Do we know or just think we know?

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ABSTRACT

The paper describes the use of SALSA (Systematic Analysis of Learner Self Appraisal) software in monitoring students learning time and their learning progress. Students monitor their own learning progress and produce weekly reports of their progress using SALSA software. Data collected is analysed to determine the relationship between mastery and the elapsed time required. The shape of the mastery learning curve for the class is discussed. A model is derived and a new timing for the SQL test is proposed on the basis of the research results.

1. INTRODUCTION

The paper describes the use of data collected by SALSA (Systematic Analysis of Learner Self Appraisal) software to help identify the optimum time for running a summative test in one course in our degree programme.

The first seven weeks of the level 6 Data Management Technology (DMT) paper in our Bachelor of Information Systems Degree cover the complete Data Manipulation Language (DML) part of SQL. There is a practice test in week 7 and the material is assessed by a summative test in week 8.

In judging the optimum time for the test we have to balance several factors:

• How long does it take students to master the material?

• What effect does the timing of the test have on learning?

• Will the student have timely feedback on their achievement?

• Is the spread of workload acceptable?

• Is the timing valid and fair to students with different learning styles?

The implication of the research is very practical and aims to set the timing of the test to address better the real needs of the students.

We explore the first two points in some depth in the body of this paper.

The value of feedback is questionable for a test in week 8. It is week 10 by the time the test is marked and feedback given and this is probably too late for the student to modify their study approach and recover from a poor performance.

The spread of workload is currently reasonable. Moving the test could create problems here.

For validity, we should assess all learning towards the end of the course. Early assessment rewards shallow learning and penalises those learners that take longer to learn, even if the learning is deeper. On the other hand, assessment of all material towards the end of the course can cause an excessive learner workload and limit the opportunity for feedback and corrective action.

We believe that learning happens best when the students are in control of their own learning and our intention in this study is to identify the optimum time for the test having regard to:

• the time it takes a student to master the material and

• the effect the timing has on learning.

This is a pilot project. We aim to repeat and refine this analysis over several deliveries of the studied course, and other courses. We also plan

to enhance the software based on our experience in this study.

2. METHODOLOGY

We used the SALSA software (Lopez, 2005) to describe our learning expectations for the course in terms of learner time, activities and learning outcomes.

Students used the software to monitor their learning progress against our expectations and to produce weekly reports of their progress. The software was introduced to the students at the beginning of the course and this was their first experience of the software. Students recorded their time investment, their engagement in the various activities and self-assessed their mastery of the specified learning outcomes. The software also allowed them to indicate where they needed more time, or needed help. All learning outcomes are carried forward each week until the students report mastery.

The lecturer used the software to monitor the learning progress of the students and to target assistance to those students in need of help. It allowed every student to ask for help quietly and anonymously in the classroom and gave the lecturer detailed information about what topics they had trouble with. The lecturer was able to respond rapidly to requests for help.

It was also possible to identify where many students struggled with the same topic and to choose whether to repeat this topic for all of the students again or to intervene individually.

The course included several self-paced learning modules and recorded audio visual demonstrations. Students were able to work at their own pace through these and to ask for help when they felt they needed it.

Salsa works in the affective domain. This enables lecturers to look at the course from the student point of the view and understand how they feel in regards with timing of the test. Do they feel they are ready for the test at defined time in week eight immediately after the material has been delivered?

3. RESULTS

We studied the delivery of the level 6 Data Management Technology paper in semester 1, 2005. There were 24 students enrolled. Two students withdraw from the paper within two weeks.

The Salsa software tool used is briefly explained in the methodology. A total of 72 detailed learning outcomes were specified. Students were required to report each week about their learning progress in the previous week.

The self-assessed mastery from Salsa at the time of the summative test was compared to the results from the test. Correlation was significant at 95% confidence. This replicates results from other researchers such as Boud(1995) and suggests that we can trust the subjective weekly data as an objective indication of learning.

Analysis of the data to show the average learning each week, expressed as a percentage of the lecturers' expectation is given in Table 1.

Week	Learning achieved
1	6%
2	91%
3	90%
4	85%
5	87%
6	41%
7	61%

Table 1: Learning by week

The pattern for the learning suggests that after the initial "getting to know the lecturer" time in the first week students settled down and learned with a steady rate of 85-90% of the lecturers' expectation each week, until week 6.

Week 6 included the Easter holiday and this seems to have had several different effects on students. Some students decided to use this opportunity to catch up with the work and improve their position, some treated it as a holiday and did no work and for others it was a time to reflect and as a result of it to make the decision to gave up on the paper.

Week 7 included a practice test. The data suggests that both the test and the holiday were

distracters to the learning process.

An analysis of the average time taken for learners to master the first three weeks' material is given in Table 2.

Percentage Mastered	When mastered
52%	One week after introduced
62%	Two weeks after introduced
69%	Three weeks after introduced
75%	Four weeks after introduced
78%	Five weeks after introduced

Table 2: Tiime to master first three week's material

This suggests that significant learning happens over the four week period after a topic is introduced; learning continues beyond this, but at a lower rate.

An analysis of the self assessed mastery at the time of the test, showing self-assessed mastery analysed by the week in which the related topic was introduced in the course is given in Table 3. There was no new material in week 6 (Easter).

Week	Learning achieved
1	79%
2	80%
3	76%
4	74%
5	56%
6	
7	35%

Table 3: Self assessed mastery

The data suggests that at the time of the test the material introduced in weeks 1 to 4 was reasonably well understood, but material from weeks 5 onward much less so.

Accordingly, it would seem reasonable to assess, in week 8, the material introduced in weeks 1 to 4, but this is too soon for the material introduced in weeks 5 onward. By inference, assessment of the material covered in weeks 1 to 7

should be carried out in week 11.

4. CONCLUSIONS

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Prior to this study, we would have predicted an increase in learning rate just before the summative test, as students focused their study on preparing for the test. The data suggests that the exact opposite is happening and that the learning rate falls off as the test nears. It would also appear that the use of a practice test can distract the learner from learning. One possible explanation is that shallow learning is valued more than deeper learning as the test nears and the desire to pass overshadows the desire to learn.

It is not clear if learning for the SQL material would continue as new topics (HTML and XML) are introduced in the course, since the Salsa software was only used for the SQL part of the course. We plan to replicate this study in the next delivery of the course but to continue the use of Salsa throughout the whole course. It will be interesting to see if the improvement in understanding of SQL with time is sustained.

It would appear that the presence of a public holiday during teaching time had an effect on learning progress. By implication, a study break might well have a similar effect. It would be interesting to study the effect on learning these have in other courses.

From the results, it would appear that we are running the test too soon if the test is to assess all the material covered in the first seven weeks. The data suggests that we should either limit the assessment to the first four weeks' material, or run the test later. The data also suggests that the test as it stands should be run in week 11, but only if the learning rate is sustained as the learner is introduced to new material.

5. REFERENCES

Lopez, M. (2005),"Salsa: The Systematic Analysis of Learner Self Appraisal", Proceedings of the NACCQ, Tauranga, New Zealand, 10-13 July, 2005.

Boud, D. (1995), "Enhancing Learning through Self Assessment", London: Kogan-Page