

# Self Assessment and Project Based Learning

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## ABSTRACT

This present paper shows how self assessment (SA) is an integral part of project-based learning (PBL). Defined as *the involvement of students in identifying standards and/or criteria to apply to their work and making judgments about the extent to which they have met these criteria and standards*, SA seeks to support PBL that has been widely accepted as a pedagogical method in which a real-life problem or situation is presented for investigation, analysis, solution, synthesis and evaluation. Students work individually or together in reasonably small sized groups of three to five. The teacher acts as coordinator, facilitator, coach, resource person and fellow learning partner rather than director, instructor, tutor or disseminator of information. A walk through a tried-and-tested PBL project allows educators to appreciate how SA can be incorporated into teaching to enrich the learning experiences of all participants. Implications for improved teaching and learning are discussed.

Key words: Self assessment, project-based learning, personal responsibility, student-centred.

***Introduction***

How can students increase the gains from project-based learning (PBL) through self assessment (SA)? How can SA make a difference in long term gains from PBL? These and many more questions have been asked by serious minded inquirers whose aim is to document gains derived from new approaches to teaching and learning. This paper arose as the outcome from classroom work that was designed to address current issues that students in a Year 2 Statistics class at a tertiary institution had.

***Literature review***

Much has already been written on the virtues of PBL particularly in relation to improved student outcomes (Barrett, 2005; Helic, Krottmaier, Maurer & Scerbakov, 2005). The model uses projects to organize learning. Often considered as a pedagogical method in which a real-life problem or situation is presented for investigation, analysis, solution, synthesis and evaluation, students work on projects, individually or together in reasonably small sized groups of three to five persons. The teacher acts as coordinator, facilitator, coach, resource person and fellow learning partner rather than director, instructor, tutor or disseminator of information. Moursund (1999) emphasized this aspect of teacher facilitation (not direction) along with authentic content, authentic assessment and explicit educational goals.

Amidst the varying definitions of PBL, Thomas (2000) posited five criteria for determining the authenticity of a PBL activity: centrality, driving question, constructive investigations, autonomy, and realism. He maintained that PBL projects are not peripheral to the curriculum but are central to it. The main teaching strategy is the project through which students learn the main concepts of the discipline. Thomas elaborated that the project is so crafted that it focuses on a question that literally drives students to address the central concepts and principles of the discipline. Knowledge is constructed and transformation occurs as students engage in new skills and come to terms with new understandings. There is problem finding, discovery, problem solving, model building and decision making, among other activities. Thomas explained the autonomous nature of the process where students, not teachers, take responsibility as they engage in unsupervised work that does not take a predetermined path and produces a predetermined outcome. Finally, Thomas emphasized the realistic (not simulated) nature of the process that gives students a feeling of authenticity.

According to Jones, Rasmussen and Moffitt (1997) and Thomas, Mergendoller and Michaelson (1999) the projects may be complex tasks, based on challenging questions or problems. The process involves students designing, solving problems, and making decisions as they engage in investigative activities that give them the opportunity to work relatively autonomously over an extended period of time. At the end of this period students present their findings.

Numerous advantages accrue from PBL. Diehl, Grobe, Lopez and Cabral (1999) comment on advantages like cooperative learning, reflection, and incorporation of adult skills. Bereiter and Scardamalia (1999) confirmed the construction of new knowledge and a deeper understanding of the subject matter. Students obtain increased self-direction and motivation, improved research, problem-solving, divergent, critical and lateral thinking skills as the project is crafted to make a connection between activities and underlying conceptual knowledge expected to be obtained (Cognitive and Technology Group at Vanderbilt University, 1992).

In addition to providing numerous opportunities for learning with constant feedback (Black and Wiliam, 1998; Izard, 2004), PBL supports students as they develop and hone excellent communication skills. Students are allowed to work on personal areas of interest that afford them the opportunity to excel in their specific areas of competence. Facilitators improve their own competence and confidence in numerous instructional approaches that encourage higher order thinking skills in their students; a major goal of today's education systems worldwide (Moursund, 1999).

Usually the real-life situation or project or problem is discussed in small groups of three to five persons in an attempt to clarify the information given and define the real problem. To maximize on the ideas available brainstorming using information from prior similar situations is often used. Students formulate an action plan for working on the project or problem. Learning issues or what was not known prior to the project are identified as information is sourced from a variety of places including industry, libraries, the Internet, encyclopedias, resource persons, etc. Students share information as they continue to work together. Eventually, they present a feasible solution. Review, reflection, SA and facilitator assessment all form an integral part of the process (Barrows & Tamblyn, 1980).

Assessment in PBL differs from more traditional forms of testing and evaluation. Because PBL operates under a non traditional paradigm there is a focal shift from teacher-centredness to student-centredness. Instead of merely acquiring knowledge for its own sake there is emphasis on knowledge application and knowledge transfer. Traditional assessments typically tend to audit performance and uncover what students do not know, rather than what they do know. Unfortunately the knowledge gaps uncovered are not attended to with follow up explanations why answers were incorrect. Traditional assessments measure what students can recall at a specific point in time given certain conditions over which they may not have control. Such assessment rarely inform teachers of what students know and can do with what they know in the days and weeks following the test. There is often little opportunity for improved performance. Further, traditional assessment tends to disrupt learning as students stop learning to cram for tests (Lambros, 2004).

Appropriate PBL assessment strategies would not exclusively deal with what students have learned but how they learned what they have learned. In other words, the how is as important as the what! Each student's performance as a group member is evaluated. The quality of work including content acquisition, reasoning and thinking process and collaborating for effective outcomes is carefully considered in relation to its value to the student's growth and the group's performance (Lambros, 2004). Therefore numerous authentic assessment tools for PBL may include journals, log books, learning logs, posters, constructed models, SA sheets and a variety of appropriate rubrics, portfolios and observations of various types. Students have the opportunity of being assessed in numerous ways in keeping with their individual differences, learning styles and personality traits. Hence, during the entire PBL process there is relevant ongoing assessment that directly relates to the specific learning that is taking place.

This present paper proposes that assessment of PBL can be skillfully organized so that students are not merely judged at the end of the project but they learn throughout the entire process. Most importantly, each student has the opportunity of assessing him/herself (self assessment). SA has

been defined as the involvement of students in identifying standards and/or criteria to apply to their work and making judgments about the extent to which they have met these criteria and standards (Boud, 1986:5). There is a three step process to SA apparent here. Firstly, the learner must autonomously identify commonly acceptable standards and/or criteria that pertain to his or her work. Secondly, the learner must apply those identified standards and/or criteria to his or her work. Thirdly, the learner must make a judgement that clearly indicates the extent to which he or she has met the identified standards and/or criteria that were applied to his or her type of work. Boud posited two key elements as essential to every assessment (whether conducted by teacher or learner): (1) development of knowledge and an appreciation of appropriate standards and criteria for meeting those standards (2) capacity to make judgements about whether or not the work involved does or does not meet those standards (involves critical thinking). These two key elements involve a desire for achievement and a clear understanding of what is involved in the process.

Boyd and Cowan (1986) posited that the criteria or headings under which the judgement will be assembled must be known and understood by the student. Consequently the self-evaluating learner is consistently self-directing towards understood outcomes and standards. Boyd and Cowan found that as their learning progresses, the self-evaluating learners will note deviation from the desired outcome and then modify their learning behaviour and activity accordingly, thus monitoring and managing their learning as it progresses.

SA not only encompasses testing/grading one's own skills/work but also involves an active process of evaluating what is good, mediocre or poor work in any given situation. SA represents a much-expanded role in assessment because the construct underscores provisions for strengthening personal accountability for academic achievement. Besides requiring setting appropriate criteria for meeting standards, SA seeks to offer a method for judging criteria effectiveness, establishes a schedule or timetable for ultimate progress and also establishes a sequence for failure.

SA may be viewed as the act of evaluating or monitoring one's own level of knowledge, performance and understanding in a metacognitive framework, taking into account the contexts in which it occurs. SA involves the individual making an informed assessment of his or her own work, with an appreciation for and the understanding of those concepts of quality upheld and practised by the adjudicators of his or her work. SA emphasises high levels of thinking, metacognitive thinking, self-reflective thinking, self-regulated thinking, goal directed learning and preferred learning styles. In a sense, SA is a component of metacognition that is applied more spontaneously, more deeply and more automatically as students move through developmental stages.

SA involves reflecting on past achievements, critically evaluating present performance and planning future goals. It thus involves past, present and future perspectives. Personal goal setting and standards underscore the perspectives (McAlpine, 2000). Sekula, BATTERY and Guyton (1996) agree that SA is premised on realistic knowledge about the self in relation to educational goals. It asks 'How am I doing?', 'How can I do better?' Students learn to compare and contrast their work with models and against a set of standards and/or criteria (Bourke and Poskitt, 1997).

### ***Participants***

Participants of this study comprised the entire Year 2 Statistics class (33 % males). The tertiary educational institution was located in a small island whose main source of income was derived from tourism. The students averaged 30 years and earned their daily living by engaging in various aspects of the tourism industry as front desk clerks, supervisors, managers and inventory personnel. Coming from similar socioeconomic and cultural backgrounds, they enrolled for a bachelor's degree programme with the aim of improving their current status and possibly gaining upward or lateral mobility at their workplaces. Plagued with long standing academic issues and difficult-to-change attitudes, this researcher sought to find practical ways of assisting them to achieve their fullest potential and realize their personal goals.

### ***Methodology***

To ensure maximum participation of all students numerous sessions were organized to have students discuss how their projects should be assessed. The sessions engaged the attention of all class members especially since for the first time they were invited to be part of their own assessment. Numerous proposals with accompanying reasons and justifications were presented and after much discussion a vote for each segment was taken to determine the mark to be allocated and the granular details of that allocation. Finally, we arrived at the proposed one page assessment sheet (Exhibit 1) detailing marks for specific deliverables in a manner that facilitated the natural flow of information in an orderly manner, from commencement to end of the given project. At first glance Exhibit 1 may appear to focus on the actual project but the many conversations leading up to the finalization of this exhibit underscore the abilities developed and used during its execution as confirmed by students' testimonies (Exhibit 4).

Exhibit 1 Sample assessment *for* learning in PBL

Using your knowledge of your workplace think of a situation there about which you have a hunch that there exists a workable solution to an area of great concern. Carefully formulate ONE testable hypothesis and use the statistical skills that you have acquired in this course to examine your hypothesis and make the necessary recommendations after a discussion of the issue at hand. Include your completed self assessment sheet and this page in your final project report.

#### **Assessment (20 % of final score)**

1. (a) General presentation: how YOUR project is organized and laid out, grammar, language, vocabulary, visible right hand pagination, separate pages for each heading, no borders on text pages, a short title for your project numbers in 1-10 words, etc. **(5 marks)**
  - (b) Table of contents: details of contents paginated in the order below **(5 marks)**
  - (c) Abstract (< 100 words). Briefly summarise the following: objective, sample size, sample selection, data analysis methods, results, recommendations, etc.-see Internet as discussed, library, etc.). Identify at least 5 key words. **(5 marks)**
  - (d) Acknowledgements: persons, organizations, professor, etc. who must be thanked **(2 marks)**
2. (a) Introduction: relevant details about YOUR workplace **(5 marks)**
  - (b) Description of your problem: objective of your investigation, definition of the terms used in your present study **(5 marks)**
  - (c) BRIEF literature review in your own words incorporating at least 3 summary accounts of SIMILAR work found in literature related to YOUR investigation: (see Internet, library, etc.) **(6 marks)**
3. (a) Formulation of a testable hypothesis (see text book, Chapters 9-13) **(2 marks)**
  - (b) Sample Selection **(3 marks)**
  - (c) Research Design **(2 marks)**
4. (a) Description of data collection instruments, e.g., questionnaire, opinionnaire, interview, records, etc. **(4 marks)**
  - (b) Method: how you went about doing what you did for YOUR study **(5 marks)**
5. Data Analysis (test statistics used, calculations, appropriate tables,  $\alpha = 0.5$ ) **(10 marks)**
6. Discussion showing significance of YOUR findings, including any assumptions, limitations, generalisability, etc. **(6 marks)**
7. Recommendation/s (based on YOUR SPECIFIC findings in THIS study) **(6 marks)**

- 8. (a) References (in APA format: see Internet, library, etc.) (3 marks)
- (b) Appendix (ALL supporting information, e.g. brochures, pamphlets, handouts, etc., letter/s of permission to collect data, interview protocols, raw data records, statistical table/s used in YOUR present study, etc.) (4 marks)
- 9. Six (6) numbered PowerPoint slides (NOT MS WORD SLIDES), printed on a single page summarising your project (2 marks for each slide totaling 12 marks)
- 10. (a) Dated sequence of events for your project (2 marks)
- (b) Self assessment (2 marks for each of the 10 items totaling 10 marks).

**Total Score: 100 Marks**

Date given \_\_\_\_\_ Submission deadline: \_\_\_\_\_

This project should not be attempted in a single sitting. You are advised to carefully do your project over the entire semester for best results. Please consult your professor regularly. Thank you!

Exhibit 1 begins by detailing, with specificity, the project or issue to be addressed. The contribution of the project to the entire course assessment is provided. Itemised from 1 to 10, in a sequential manner, are various important aspects of the project and their relevant mark allocation italicized in parenthesis. As much as possible, a brief explanation of what is expected is offered to facilitate students in their own self assessment. For instance, in # 1 (a) where the score for general presentation is chosen to be 5 marks, exactly what is meant or intended by general presentation is explained. By detailing ‘*how YOUR project is organized and laid out, grammar, language, vocabulary, visible right hand pagination, separate pages for each heading, no borders on text pages, a short title for your project numbers in 1-10 words, etc. (5 marks)*’, the student is better able to perform his/her own self assessment. A collaboratively agreed upon accompanying rubric looked like:

Exhibit 2 One Sample Rubric

Mark	Descriptor
5	project is exceptionally well organized and laid out, proper grammar, language, vocabulary, visible right hand pagination, separate pages for each heading, no borders on text pages, a 1-10 word project title
4	project is well organized and laid out, proper grammar, language, vocabulary, visible right hand pagination, separate pages for each heading, no borders on text pages, but missing a 1-10 word project title
3	project is fairly well organized and laid out, proper grammar, language, vocabulary, visible right hand pagination, but missing separate pages for each heading, no borders on text pages, a 1-10 word project title
2	project is barely organized and laid out, proper grammar, language, vocabulary, but missing visible right hand pagination, separate pages for each heading, no borders on text pages, a 1-10 word project title
1	project is not well organized and laid out, but missing proper grammar, language, vocabulary, visible right hand pagination, separate pages for each heading, no borders on text pages, a 1-10 word project title
0	None of the above

The foregoing information underscored the fact that assessment was data-based as demonstrated by setting data or evidence against criteria. For many students this was an unfamiliar domain since they were used to being told about mark assignments without having any input. As expected, many students feared a lack of precision of common outcomes and wondered how it was possible to arrive at consensus. Accordingly, this was an area that fuelled a lot of discussion among students as they had varying ideas of what constituted certain scores in the rubric. Through a series of pointed questions aimed at challenging students’ reasoning process this researcher was collaboratively able to arrive at consensus which was confirmed by the majority of students.

SA afforded the student the opportunity to be his/her own judge prior to being judged by anyone else. Exhibit 3 summarises the SA experience that a student could have. Observe provision is made for 10 entries consistent with the 10 assessment criteria on Exhibit 1. The total mark for each criterion is inserted by the student. For example, from Exhibit 1, criterion 1 affords a total of 17 marks. Hence the student writes 17 under Qu Total for # 1. For criterion 2 on Exhibit 1, there is a total of 16 marks so the student enters 16 under Qu. Total for #2 and so forth. Based on the student’s own assessment, s/he enters relevant marks under the column marked ‘Ex. ’s mark’ in Exhibit 3. The final column ‘Comments for Improvement’ in Exhibit 3 facilitates reflection and metacognition. This column is completed by the student following reflection and introspection. This method therefore allows the student to determine his/her position (with relative degrees of accuracy, assuming practice and self honesty) prior to the supervisor’s assessment.

Exhibit 3 Sample SA form

NAME-----  
 STUDENT’S ID-----  
 DATE-----  
 COURSE -----  
 GROUP-----  
 TOPIC -----  
 As discussed it is useful to assess your own performance for a number of reasons.  
 Here is your opportunity to assess yourself.  
 Complete the table below being careful to be POSITIVE with your comments.  
 Thank you!

Qu #	Qu total	MY mark	EX’S mark	COMMENTS FOR IMPROVEMENT
TOTAL				

**Results**

This study was intended to assist students in overcoming their difficulties in presenting an entire project in a systematic manner, consistent with acceptable research methods. The step-by step method detailing systematically what is expected of the student in the presentation of a report

arose from collaborative work with students on a day-to-day basis and empathizing with their operational difficulties in completing assignments in a timely manner. Some of the students opted to pursue topics like reducing turnaround time between making a request of the Human Resources Department and obtaining a response; diversification of manufacturing products for increasing a broader customer base; minimising the queuing time customers spend before being attended to by bank tellers; and improving the tourist experience at a local resort, among other similar topics.

Overall students were generally pleased about the special assistance they received. Some supporting comments were:

*'Creativity always evaded me but this PBL with SA has aroused in me a passion for creativity that would never stop I hope...'*

*'...For me, it's like learning by doing ...no cramming for examinations...I feel engaged... It's real-life...The focus is on ME, not a curriculum...'*

*'... The scores helped me to focus my efforts in a strategic manner instead of operating in a vacuum, not knowing how the final scores would be allocated...'*

*'...I prefer to be on my own...I always believe I work better when I am left alone...'*

*'... I enjoyed this idea of a project with SA from which I learned a lot ...'*

*'...PBL is certainly a better alternative to teacher-led-and-directed activities, where the student plays a non prominent part and is forced to learn through memorization instead of depth of conceptual understanding...'*

*'... I feel like I have a much broader knowledge of the subject and best of all, I can communicate my thoughts so much better and clearer...'*

*'...Oh I enjoyed the teamwork, the camaraderie...Long term benefits I believe ... What a blessing!...'*

*'...Give me my independence I'm OK....Too many loafers waiting for something to happen...I hope the facilitator would observe this...'*

*'...The role of The Self in this PBL activity with SA is astonishing as it allowed me to delve deep within myself in an effort to draw out so much more of ME...'*

*'... leadership and mentorship have taken on new meaning to me...'*

Exhibit 4 is a compilation of some skills students claimed that they honed by engaging in PBL with SA. They spoke of PBL with SA encouraging innovation, entrepreneurship and industry and discouraging regurgitation and information accumulation for its own sake. Students claimed that they developed professionalism as they learned to apply course content to real-life, practical



everyday situations and make technology-based presentations. Additionally, the students found that PBL discouraged subject compartmentalization and encouraged subject integration and interdisciplinary learning as evidenced from the input required for their projects. Of course these qualities are not specific to PBL but may be shared by other forms of instruction or teaching situations like Problem-based Learning.

#### Exhibit 4 Some qualities students claimed they honed through PBL

Communication \* persistence \* self directed learning \* self esteem \* analytical skills \* regularity \* editing skills \* methodological skills \* punctuality \* organizational skills \* management skills \* motivation \* conflict management skills \* creativity \* self assessment \* authenticity \* decision making skills \* empathy \* neatness \* lateral thinking \* divergent thinking \* discipline \* positive attitude \* responsibility \* multi tasking ability \* self control \* interpersonal skills \* technical skills \* reporting skills \* self efficacy \* technology skills \* presentation skills \* accountability \* confidence \* personal development \* strength \* flexibility \* active listening skills \* civic mindedness \* decisiveness \* industry \* professionalism \* decision making skills \* efficiency \* trust \* leadership \* emotional intelligence \* high order thinking skills \* collaborative skills \* research skills \* problem solving skills \* self discipline \* self-direction \* innovation \* hands-on practical skills \* competence \* excellence \* excellent time management \* brain storming capacity \* reflection \* knowledge application \* openness \*

#### ***Discussion and Conclusion***

As explained earlier, this report cannot compare the performance of students who were exposed to PBL and those who were not, since this work was not designed to provide such information. The existing research literature already supports the view that students in PBL environments obtain higher scores than students in traditional classrooms (Krajcik & Blumenfeld (2006); Rivet & Krajcki (2004). Nevertheless, critics like Hye-Jung & Cheolil (2012) believe that PBL encourages social loafing where some team members do not provide sufficient contributions but depend on other group members. There may be a lowering of expected standards to maintain congeniality with group members and often facilitators overlook social loafing to the detriment of all concerned.

What this report offers is the reflections of students who, for the most part, claimed that they benefitted from PBL with SA. The students commented on the assistance they received from step-by-step project reporting outline detailed in Exhibit 1. Since the explicit role of SA in PBL was detailed in this report, this researcher hopes that the ideas provided in this present paper would be useful to educators and all concerned with assessment in project based learning.

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