Is self-assessment effective in enhancing student learning?

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Abstract: *It has been argued that self-assessment deepens student learning. This study examined that proposition through online assessment of an assignment in a first year course, with a large percentage (85%) of students enrolled in a distance mode. The aim of the study was to examine the effectiveness of self-assessment in student learning. One hundred and fifty-two students completed a self-assessment of their assignment using assessment guidelines, a marking rubric and model answers. The learning effectiveness of self-assessment was appraised through content analyses of student comments in the self-assessment, and in a survey. In this study, self-assessment of the assignment was found to be effective in enhancing student self-awareness and engaging students in metacognitive processes. Most survey respondents agreed that self-assessment helps students identify the strengths and the weaknesses of assignment answers and highlights areas where performance could be improved. Overall, self-assessment of the assignment was shown to be effective in positively influencing student learning in this learning environment.*

Introduction

Self-assessment allows monitoring and tracking the progress of one's own study. It creates opportunities to judge the quality of personal work, based on evidence and explicit criteria, and to improve future work (Rolheiser & Ross, 2000). The criteria and standards used for self-assessment may vary depending on whether assessment settings are formal or informal. In this study, the terms 'formal' and 'informal' are used for the purpose of differentiation only. In a formal setting (e.g. classrooms), a pre-determined set of criteria and standards may be used for self-assessment, whereas, in an informal setting (e.g. student face-to-face interactions), criteria and standards shared by the fellow students may be employed. The aim of informal self-assessment is to compare a student's own performance against that of their peers. Informal assessment is critical for students to monitor their progress and to develop self-confidence. Inadvertently the distance-learning environment has compromised informal self-assessment through learner isolation. Connecting distance students via on-line discussion forums has not been effective due to a number of limitations including the asynchronous nature of the discussions, mismatches in learning styles, and a higher risk of misunderstanding (Richards, 2009). Consequently, distance students miss out on the progress assessment aspect of learning. This is evidenced by student inquiries relating to the interpretation and expectations of questions, as well as requests for feedback on their personal progress. Hence, distance learners are arguably finding it hard to monitor and track their own progress due to the lack of an appropriate progress assessment environment. Providing a well-structured self-assessment environment for distance learners could allow them to monitor and track their own progress whilst realising other potential benefits of self-assessment. However, the literatures fall short in providing information supporting or negating this argument.

Self-assessment has been shown to have various benefits such as awareness of ability, goal-oriented motivation, learning promotion, knowledge of assessment techniques and sharing of the assessment role (Oscarsson, 1997); development of critical thinking and metacognitive behaviour (Cooper, 2006); and increased responsibility for own learning (Cyboran, 2006). Rolheiser & Ross (2000) and Ross (2006) reported improved student performance and behaviour; and intrinsic motivation due to self-

assessment. The Canadian Ministry of Education (2007) pointed out that self-assessment leads to a greater self-awareness and understanding of oneself as a learner. Self-awareness is often understood as the ability to take note of oneself as an object. In the theory of 'self-awareness', Duval and Wicklund (1972) recognised that at times people turn attention to themselves for self-evaluation where they compare the self with standards, try harder to meet standards, and show stronger emotional responses to meeting or failing to meet a standard. Thus, self-assessment is a recognized and useful assessment technique to bring about positive change in behaviour through self-awareness.

As learners, students may self-assess almost anything they produce. Student self-assessment of an assignment is the involvement of students in identifying standards and/or criteria to apply to their work and making judgements about the extent to which they have met these criteria and standards (Boud, 1995). Some students innately practice self-assessment of their work. However, the majority of the students may not be naturally inclined and/or skilled in self-assessment (Falchikov & Boud, 1989). Yet, the importance of self-assessment in providing self-awareness has been realised ever since the development of the metacognitive learning theory. Falvell (1976) defined metacognition as the knowledge concerning one's own cognitive processes. It is also the knowledge, awareness, and control of one's own learning (Cubukcu, 2008) and therefore helps in learning new things by linking it with prior knowledge and solving new problems (Gok, 2010). Nicol and Macfarlane-Dick (2006) suggest that students be provided with opportunities to regulate their own learning through self-evaluation and self-judgement. However, they also acknowledge that active progress assessment through self-assessment is rarely encouraged and/or entrusted to students. Indeed, opportunities for active progress assessment are removed from distance learners as they are bound to work in secluded learning environments. Hence, institutions striving to offer an equitable learning environment to both on-campus and distance students, are finding it hard to meet the equity challenge.

A large proportion of distance learners are mature-aged students returning to study after a significant study hiatus. Anecdotal evidence suggests that the majority of them have family commitment and work full time while studying part-time. In addition, many distance learners are geographically dispersed and lack contemporary student experience. Our experience suggests that they have limited exposure to on-line participation and engagement with the social media. Thus, the interaction of this cohort of students with their peers and/or teaching staff is limited. Arguably, the isolated learning environments make it difficult for distance students to judge the quality of their work and track their progress as they lack a point of reference (or benchmark) for informal self-assessment. Therefore, in the context of online learning, providing some mechanism for progress assessment of learning to distance students appears crucial. In this study, a self-assessment environment with appropriate assessment guidelines and resources was provided to help distance learners in progress assessment (i.e. to develop an awareness of their own learning in terms of what they have done well and where more focus is required). The research question for this paper was: Is self-assessment effective in enhancing student learning through self-awareness?

Methodology

This self-assessment study was conducted within a Geographic Information Systems (GIS) course in semester 1, 2011. The aim of the study was to examine the effectiveness of self-assessment. The effectiveness was evaluated using two instruments:

       a) the content analysis of students' self-assessment reports, and
       b) the student survey feedback.

The three assessment items normally used in this course are; an assignment, an on-line quiz and a final examination worth 30%, 10% and 60% of total marks respectively. The self-assessment activity was conducted on the assignment item. The 30% marks allocated for the assignment comprised 25% for the assignment and 5% for self-assessment. The assignment comprised of ten short answer type questions requiring descriptive answers with examples/illustrations and references. Each assignment question was composed of two to four sub-questions. Students were required to answer each sub-question separately as indicated in the assignment guideline and the marking rubric provided. Students were asked to submit their completed assignment electronically. The self-assessment process

commenced soon after the assignment submission due date, and all electronically submitted assignments were locked in to prevent any changes.

One hundred and seventy (170) students submitted the assignment and were encouraged to self-assess their own submitted assignment. Model answers to the assignment questions, self-assessment guidelines, and a self-assessment marking rubric were provided. The self-assessment guidelines detailed the assessment procedure and quality requirements (e.g. comprehensiveness and accuracy of comments, appropriateness of marks awarded, and realisation of strengths and weaknesses). The self-assessment marking rubric detailed marks for various levels of achievement for each answer (Table 1). It also offered room for comments. The self-assessment marking rubric had been given to students during assignment preparation. Out of 170 students, 152 (~90%) completed and submitted the self-assessment marking rubric. Table 1 shows a sample of a completed self-assessment marking rubric. In the sample, a self-assessing student has awarded 5.8 marks for part 1 of the question and provided a brief justification for the marks below.

Table 1: A sample of a completed self-assessment marking-rubric

Question 9 GIS development (25 marks)	With the help of a practical example discuss the view that GIS is an Information systems (10 marks)	0 to 3 marks ☐ Very poor discussion	3 to 5 marks ☐ Limited discussion	5 to 6 marks ☒ Satisfactory to good discussion	6 to 8 marks ☐ Very good discussion but no reference	8 to 10 marks ☐ Excellent discussions with proper reference	5.8
	Identify& discuss the main factors contributing to rapid growth & development of GIS and its application in the last 30 years (15 marks)	0 to 4.5 marks ☐ Very poor identifica-tion and discussion of main factors	4.5 to 7.5 marks ☐ Limited identifica-tion and discussion of main factors	7.5 to 9 marks ☒ Satisfactory to good identifica-tion and discussion of main factors	9 to 12 marks ☐ Very good identifica-tion and discussion of main factors but no reference	12 to 15 marks ☐Excellent identifica-tion and discussion of main factors with correct reference	8.0

Please provide separate comment to support your assessment for each part of the Question 9.
(*You must write comments. No comments = No marks for self-assessment*).
Part 1: Not the best answer to the question, but is still an averagely adequate. Missing reference.
Part 2: Some part of the question was answered but quality answer would have improved result.

While student self-assessment was in progress, the marker assessed each of the students' assignments independently. Feedback was provided to the students, after the self-assessment due date, via a marking rubric completed by the marker.

Student self-assessment marking rubrics (i.e. reports) were then assessed by the tutor in terms of the assessment quality and the appropriateness of the self-awarded marks. The assessing tutor provided feedback and marks for the self-assessment work via a course based feedback link.

In this study, comments provided by the students in the self-assessment marking rubrics (e.g. part 1 and 2 in Table 1) were analysed to determine the effectiveness of self-assessment in enhancing student learning. Self-assessment was considered effective when students reviewed their assignment answers and provided critical and self-reflecting comments. The focus of the content analysis was to evaluate students' comments that:

a) identified the strengths and the weaknesses of their assignment,
b) demonstrated metacoginitive behavior, and
c) indicated self awareness through self-reflection.

The second instrument used in this study was the student survey, conducted after the release of assignment and self-assessment marks. The survey question asked students to answer in a 5-point Likert-scale format whether the self-assessment had made them realise the strengths and weaknesses of their assignment. The survey also provided the opportunity to comment on what they found useful and/or not useful in self-assessment. The survey feedback was used to judge the perceived usefulness

of self-assessment to the students. The voluntary nature of the survey attracted 53 out of 152 (~35%) self-assessment participants.

Results and Discussions

Content analysis of students' self-assessment reports

Analysis of the content of the reports revealed that students were able to pinpoint the strengths and the weaknesses of their assignments using a wide range of comments. Almost all participating students highlighted the strengths of their work using comments such as; *complete answer, all correct, excellent answer* etc. Most of them also identified deficiencies in their work. They used a variety of comments to express those deficiencies. Table 2 groups those comments into 6 distinct categories. The number of students responding to each category, based on a sample of 82 students, is also presented in the table. It is to be noted that a student's comment could fall into more than one category.

Students became aware of various deficiencies and expressed them as self-reflection using individualised comments. Almost all sampled students came to the realisation that at least some of their answers were unsatisfactory (i.e. inadequate, unclear, insufficient, and/or inappropriate). A high number of them detected referencing problems in their work (row 2, Table 2). A substantial number of students found missing answers for some questions. Some realized that they interpreted one or more questions incorrectly (row 4, Table 2). A few acknowledged that they did not put enough effort (row 5, Table2). In

Table 2: Categorised student self-assessment comments

Students' comment categories	Respondents
Unsatisfactory answer (unclear, incomplete, incorrect, lacking details, no illustration)	82 out of 82
Referencing problem (missing and/or incorrect in-text use and/or listing of reference)	52 out of 82
Missing answer altogether (question not answered)	19 out of 82
Misinterpretation of question (question interpreted/understood incorrectly)	12 out of 82
Acknowledge inadequacy suggest future actions for improvement	7 out of 82
Ignored assessment criteria (failing to refer to marking guide/rubric)	1 out of 82

general, these students' comments revealed self-reflections. Through the process of self-assessment, they became self-aware and reflected themselves. This does not, however, answer the most pertinent question: How do students incorporate the self-awareness messages in their learning? This study is in its early stages and has not yet explored how students incorporate the demonstrated self-awareness into their subsequent learning process. However, the relevant learning theories and the published literature, cited in the following sections, offer some insight into possible outcomes.

Through self-assessment, students became aware that there were some deficiencies in their work. They presumably also became aware of the consequences (i.e. loss of marks) because there were very few inquiries about the assignment marks and this is quite unusual for the course. Thus, one of the outcomes appears to be that students knew where they stood due to self-awareness. With reference to bringing about the change due to self-awareness, Duval and Wicklund (1972) suggest that the process of comparing the self with standards allows people to change their behaviour and to experience pride or dissatisfaction with the self. They consider self-awareness as a major mechanism of self-control. Self-control is expected to lead to correct judgement. However, the validation of this learning outcome was beyond the scope of this study.

The messages presented in Table 2 indicate that students identified flaws in their work and self-reflected when they compared their answers with a set of standards. In the process of self-reflection, they went through the process of metacognition where they learnt about how they approached an assignment and what worked well. This is evidenced by students' acknowledging comments such as; "*I did not put enough effort, I ignored the marking rubric, I misinterpreted the question, I forgot to answer etc*". Some of these students also provided general comments indicating their future actions to resolve obvious problems. They expressed those actions using statements such as; "*I need to read*

questions carefully next time, I need to review my assignment before submission, I need to consult marking guidelines in the future, etc". Students' acknowledgment of inadequacy and suggestions for future improvements are evidence of metacognitive behaviour. Thus, this study agrees with Cooper (2006) who suggests that self-assessment encourages the development of critical thinking and metacognitive behaviour.

Student survey analysis

The second part of the study focused on analysing students' perception of self-assessment. In the survey, students provided their level of agreement with the statement "*Self-assessment made me realize the strengths and the weaknesses of my assignment*". Students also provided comments in support of their perception.

Most survey respondents (>73%) agreed that self-assessment has made them realize the strengths and weaknesses of their assignment. However, about 23% of the respondents disagreed and less than 4% remained unsure.
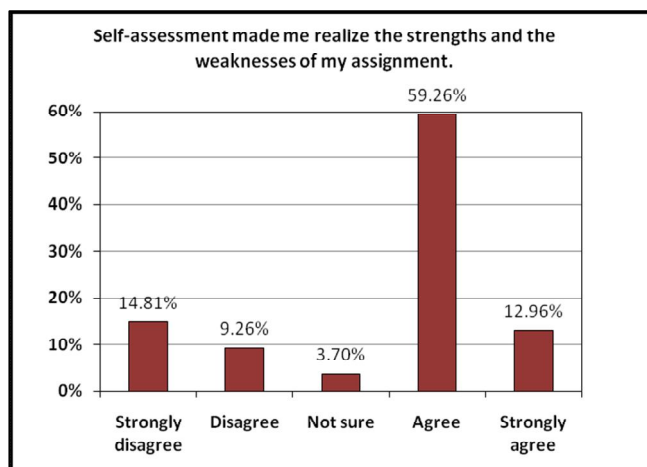

Figure 1: Students' responses to survey question

Many comments made in the survey indicated student self-awareness, suggesting that students' have acquired various learning benefits through self-assessment. For example, by stating "*it helped me to learn what I need to improve*" one student has detected his or her weakness that needs to be addressed. In another statement the student reflected by stating: "*it made me realise that I need to proof read my assignment a lot more in case I miss any significant comments to add into my answer*", indicating that proof reading will be the future action taken by the student. On the other hand, when a student writes, "*it gave us understanding of how assignments are marked and how hard it is to mark*", it is a clear indication that the student better comprehends assessment skills. In yet another statement, the student reveals development of life-long learning skill when he or she writes; "*it helped me to understand and recognise the weaknesses in my assignment. This will help me in many assignments yet to come.*" All of these comments indicate student self-awareness and possible changes in their behaviour. This finding is consistent with the theory of self-awareness where Duval and Wicklund (1972) point out a change in personal behaviour to conform to the knowledge gained from the self-awareness. In this regard, the expected change in student behaviour due to self-assessment may prove to be effective in enhancing student learning. However, this is yet to be verified.

Table 3 groups similar negative student comments together and presents them as type a, b, and c to ascertain diverse views of students towards self-assessment. Comments referring to type (a) in Table 3 appear to be from students with a judgemental view of self-assessment. Comments type (b) is perhaps from students who are not fully informed about the objective of self-assessment. Comments (c) appear to be from students with a fear of experiencing failure. These interpretations are not based on formal analysis. A further analysis is necessary to establish the real meaning of these comments.

Table 3: Negative student perceptions of self assessment (quotes)

	It is time consuming. Takes lot of time. I have to do extra work.
a	I pay to be taught not to mark my own assignments. I do not believe it is my job to mark my work.
	I hate having to read my assignment. It does not teach you anything. There is no point doing it.
	It is hard to be accurate without being critical to yourself. You have to give bad marks to yourself.
b	It seems counter intuitive to mark own answers. Nice to get feedback from lecturer not from myself.
	The strict, marking rubric was not helpful. The mark rubric was difficult to understand.
c	It has made me worried that I will not pass. It makes me realize how lazy I am.
	You have to look at your work and say it is not good.

In general, most of the above comments appear to arise from some concern about self-assessment among students. Rolheiser & Ross (2000) pointed out that students' concerns about self-assessment are mainly due to a lack of understanding of its purpose and processes. In the literature, it is sometime argued that self-assessment can damage students' self-esteem over the short-term. Duval and Wicklund (1972) warned that objective self-awareness that comes from a self-assessment task could be painful immediately following a failure experience. However, Trope (1986) agrees that this short-term effect has beneficial long-term consequences, as students would work harder to obtain better results in the future and so enhance their self-esteem in the longer term. In this context, Rolheiser & Ross (2000) recommend four-stage self-assessment training involving; students' development of assessment criteria, students' application of assessment, feedback on self-assessment, and helping them to develop productive goals and action plans. Such training is therefore expected to alleviate most concerns.

Conclusions

In this study, self-assessment was found to be effective in enhancing student learning through student self-awareness. The content analyses of students' self-assessment reports clearly revealed that self-assessment has helped in the development of self-awareness and metacognitive behaviour among students. The survey feedback reinforced these findings. The majority of survey respondents found self-assessment useful as a learning tool. About one quarter of the respondents raised concerns about self-assessment due to fear of experiencing failure and/or lacking an understanding of the purpose and the process of self-assessment. Training on self-assessment, as recommended in the literature, will possibly alleviate such concerns.

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