results for the part time students who identified time pressures as the main challenge. English language ability and understanding emerged in the last two iterations of analysis (full time students only), although it had been noted by the academics in 2010 [6]. English entry requirements are outside the control of the module team, although from 2014 onwards the University will accept IELTS 6.5 minimum score for entry to master's programmes. Across the study the students consistently identified guided learning (passport completion) and learning by doing as a challenge. However, there were strong findings that the students also find these approaches helpful along with interactions and group work.

4 DISCUSSION

Early in this research it was established that international students were not all the same [6] aligning with Morgan's [19] assertions and therefore findings based on the cohort (unit of analysis) were used to identify commonalities to inform the iterative adjustments to the module which would benefit all students [21]. At the module (case) level, over the three years the study has found that time pressures are important to students and need to be considered when designing, planning and scheduling the module teaching and learning especially since a heavy workload is associated with a surface learning approach [12]. In similar research [28] students resent the "intellectual effort" associated with active learning which could explain why guided learning and learning by doing are perceived as a challenge. Across the cohorts, students found learning by doing helpful to learning and teaching, suggesting that they like the approach. The positive perception concerning engagement with learning has also been reported in research [28]. In addition, the recognition that interaction, group work and engagement were helpful to learning suggests that the approach facilitates deep learning [11,12,13].

This study did not examine the link between ALL and academic performance and whilst acknowledged as a limitation, it should be noted that the questionnaires were anonymous and so perceptions could not be linked to performance. The module results were within faculty norms.

However the results do provide sound evidence of one method for successfully applying an Activity Led Learning approach in a PGT module.

5 CONCLUSIONS AND RECOMMENDATIONS

The longitudinal research and development conducted by the module team has provided a case study of excellent practice, demonstrating how to fine-tune learning, teaching and assessment by listening to student feedback. The results from previous research together with those presented here should provide inspiration both for colleagues and people across the wider academic community. This study provides evidence that active learning approaches such as ALL can be successfully applied in the context of postgraduate taught programmes involving students with diverse range of previous educational backgrounds. In the local context of the Faculty of Engineering and Computing at Coventry University, the results from this research are helping to convince colleagues that such approaches can help to inspire and engage students and encourage deep and sustained learning.

There is no reason to doubt that similar approaches could be highly beneficial to PGT students if implemented for other subjects and in other universities.

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