

Perceptions of the benefits of the A3 planner in facilitating project-based learning in accounting education

Jing Wang, Nottingham Trent University*

Vangelis Tsiligiris, Nottingham Trent University

Robert Hartley, Nottingham Trent University

*Author for correspondence, Newton Building 609, Accounting and Finance

Department, Nottingham Business School, Nottingham Trent University, NG1 4BU

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This paper evaluate ways of instilling project management skills into accounting based learning by the use of an iterative A3 planner to plan, monitor and review assignment progress. The application of an A3 planner to facilitate a project-based learning (PBL) group assignment in undergraduate accounting education has been critically evaluated in terms of both the student and tutor experience. The study uses a mix of qualitative and quantitative data. Quantitative data assisting exploration of perceptions were collected through 100 undergraduate students. A series of focus group discussions were carried out to investigate students' engagement and tutors' teaching experiences regarding the adoption of the A3 planner. The results suggest that the A3 planner promotes active planning and effective management of a PBL group assignment. It makes students' thought processes more visible thereby facilitating and enhancing the tutoring/mentoring process. Moreover a more interactive and transparent approach by doing assignment via the use of an iterative A3 planner has ensured more feedback points and action based efficiency in the doing approach for learners.

Keywords: accounting assignment; lean-based tool; A3 planner; university accounting education; group assignment

Subject classification codes: research paper

Introduction

In recent years, there has been increased discussion about the need to develop accounting and business students' generic skills as a way to respond to the changing needs of the employment market (Stanley & Marsden, 2012). To achieve this, there has been a call for accounting and business tutors to shift from a content-based approach to a skills-driven teaching approach. The project-based learning (PBL) approach, as a derivative of an inquiry-based learning, has been considered as a way to facilitate this shift. The main research question that this study aims to answer is how an A3 planner is perceived by students and tutors as a tool for facilitating a project-based learning (PBL) group assignment in undergraduate accounting education.

Exploring the applicability of an innovative way to facilitate project-based assignment, via application of the A3 planner, this investigative research would be valuable in overcoming the problems associated with the complexity of the project-based learning approach which often leads to adverse results (Kirschner, Sweller & Clark, 2006). A3

think is as much about developing good problem-solvers as it is about effectively solving problems (Sobek and Smalley, 2008). As such, this study is relevant to accounting educators who envisage, by adopting a PBL approach, making students responsible for their own learning through inquiry. Additionally, considering the catalysing role of PBL in bringing about better learning outcomes for accounting graduates at global scale (Stanley & Marsden, 2012), this study is of relevance to accounting educators anywhere in the world.

To address the above main research question, a mixed approach was adopted to collect students and tutor feedback. For student feedback, data was collected through a questionnaire survey followed by a focus group interview. Tutor feedback was collected through focus group interview.

Contribution

The paper provides a justification as to how a real-world lean management principles based tool, such as the A3 planner, can be used in accounting education classroom experience and help the facilitation of a problem-based learning assessment. Specifically, by reflecting on student perceptions, this study shows how the A3 planner can be used to project manage the assignment process by providing a one page iterative planning document which recognises the value of the student voice. Also, the findings emerging from tutor feedback, explain how the A3 planner can enable accounting tutors to use it as a platform for ongoing feedback on students' progress.

The remainder of this paper is organised as follows: Section 2 provides a summary of relevant literature and the theoretical frameworks, which are essential for understanding the process of applying lean-based tools such as the A3 planner. Section 3 outlines the methodology of the study; Section 4 includes the presentation of the findings from tutors' and students' perspectives; Section 5 provides discussions; and Section 6 provides concluding remarks and consideration of the limitations.

Literature review

Project-Based Learning (PBL)

PBL is an approach to teaching and learning that places the students at the centre of learning and makes them responsible for their own learning through inquiry (Bell, 2010).

PBL provides students with the specifications of the end product (i.e. project business report), and while completing the project students will have to resolve several problems that act as learning moments (Walker et al., 2015). During the process of PBL tutors are expected to provide guidance and feedback thus acting as coaches and facilitators rather than as teachers (Bell, 2010). The PBL approach is said to promote “learning responsibility, independence, and discipline” (Bell, 2010, p. 40). Additionally, during the PBL process, the students develop a range of “soft skills” such as teamwork, active listening, generation of ideas, and self-evaluation (Stanley & Marsden, 2012). As such, PBL promotes generic skills that are considered critical, by both students and employers, in the contemporary employment market in accounting (Kavanagh & Drennan, 2008).

Challenges in the application of PBL group assignment

There are three main fundamental prerequisites for the effective and efficient application of PBL: 1) teachers acting as facilitators and coaches, 2) students becoming active problem-solvers, and 3) shifting the focus from theoretical content to problem engagement (Tan, 2004). Achieving these three prerequisites is a challenging task. Previous studies (e.g. Milne & McConnell, 2001) indicated that tutors who attempted to apply PBL in accounting education encountered difficulties in the facilitation and support of the process and students were not easily transformed from passive to active learners. When it comes to the facilitation and support of the PBL process, increased workload for tutors is created due to the varied nature of the different projects in a single classroom (Milne & McConnell, 2001). Studies (Dowling, Godfrey, & Gyles, 2003; Drennan & Rohde, 2002; Ginns & Ellis, 2009) show that positive perceptions from students about the value of the PBL approach are linked to better engagement with the process and, consequently, improved educational outcomes in comparison with traditional teaching approaches.

PBL assignments normally require a larger and more complex skill set to complete (Sterns & Spokus, 2013), therefore group work becomes beneficial as it enables students to participate in producing work which is beyond the capabilities of a single student. However in a group-learning context the students have to learn how to work within a group, listen, and negotiate with others in order to resolve dilemmas or conflicts. (Donnelly & Fitzmaurice, 2005). Research shows that student satisfaction during the process of coursework preparation plays an important role in student engagement

(Drennan & Rohde, 2002). From the above discussion it follows that some of the challenges in the application of PBL could be resolved by helping students to manage their group dynamics, and helping tutors to facilitate the PBL process in a way that promotes student satisfaction. To this end we explore how the A3 planner can aid in the facilitation of a PBL group assignment in accounting undergraduate education.

The A3 planner as a tool to facilitate PBL assignment

The A3 refers to Toyota's approach in capturing all aspects of an issue on a single piece of paper (Chakravorty, 2009). This approach is based on the lean management philosophy where "less is more" and is defined as "a systematic approach to identify and eliminate waste through continuous improvement" (Bhasin, 2015, p. 11). The latter is often facilitated by the plan-do-check-act approach (PDCA) known also as the Deming's Cycle (Shook, 2008; Sobek and Smalley, 2008).

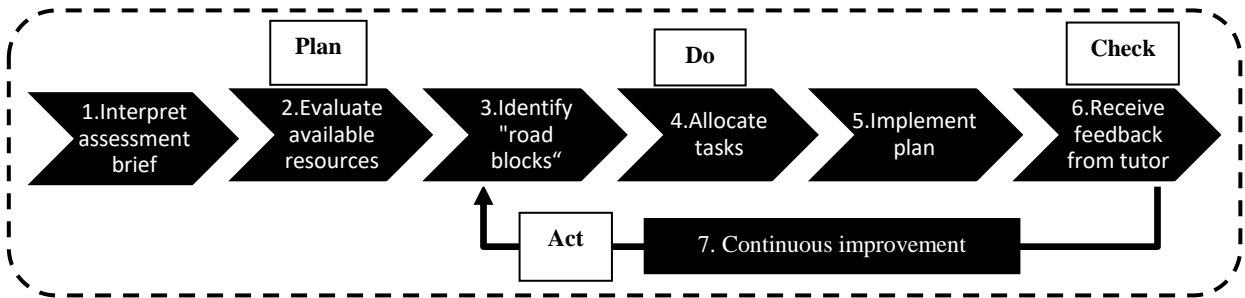
As shown in Figure 1, the A3 planner¹, based on the lean management principles and the PDCA approach, can be used to manage projects and coordinate teams towards the achievement of organisational strategic objectives. Also, based on the lean management principle of continuous improvement, the A3 planner helps team members to openly evaluate progress towards the achievement of a common goal and jointly plan corrective action. Overall, the A3 planner is a tool that allows organisations to actively engage all internal stakeholders (e.g. senior management, line managers, supervisors, workers) in the management and resolution of a problem or the achievement of an objective (Chakravorty, 2009).

Specifically, reflecting on the PCDA approach, during the planning phase (steps 1-4) the A3 planner allows students to take their time to understand the assignment requirements, assess the availability of time and other resources, identify roadblocks, and then plan future actions by allocating tasks to members. In implementation phase (step 5) students are able to implement the tasks planned and openly monitor the completion progress. The involvement of tutors comes in step 6, where they use the A3 planner information to provide feedback to student groups. Then, in step 7, students act upon

¹ In this study, we use the term "A3 planner" to refer to the A3 document used to plan, implement, manage, and improve PBL assignment.

feedback and continuously improve their project by updating their A3 planner accordingly.

Figure 1 PDCA approach



The format of an A3 planner is not fixed. Instead, it may be tailored according to the nature of the problem and the needs of the organisation. Some of the standard contents of the A3 planner are (Shook, 2008) 1) the title of the problem; 2) users and date; 3) background information about the problem; 4) current state of things; 5) goals and targets; 6) analysis of potential causes of the problem; 7) proposed solution/action to solve the problem; 8) implementation plan: what, by when, by whom; and 9) follow-up actions.

How the A3 planner can help in facilitating PBL group assignment in accounting education

As indicated by a review of the literature (Bell, 2010; Opdecam, Everaert, Keer, & Buyschaert, 2014; Stanley & Marsden, 2012) the main challenges in the application of PBL is on how to monitor student progress and manage group dynamics. The varied nature of each project, which is a source of the value of PBL, creates a potential barrier for tutors to provide feedback to students. The A3 planner could be used to help students and tutors manage each project in a more efficient and effective way. By gathering all the necessary information in one document - the A3 - students will be able to 1) review the problem; 2) evaluate progress towards the planned objectives; and 3) receive formative feedback from tutors.

The A3 planner, as a tool that helps to identify and delegate tasks to group members, can help manage the “equal contribution” issue in higher education assignment. The use

of the A3 planner by students for managing group assignment can create a transparent way of monitoring progress and evaluating the contribution of individual member. As such, the use of the A3 planner can potentially minimise conflict amongst group members and improve student satisfaction in group assignment.

Additionally, considering the lean management principle that drives the A3 planner design, it can help accounting students to acquire soft skills such as time management and project management which are considered to be valuable by employers (Milne & McConnell, 2001).

Conceptual framework

This study aims to evaluate the use of the A3 planner in the context of a plan-do-check-act (PDCA) lean management approach for the facilitation of PBL group assignments in undergraduate accounting education.

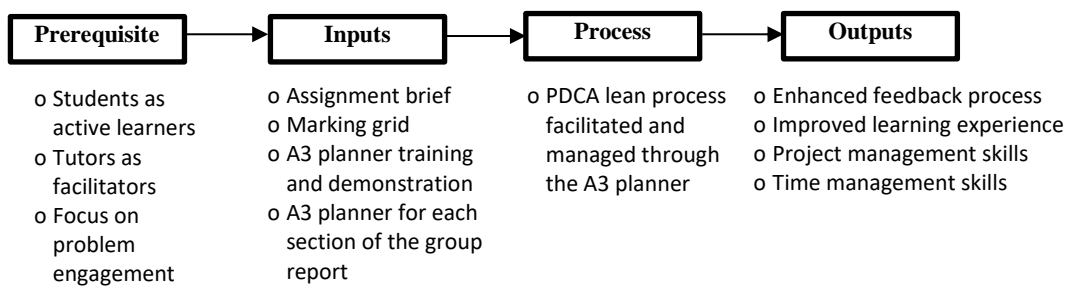
As outlined earlier, the PBL approach has three prerequisites (Tan, 2004). Our conceptual framework (in Figure 2 below) represents the PBL approach with an input/process/output model. The inputs refer to information provided to students that is necessary to initiate the PBL process. In the context of our study, the inputs we provided our students with were; a) the assignment brief and the marking grid; b) training on how to use the A3 planner; and c) electronic copies of the A3, one per section of the group report. The process of planning, managing, completing, and submitting the PBL group assignment was facilitated by the A3 planner. The A3 planner is structured to enable the PDCA lean management approach. We expect that this approach will allow students to plan and develop their project, control project schedule and effectively manage the group assignment task in a timely manner. Consequently this will lead to less conflict between group members and greater student satisfaction with the process. At the same time it will allow tutors to monitor the process and to effectively provide feedback.

The research questions we aim to answer in this study are the following:

1. What are the perceptions of tutors regarding the use of the A3 planner as a tool to help them act as facilitators in a PBL group assignment?

2. What are the perceptions of students regarding the use and benefit of the A3 planner as a tool to facilitate PBL group assignments?
3. To what extent have students used the A3 planner in the different stages of preparation of their PBL group assignment?
4. What are the factors that contribute to the successful application of the A3 planner?

Figure 2 Conceptual Framework



Methodology

The research setting

This study took place in two different full-year accounting and finance undergraduate modules taught in years 1 and 2 at a UK university. Both modules have a managerial, non-specialist perspective and are compulsory for students.

Both modules are entirely assessed by a PBL group summative assignment and this is the only PBL assignment that the students have encountered in their year of study. The project requires students to work in teams of 3–4 to deliver a business plan presentation and produce an accounting-based business report in an imaginary (but realistic) start-up of their choice. Both the presentation and the report should include the following sections: 1) Introduction of the business idea and market research; 2) Predicted product costs and CVP; 3) Forecasted financial reports; and 4) Foreign exchange, strategic capital structure and investment and dividend decision. The students are provided with guidelines about the expected content and quality of each section.

This was the first time that the lean-based project management tool A3 planner has been used in a PBL assignment. Before the start of the group work, there was a lecture in each cohort to formally introduce the assignment brief and demonstrated how the A3 planner could be used as a project management tool. Students were provided with A3 planners customised for each section of their group report. Students are asked to plan, record and monitor their actions during the preparation of the group assignment. Additionally the A3 planner was framed as a compulsory component of the group business plan presentation, and it was expected that students will use it to receive formative feedback by tutors in the scheduled drop-in sessions and any other booked meetings with their tutors. The final submission for the project was a business report. The A3 planner was not required in submission as the content, and project management process should have been captured and reflected in the report.

In the present study the A3 planner (Figure 3 below) was adapted to reflect the requirements of the PBL group assignment as shown below. First it includes static sections about; 1) the assignment marking criteria; 2) the project title; 3) the group members; and 4) submission details and requirements (e.g. date and deliverables). These sections and the information there are to play a useful role in reminding students and tutors about the key aspects of the assignment and the composition of the group.

Second, the sections of the A3 planner used by each group to plan, manage and report their progress include: 1) the title of project part; 2) group meeting-actions to date; 3) status of actions; 4) feedback from the seminar tutor; and 5) follow-up actions (by when, by whom).

Figure 3 A3 planner

Seminar Number		Group No.	Project Title:		Seminar Tutor	
Updated on:			[title of project section]		Group Set Members	
Assignment Marking Criteria			[here students will report the key highlights/structure/findings of the project section]		[list of group members using student reg number and email]	
Submission Date					Road Blocks	
Submissions/Deliverables					[here students will identify and list the limitations, possible restrictions and key assumptions for the report]	
Date	Group meetings-actions to date				Status	
Feedback from seminar tutor						
Date	Follow up actions				by when	by whom

Data Collection and Analysis

The study deployed a mix of qualitative and quantitative data collection methods: a) a questionnaire survey for students, and b) two separate focus group discussions, one for students and another for tutors. Prior to the collection of data the study gained full ethical approval of research by the divisional and school ethics committee.

The purpose of the questionnaire survey² was to capture students' general perceptions of the use of the A3 planner for managing their PBL assignment. The questionnaire survey was distributed to two cohorts totalling 179 undergraduate students in nine seminar groups. To comply with the university and the wider education research ethics guidelines³ the seminar tutors of the module administered the survey. The tutors introduced the survey by explaining that participation was voluntary and anonymous, and the data collected was purely for research purposes and not linked in any way to the student's assessment.

² A copy of the questionnaire is provided in Appendix A.

³ See Ethical Guidelines for Educational Research available here: <https://www.bera.ac.uk/wp-content/uploads/2014/02/BERA-Ethical-Guidelines-2011.pdf?noredirect=1>

The respondents for the questionnaire survey were 100 undergraduate students which represents an overall response rate of 56%⁴ (additional descriptive data on students appear in Table 1 below). The questionnaire includes eleven 5-point Likert scale-type questions and three semi-closed type (yes/no) questions with space for further elaboration. The Likert scale questions focused on the four aspects of the A3: 1) understanding of the assignment; 2) project management; 3) time management; and 4) continuous improvement.

Table 1 Sample of the study

Module information Level	Type of assignment	Summative /formative assignment	Compulsory /optional accounting module	Programme of study
Undergraduate Level 1 Total 62 students, 37 responses, response rate 59.7%	PB-Group	Summative	Compulsory	International Business
Undergraduate Level 2 Total 117 students, 63 responses, response rate 53.8%	PB-Group	Summative	Compulsory	International Business

The quantitative data collected from the student survey were analysed using SPSS to address general opinions on the benefit of the A3. Cronbach's alpha was used to measure the internal consistency ("reliability") of the questionnaire. In addition ANOVA was used to identify differences between the two levels of students.

⁴ The voluntary participation nature and the timing of the survey explains the slightly higher than normal non-participation rate. The fact that the survey did not form part of the students' assessment and that it was conducted at the end of the module probably prevented a higher response rate. Despite being lower than expected the response rate is satisfactory and - subject to its limitations which are discussed and acknowledged - allows us to gather valuable insights on the topics of the study.

To complement our findings from the questionnaire survey we conducted a focus group discussion with eight undergraduate students.⁵ Specifically, we facilitated a one-hour focus group discussion with a list of six main questions (see Appendix B). The interview questionnaire was used as a guideline to allow us to gain more insight into the themes that emerged from the analysis of the quantitative data. We asked students to describe their experience on the uses of the A3 planner in the project management process. Within the focus group discussion, we provided prompting questions to elicit expansion of interesting subtopics and challenged participants to share a range of perspectives on the topics under discussion. The focus group discussion also emphasised the level of students' engagement and how students used the A3 planner across the stages of assignment preparation and submission. The final question in the focus groups asked students to reconsider the use of the A3 planner if they knew that it was highly valued by future employers. This aimed to identify the potential driver for the adoption of the A3 planner by students.

We are aware that the validity of qualitative data, such as the data collected via our focus group discussion, can be affected by two factors: 1) researcher bias and 2) reactivity (Patton, 2002). In order to reduce researcher bias we used an interview questionnaire to conduct the focus group discussion. In this way we ensured that participants were asked the same questions and that their responses were properly recorded. In terms of the risk of reactivity we were not involved in the delivery of the modules that were the subject of this study. Thus the potential influence of our presence on students' responses during the focus group discussion was minimised.

We invited the three tutors, who were directly involved in the delivery of the accounting modules used in the study, to voluntarily participate in a focus group discussion.⁶ We facilitated a one-hour focus group discussion with tutors to gather their observations and

⁵ Participation in the focus group was voluntary. Students who answered "Yes" to a follow up study were selected from the questionnaire survey.

⁶ There were another four tutors who used A3 in modules at postgraduate level and executive teaching. These tutors were not invited to participate because the focus of this study is on the undergraduate level.

experiences in managing a PBL group assignment before and after adoption of the A3 planner and their perception of its benefits.

The qualitative data were analysed in the context of the tutor perceptions of the PBL group assignment process before and after the adoption of the A3 planner as well as students' use of the A3 and how its use is linked to employability.

Analysis of results

Tutors' perceptions of conventional processes of undertaking assignment vs. the A3-based process

As part of the focus group discussion we asked tutors to outline their observations and experiences before and after adopting the A3 planner as part of their PBL group assignment.

The Conventional Process

In describing their conventional process, tutors mentioned that students were given the assignment brief along with explicit marking criteria through the module handbook and that additional clarification is provided in lectures and seminars. The assignment involved the preparation of a final business report. An interim presentation was required to report progress and receive summative as well as formative feedback from the tutor.

The tutors' observation of the conventional process was that students did not start gathering the required information until near the time of the presentation. In addition to the delay in the information-gathering process, the quality of the presentations indicated a superficial engagement by students who tended to spend their time and effort in tackling the soft issues rather than developing a comprehensive overview of all of the required areas, particularly, accounting-related areas. Substantively, one goal was furthered but others were hindered. Tutors commented as follows:

“Students expand extensively on marketing-related business ideas in their presentation and largely ignore the fact that the key part of this project is about cost, budgeting and financial statements”

“...PBL group assignment, due to its relatively long time span and complexity of nature, particularly in group work, early and formal planning is critical to keep students engaged in the process.”

Some students attempted to provide information on the most challenging parts of the project but because of a lack of formal planning, there were inconsistencies between the assumptions made earlier on and the data presented. The tutors considered their ability to provide useful feedback to be affected by the limited, partial or discontinuous information provided by the students; as seen in the following comments:

“Students constantly change their ideas as the project moves forward so monitoring each member’s progress and consistency during the whole project appears to be a challenge.”

“...it is not easy to provide feedback on a project, especially in the late stages of the project; we have to spend time tracing back all the changes made.”

A3-based Process

The tutors justified the introduction of the A3 planner as an effort to encourage students to obtain comprehensive views of the project and a better understanding of the requirements. Specifically the A3 planner was embedded in the summative assignment by replacing the traditional PowerPoint slide presentation. The A3 planner was chosen because it has been an effective tool that is widely used in industry for planning and managing projects.

“...what we observe is that the A3 planner helps us to manage students and the students to project manage themselves.”

Students tailored the A3 planner to reflect their specific aspects of the project and monitored their own progress by continuously updating their record, identifying potential issues, reporting these to their tutors via the A3 planner and receiving timely feedback. The tutors mentioned that the project development process usually takes time, however, the A3 planner updated the project process through intuitive reports and made students’ thought processes visible. The students could plan changes in detail, including which steps will be taken, by whom and when. In contacting or meeting with tutors, tutors easily

traced students' progress and focused on encouraging the project's strengths and addressing the weaknesses. Overall, the tutors perceived the A3 planner as helping to reduce staff workload while improving the quality of feedback to students.

“A3 is a structured tool and it virtualises the project process for both our tutors and students.”

“...we used to receive a lot of difficult enquires near the project submission date; now, our workload is eased as the project is broken down into bite size pieces and can be largely managed by the students themselves...”

Students' Perceptions of the Benefit of the A3 Planner

As Table 2 showed the questionnaire's multiple-choice questions were grouped into four key aspects: 1) understanding of the project; 2) project management; 3) time management; and 4) continuous improvement. The results indicated that students perceived their experience of adopting the A3 positively, with mean scores between 3 and 4. The majority of students (72%) agreed that the A3 planner contributes to their understanding of the project requirements. Over 70% of respondents agreed that in the early stages, the A3 made them aware of the potential challenges of the project. The students perceived the A3 to be an effective structural tool for planning their project and facilitating the allocation of group tasks, with over 80% of the respondents rating either agree or strongly agree. Cooperation among students was one of the seven effective practices in teaching and learning (Chickering & Gamson, 1989); however, strikingly, we noticed that the A3 was not perceived by students as an effective tool in promoting team cooperation and communication as was expected. Forty-seven percent of respondents strongly disagreed or disagreed with this statement, and the large standard deviation in this question suggested that opinion on this issue is more polarised than on other issues.

Under the time management section the results indicated that the students planned ahead in the early stages of the project with 81% agreeing or strongly agreeing. Over 55% of respondents agreed or strongly agreed that their personal time management techniques – for example, sorting out materials and information – improved after adopting the A3. Interestingly students perceived that the A3 did not seem to speed up the project as they

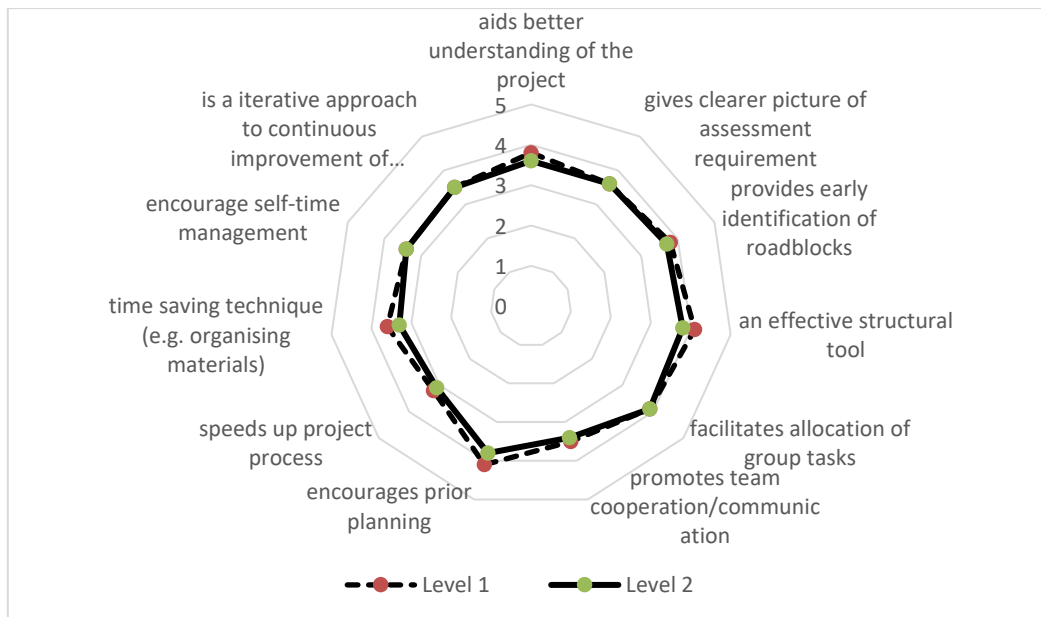
rated it with the lowest mean of 3.13 and the highest deviation. The A3 was adopted as a project management tool and forward planning consumes a great deal of time; however, the students perceived finishing the project quicker as a priority rather than managing all aspects of the project in a timely and appropriate matter.

Table 2 General experiences in using the A3

	N=100 students	Mean	SD	Cumulative percentage agree/strongly agree
Understanding of the project	provides clearer picture of assignment requirements	3.63	1.012	72%
	provides early identification of missing knowledge/roadblocks/issues	3.72	0.933	70%
	aids better understanding of the project	3.63	0.960	67%
Project management	is an effective structural tool	3.90	0.835	80%
	facilitates allocation of group tasks	3.89	1.004	80%
	promotes team cooperation/communication	3.43	1.085	53%
Time management	encourages prior planning	3.92	0.895	81%
	encourages self-time management	3.40	1.064	55%
	is a time-saving technique (e.g., organising materials)	3.38	1.062	51%
	speeds up project process	3.13	1.125	40%
Continuous improvement	is an iterative approach for continuous improvement	3.52	0.959	59%

When we compared the means by student level (Figure 4) we found that the questionnaire scores rated by Level One and Level Two students were almost identical; and ANOVA indicated that there was no significant difference by year of study.

Figure 4. Comparison of means (different levels of study)



The questionnaire survey included three yes/no questions asking about students' opinions on the A3. Seventy-six percent of students agreed that the adoption of the A3 would improve their project management skills and performance. Eighty-nine percent of students agreed with the view that the A3 is an effective communication tool for monitoring progress and receiving feedback. Seventy-two percent of students also believed that it would be beneficial to apply lean concepts, such as the A3, to the coursework assignment of other modules. Students commented as follows:

“The use of A3 is a fail-proof method to stop students from doing things the easy way and forces them to engage in discussion and put hours into the project.” (year one)

“It was really helpful in the beginning because we were “forced” to think about all parts right from the start.” (year two)

We further calculated subscale scores of the four key aspects of the A3 based on multiple-choice questions and tested the internal consistency reliability as shown in Table 3. Cronbach's alpha coefficient for the four aspects was 0.913, suggesting that the aspects have relatively high internal consistency.

Table 3 A3 key aspects and internal consistency

Key aspects of A3	Average Score	Cronbach's Alpha
Understanding of the project	3.72	0.913
Project management	3.74	
Time management	3.46	
Continuous improvement	3.52	

Student Use of the A3

A focus group discussion investigated the extent to which students used the A3 during the assignment. Despite students' positive perception of the value of the A3 planner a minority of students in the focus group reported using the A3 to complete all stages of the project. Instead the majority of students reported using the A3 as a tool to facilitate some stages of the project (e.g. presentation, organising tasks, reporting progress).

The students were required to elaborate on the reasons for using A3 the way they did. One student who used A3 until the presentation stage explained:

“A3 provided a base and it improved upon the writing stage. After the presentation, each member took their section and began their own part. The work was then taken from the A3 and individually improved.” (year one)

On the other hand students who used A3 throughout the final project explained:

“[it] consolidates our information to then help with writing the main report.” (year two)

“...it is a clear plan and helps get you into the project.” (year one)

“...my team found it useful as it contains important information.” (year two)

The discussion moved to explore the specific uses of the A3, aiming to identify whether students were able to utilise the tool to its full extent, irrespective of the assignment stage up to which they used it. It emerged that “breaking down assignment into manageable pieces/sections” was the most popular function of the A3. Furthermore students mentioned the use of the A3 as a means of “identifying roadblocks/missing information” and “raising questions and obtaining feedback from tutors”. The discussion revealed that the students – even those who only used it up to the presentation stage – used the A3 in a

meaningful manner in planning their work and identifying areas of concern. This is supported by the fact that the students placed less emphasis on operational aspects, for example, using the A3 to record the attendance of group members.

Considering the ever-increasing importance of employability and “value for money” for both students and universities (Douglas, Douglas, McClelland, & Davies, 2015) we asked the students to discuss how they would have used the A3 if they had known that it was highly valued by their future employers as the last question. Specifically, we provided students with the following scenario:

“Employers indicated that the lean-based A3 is highly recognised in industry so it gives an advantage to students who have used it in their projects and understand how to apply it in different contexts. Knowing this information do you think that you would use A3 differently next time?”

The majority of students in the focus group mentioned that they would have used A3 more extensively if they had known its value to future employers. This indicates a significant influence of employers’ perceptions on students’ tendency to adopt and apply the A3 planner in their assignment.

Discussion

In this paper we aim to assess whether a project management tool - the A3 planner - could be used to facilitate and manage a PBL group assignment and generate benefits for students and tutors. Reflecting on the empirical evidence from students, tutors, and the relevant literature we found that both students and tutors perceive the benefits of adopting the A3 planner in PBL group assignment from many different perspectives.

Research indicates that a lack of input by tutors and appropriate engagement by students in developing a project plan and a structured management approach to coursework often creates student disengagement, procrastination and delays (Brown, Bull, & Pendlebury, 2013). The study's finding indicated that tutors perceive that the introduction of the A3 planner engage students early in the PBL group assignment. The A3 planner retains flexibility that allows students to derive novel thinking in creating unique structures and discussion points in their A3s to meet the assignment brief. In addition, the A3 planner

makes the tutoring/mentoring process easier as it makes the students' thought processes transparent and accessible. As a result, the A3 planner captures the potential for continuous improvement in assignment delivery by facilitating an ongoing iterative feedback process. Our evidence also showed that this feedback loop can further improve communication between tutors and students as suggested by literature (Emiliani, 1998).

Majority of students in the survey and the focus group discussion agreed that the A3 planner promotes forward planning in the process of organising and managing a group assignment. Forward planning is vital for PBL group assignment, wherein each stage of project development should be carefully planned and executed. Lack of appropriate forward planning might result in inconsistencies, for example, between the assumptions formed and the data presented in the final project report. Thus the A3 planner, through appropriate forward planning, seems to improve the consistency of assignment development. However, we noticed that only half of respondents perceived A3 planner as a tool to promote team cooperation and communication, which can be interpreted as an outcome of group dynamics. A strategy that could resolve this includes the introduction of small group-based activities into the project by tutors as a way to encourage developing leadership; sharing information; supporting group members and keeping positive attitude throughout the project.

Most students in our study actively engaged with the A3 however the level of engagement varied across the levels of study. The majority of students appeared to use the A3 planner as a tool for understanding the requirements of the assignment. It was also used in organising the tasks, timing, resource allocation, content, identification of road blocks, and alignment to assignment marking criteria and learning aims. Even though the A3 planner was not used to its full extent by many students it does seem to have improved students' engagement and time management with the PBL group assignment. To this end, to promote the full adoption of the A3 by students, tutors should spend sufficient time in introducing and explaining its purpose and its potential benefits adopted as a developmental tool.

We found that the A3 planner can help manage student expectations about the level of their expected contribution. This was an important finding that had wider implications considering that managing student expectations and promoting project self-regulation were both important in higher education assignments (Nicol & Macfarlane-Dick, 2006). In addition student expectations have been found to be an important influence on the student experience (Christie, Tett, Cree, Hounsell, & McCune, 2008). In recent years there has been evidence of changing student expectations towards a more passive role in the learning process (Tomlinson, 2015; Woodall, Hiller, & Resnick, 2014). This poses a number of serious challenges for universities and faculty (Woodall et al., 2014). The use of the A3 planner can help the faculty to manage student expectations by introducing the specific tasks of the assignment, illuminating the need for student contributions to project-managing resources and completing the tasks in a timely manner.

Our results indicated that there are a number of factors that contributed to the successful application of the A3 planner including a clear guidance on utilization of the A3 from tutor and training on team dynamics. We also found out that students are more likely to benefit from a project management tool such as the A3 planner when they understand its practical implications for future employers. This finding justified the need to supplement the introduction of the A3 planner, and similar industry tools, with evidence about its relevance and value in the real world. Beyond academic achievement in assignment students also actively seek ways to improve their employability prospects. Highlighting the employability benefits of assignment components can be an effective strategy to improve student engagement with this tool.

Limitations and Future Research

In the university we were unable to test the learning experience before and after the adoption of the A3 planner with the same group of students. The absence of control or comparison group against which to compare the A3 students makes it difficult to assess the exact level of improvement.

To obtain a comprehensive understanding of the usage of the A3 planner, research involving postgraduate students can also be carried out. We observed that students conducting their final year dissertation voluntarily adopted the A3 planner to structure

and monitor the progress on their project, potentially indicating that the A3 planner has a broader application and is not only relevant to a tutor-based model. In addition gathering evidence about the perceptions of employers on the value of the A3 planner would be a valuable direction for future research.

Conclusion

PBL normally involves students taking a structured ‘project’ approach to learning, with a start (developing a business idea) and an end (submitting the business report), working in a cooperative and cross-curricular way. By incorporating a widely used real-world tool into the classroom experience, an innovative way of enhancing project-based assignments for accounting education was provided. The overall findings from the analysis of students’ questionnaires and feedback from a focus group with tutors and students were that both tutors and students recognise the benefits of the use of the A3 planner as part of a PBL group assignment. Students recognise the benefits of the A3 planner in the process across all four of its main aspects: 1) understanding of the assignment; 2) project management; 3) time management; and 4) continuous improvement. The A3 planner impacts on the management of assignment in many significant ways: namely it motivates early formal planning and break down projects into a manageable size and monitors progress. Most importantly, as the A3 visualises the decision-making process for both tutors and students, it allows tutors to provide feedback more efficiently during the project. The feedback loop in the A3 further encourages continuous improvement of students’ projects and improves communication between tutors and students.

References

- Bell, S. (2010). Project-Based Learning for the 21st Century: Skills for the Future. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 83(2), 39–43. <https://doi.org/10.1080/00098650903505415>
- Bhasin, S. (2015). Clarification of the Lean Concept. In S. Bhasin, *Lean Management Beyond Manufacturing* (pp. 11–26). Cham: Springer International Publishing. Retrieved from http://link.springer.com/10.1007/978-3-319-17410-5_2
- Brown, G., Bull, J., & Pendlebury, M. (2013). *Assessing student learning in higher education*. Routledge. Retrieved from <https://books.google.com/books?hl=en&lr=&id=ZQpUAQAAQBAJ&oi=fnd&pg=PP1&dq=Brown,+Bull+and+Pendlebury+&ots=izBh-DskVF&sig=tMbb02TAORdgKQayfK1fI7QT4ww>
- Chakravorty, S. S. (2009). Process Improvement: Using Toyota's A3 Reports. *The Quality Management Journal; Milwaukee*, 16(4), 7–26.
- Chickering, A. W., & Gamson, Z. F. (1989). Seven principles for good practice in undergraduate education. *Biochemical Education*, 17(3), 140–141.
- Christie, H., Tett, L., Cree, V. E., Hounsell, J., & McCune, V. (2008). “A real rollercoaster of confidence and emotions”: learning to be a university student. *Studies in Higher Education*, 33(5), 567–581.
- Donnelly, R., & Fitzmaurice, M. (2005). Collaborative project-based learning and problem-based learning in higher education: a consideration of tutor and student role in learner-focused strategies. In G. O'Neill, S. Moore & B. McMullin (eds) *Emerging Issues in the Practice of University Learning and Teaching* (pp.87-98). Dublin, AISHE/HEA.
- Douglas, J. A., Douglas, A., McClelland, R. J., & Davies, J. (2015). Understanding student satisfaction and dissatisfaction: an interpretive study in the UK higher education context. *Studies in Higher Education*, 40(2), 329–349.
- Dowling, C., Godfrey, J. M., & Gyles, N. (2003). Do hybrid flexible delivery teaching methods improve accounting students' learning outcomes? *Accounting Education*, 12(4), 373–391. <https://doi.org/10.1080/0963928032000154512>
- Drennan, L. G., & Rohde, F. H. (2002). Determinants of performance in advanced undergraduate management accounting: An empirical investigation. *Accounting & Finance*, 42(1), 27–40. <https://doi.org/10.1111/1467-629X.00065>
- Emiliani, M. L. (1998). Continuous personal improvement. *Journal of workplace learning*, 10(1), 29-38.
- Ginns, P., & Ellis, R. A. (2009). Evaluating the quality of e-learning at the degree level in the student experience of blended learning. *British Journal of Educational Technology*, 40(4), 652–663. <https://doi.org/10.1111/j.1467-8535.2008.00861.x>
- Kavanagh, M. H., & Drennan, L. (2008). What skills and attributes does an accounting graduate need? Evidence from student perceptions and employer expectations. *Accounting & Finance*, 48(2), 279–300.
- Kirschner, P. A., Sweller, J., & Clark, R. E. (2006). Why Minimal Guidance During Instruction Does Not Work: An Analysis of the Failure of Constructivist, Discovery, Problem-Based, Experiential, and Inquiry-Based Teaching. *Educational Psychologist*, 41(2), 75–86. https://doi.org/10.1207/s15326985ep4102_1
- Milne, M. J., & McConnell, P. J. (2001). Problem-based learning: a pedagogy for using case material in accounting education. *Accounting Education*, 10(1), 61–82. <https://doi.org/10.1080/09639280122712>

- Nicol, D. J., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in Higher Education, 31*(2), 199–218.
- Opdecam, E., Everaert, P., Keer, H. V., & Buysschaert, F. (2014). Preferences for Team Learning and Lecture-Based Learning Among First-Year Undergraduate Accounting Students. *Research in Higher Education, 55*(4), 400–432. <https://doi.org/10.1007/s11162-013-9315-6>
- Patton, M. Q. (2002). *Qualitative research and evaluation methods*. Sage Publications, Inc.
- Shook, J. (2008). *Managing to Learn: Using the A3 Management Process to Solve Problems, Gain Agreement, Mentor and Lead*. Lean Enterprise Institute.
- Sobek, D., & Smalley, A. (2008). Understanding A3 Thinking: A Critical Component of Toyota's PDCA Management System. Boca Raton: Productivity Press.
- Stanley, T., & Marsden, S. (2012). Problem-based learning: Does accounting education need it? *Journal of Accounting Education, 30*(3), 267–289. <https://doi.org/10.1016/j.jaccedu.2012.08.005>
- Sterns, H. L., & Spokus, D. M. (2013). Lifelong learning and the world of work. Older workers in an ageing society: Critical topics in research and policy, 89-109.
- Tan, O. S. (2004). Editorial. *Innovations in Education and Teaching International, 41*(2), 123–124. <https://doi.org/10.1080/1470329042000208657>
- Tomlinson, M. (2015). Between instrumental and developmental learning: ambivalence in student values and identity positions in marketized UK higher education. *International Journal of Lifelong Education, 0*(0), 1–20. <https://doi.org/10.1080/02601370.2015.1077482>
- Walker, A. E., Leary, H., Hmelo-Silver, C. E., & Ertmer, P. A. (2015). *Essential Readings in Problem-based Learning*. Purdue University Press.
- Woodall, T., Hiller, A., & Resnick, S. (2014). Making sense of higher education: students as consumers and the value of the university experience. *Studies in Higher Education, 39*(1), 48–67. <https://doi.org/10.1080/03075079.2011.648373>

Appendix A: Questionnaire to Students

You are invited to participate in a research study funded by the Higher Education Academy about your university assignment experiences. Study participants are undergraduates who used the A3 planner as part of their coursework. Filling out the questionnaire takes about 5 minutes. We will make every effort to keep your responses confidential.

Module code_____ Seminar Group_____

Name_____

1. Do you find that adoption of A3 planner as part of coursework____(please circle)

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
a) is helpful to understand the project better	1	2	3	4	5
b) provides a clearer picture regarding assignment requirements.	1	2	3	4	5
c) is useful to identify missing knowledge/road blocks/issues earlier on in the process	1	2	3	4	5
d) is an effective tool to structure your approach of the project. e.g. break-down coursework into manageable sections	1	2	3	4	5
e) is an iterative approach to continuous improvement of student plans	1	2	3	4	5
f) encourages you to manage your own time better	1	2	3	4	5
g) encourages you to plan your project ahead	1	2	3	4	5
h) speeds up the whole process of the project	1	2	3	4	5

- | | | | | | |
|--|---|---|---|---|---|
| i) saves your time to organise materials and information for the project | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|

The following two questions only apply to group coursework

- | | | | | | |
|--|---|---|---|---|---|
| j) promotes cooperation/communication between team members | 1 | 2 | 3 | 4 | 5 |
| k) helps team to allocate tasks among group members | 1 | 2 | 3 | 4 | 5 |

2. Do you think adoption of A3 will improve your process management skill, further improving your performance? (Please circle)

Yes No

3. Do you think A3 presentation is an effective communication tool used to justify your proposals or demonstrate status? (Please circle)

Yes No

If No, please give reason: _____

4. Do you think it would be beneficial to apply A3 type of lean concept to coursework assignment of other modules? (Please circle)

Yes No

If No, please give reason: _____

Would you like to participate in a follow up focus group study regarding the issues covered in this questionnaire? (Please circle)

Yes

No

Thanks very much for your cooperation!

Appendix B Focus Group Questions to Students

Q1 To what extent have you used the A3 planner for this project and why?

- a) Only at the beginning of the project
- b) Up to the point of the presentation
- c) Until the writing-up stage

Q2 Please provide a few reasons which explain why you have used the A3 planner up to the stage you answered in question 1 above

Q3 To what extent have you used the A3 planner in the following tasks and why?

- a) Breaking-down assessment into manageable pieces/sections
- b) Delegating tasks to group members
- c) Recording and reporting progress by updating the A3 planner
- d) Raising questions and obtaining feedback from tutors
- e) Identifying roadblock/missing information
- f) Recording group member meetings; attendance; engagement

Q4 Explain briefly in what way you will use the A3 planner differently next time?

Q5 Employers surveyed in our study indicated that lean based A3 planner is highly recognised in industry. They said that it gives an advantage to students who used it in their project and understood how to apply it in a different context. By knowing this information, do you think you would use A3 differently next time?