

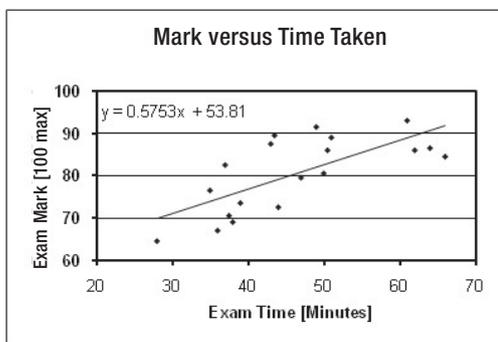
Making choices explicit

Thinking and learning in concert.

One of the last courses I taught before retirement was a First Year Seminar. This was a course with a hidden agenda – to acclimate first-year university students to a culture of thoughtfulness and to develop their academic skills. The course, on the science of networks, was taught at a time when social networks were just becoming an important part of student life. Almost every student had a mobile phone, and Facebook and MySpace were emerging as a new social phenomenon. The subject was timely and held student interest even though it contained some science and mathematics.

I taught the course twice in two successive years. The first time I noticed that students were making many bad choices about how and when to study. The second time I decided to explore student thinking about how they studied. The results of this exploration led me to observe that students make poor choices about how they study because they are unaware of alternatives and their consequences.

I took two specific actions on tests I gave. First, as each test was handed in, I noted the time spent on the test then graphed the mark earned versus time taken. The result from one test, shown in Figure 1, was



typical of results on other tests. This graph indicates that generally the more time taken on an exam the better the resulting mark;

an additional 10 minutes spent working the exam could result in a mark increase of about six points.

The second action was to place the following extra question on each exam:

During this middle part of the course I have been spending, on average,

- one hour
- two hours
- three hours
- more than three hours each week

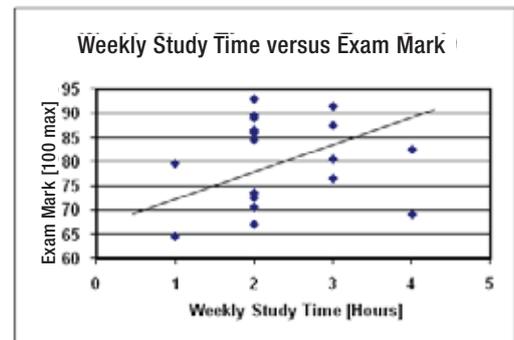
studying for this course.

I marked this as correct for all students who answered it and did not think too hard about how reliable their answers might be. I assumed students were generally truthful, a conclusion supported by my questioning them later. The results of this question are shown in Figure 2. The average study time was 2.3 hours per week. It is clear from the graph that generally marks increase with study time. Basically spending two hours per week in study instead of one hour will increase your mark by about six points.

The conclusions from these two graphs are not surprising. We all know that if you want to increase your mark, you work harder. What they give us is the ability to make quantitative statements about the improvement that a specific increase in effort will produce. I was able to confront my students with concrete evidence from their own experience and tell them approximately how much their mark would change if they worked longer. Most students were surprised by these results. They seemed not to be able to assess the consequences of changes in their behaviour.

Another interesting conclusion emerged from this data. Both graphs show the students

separated into two groups: the students in the group above the lines were more efficient learners than those below. For example, referring to Figure 2 where the distinction between the groups is clearer, the top group scores about 15 points higher than the lower



group. The group of better students seems to know how much time they needed to devote to study and test taking.

I suggest that the difference between the two groups lies in their ability to think productively about how they learn, a difference we may call the "metacognition gap." Students in the lower group are episodic learners (in the terminology of Art Costa and Bena Kallick), and they carry this lack of metacognition to their thinking about how they study.

I regret that I stumbled upon this type of meta-analysis at the end of my teaching career. It would be interesting to have examined results over a longer period. I suggest this kind of analysis gives a different view of how a class is performing. I also realise that it is particularly easy to carry out in the university environment where assessment is done on specific student work (exams or papers), but I would encourage teachers at all grade levels to explore how their students think about how they learn and provide a quantitative dimension to make choices explicit. 