PowerPoint and concept maps: a great double act

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Word Count: 1449

Introduction

How often have you heard the following comments expressed?

> 'The student has just repeated my lecture notes' Lecturer in an Exam Board.
>
> 'I must have done well in your examination as I memorised your PowerPoint slides and I know I wrote them down accurately' Student comment after receiving a poor mark.

Have you experienced such views? If so you might be interested in reading this Postcard.

Let me tell you about an experience I had about 10 years ago that got me thinking about these issues. After delivering my final financial reporting lecture of the semester and students were leaving the lecture theatre I noticed that one of the brightest students was looking rather miserable. So I asked her why the glum face. She replied that while she had followed each of my lectures and was reasonably confident about the forthcoming examination, she could rarely see connections both within and between the various lecture topics. This comment worried me as making connections is an important part of learning deeply and understanding rather than a surface approach with the intention of reproducing material for an examination (Maton and Saljo, 1976). After the

initial shock upon hearing her comments they got me thinking. How could I help my students best see that deep learning involves making meaningful connections both within, and between, topics.

Let me share my thoughts and a particular teaching/learning approach I have found useful in addressing this problem, concept mapping.

PowerPoint is Linear

PowerPoint is a really useful tool to accompany an oral presentation and has become the industry standard for accounting and other educators. Students have come to expect a set of PowerPoint slides to accompany a lecture and for these to be accessible usually posted on a teaching platform/virtual learning environment such eBridge, Blackboard or Moodle. Indeed such materials are now demanded by students and woo-betide a lecturer that fails to deliver their PowerPoint slides. However, many students have come to believe that the PowerPoint slides are indeed the lecture and even call them 'lecture notes'!

While I do indeed use PowerPoint slides in all my lectures and admire its usefulness, it does involve presenting a chain of material usually delivered in a linear way. This often has an unfortunate consequence: it conceals a network of tacit understanding built up over years of studying a subject that is not usually made available to students. That is a lecturers' expert understanding is hidden and only partially made explicit to students as the ideas are explained and developed in a lecture supported by PowerPoint slides. Hiding such connected understanding and presenting students simply with a set of PowerPoint slides often results in 'linearity rather than connectivity out of which

genuine understanding arises' (Hay et al. 2008, p. 306). This seems at odds with the mission of many business schools that emphasise 'connected thinking'.

While PowerPoint slides can be seen as a lecturer's current best listing of ideas to facilitate student understanding they are inevitably arranged in a linear order. Another lecturer may well order the concepts in a different way as might the same lecturer when repeating the lecture in the future. However, whichever approach/route a lecturer chooses to present material to their students they are still presented in a linear order.

Implications of PowerPoint

FIGURE 1 ABOUT HERE

Some students might consider a lecturers PowerPoint slides a definitive explanation of the topic and so rely upon memorisation. That is learning the lists of items from the PowerPoint slides, rather than engaging in meaningful activities in their learning. Such practices are depicted in Figure 1, as the white arrow where the student memorises the PowerPoint slides ready to repeat the content in an examination if the relevant topic comes up. However, a student who chooses to learn deeply might seek to link such ideas together in a more meaningful way with a view to becoming an emerging expert on the topic. Hay et al. (2008) refer to this process as a Transformative Learning Cycle.

PowerPoint slides can be considered as condensed knowledge from books and other knowledge sources and as such present a convenient linear source for students to memorise when preparing for examinations. However, to do so implies surface or rote learning and masks a wealth of interconnected hidden knowledge lying behind them that might lead to deep learning. Many books attempt to overcome such linearity by suggesting different pathways through the text for different types of students (e.g. avoid

Chapter 4 if you have already studied cash flow accounting). However, in a lecture situation where PowerPoint is used, there is a predetermined linear order. That is not to say that good students can reorder content when making particular arguments or answering specific questions.

Some lecturers are even complicit in this drive towards memorization as they set exam questions where reasonable scores can be earned by accurate repetition of PowerPoint slides. They might dress-up their questions with such expressions as 'critically discuss', 'evaluate' and so on, but describing content is still important. As External Examiners rarely see a lecturer's PowerPoint slides such repetition is not obvious to them.

Concept Maps are Non-Linear

What are concept maps?

FIGURE 2 ABOUT HERE

Panel 1 of Figure 2 shows a simple concept map that focuses upon the notion of profit. Profit is increased by revenues and decreased by expenses, with an example of revenue being sales and an example of expenses being depreciation. Simon (2007) and Hay et al (2008) recommend that lecturers use concept maps in their teaching to show students that knowledge is non-linear and interconnected, and needs to be individually constructed. By just providing sets of PowerPoint slides we might be giving our students the wrong impression that there is a fixed order of ideas both within and between topics.

If we look at Figure 1 again, we can see that when a lecturer makes their understanding explicit to students by providing a concept map (as well as PowerPoint slides) such interconnectivity of ideas is made clear. The learner is showing connected understanding by linking the two sides of the map. Firstly, by recognising that rent can be both revenue (on buildings the organisation owns and leases out) and an expense (on buildings an organisation uses but does not own). Secondly, by recognising that expenses need to be matched with revenue. Such connections are symptomatic of meaningful learning (Novak & Gowin, 1984). What is more the relationship between PowerPoint slides and the underlying concept map helps students see that they need to themselves travel around Hay et al's (2008) transformative learning cycle and build up their own individual understand. In fact the PowerPoint slides can be seen as a linear representation of an expert's understanding of an individual topic or the series of topics that populate a module.

Concept maps are different from mind maps (Buzan, 2002) and decision trees. Concept maps have a more restrictive set of rules than mind maps, as concepts are arranged in order of importance to a particular topic, with more important concepts towards the top, and less important lower down, the page. Concepts are then linked with annotated arrows to explain the nature of the relationship. Finally, the learner is encouraged to link concepts in different sections of the map to show an integrated understanding. Mind maps simply radiate concepts outwards from the main central idea. Concept maps are also different from decision trees in that they make no attempt to specify the outcome of a particular decision and as such are less restrictive than decision trees.

My students and I construct concept maps using Inspiration software, as my University has a site licence. While this software needs to be purchased CMap, an alternative

concept mapping software, is freely available for educational use on the internet. Another, type of software that can be used to construct concept maps is Prezis that can be used to construct non-linear presentations. Prezis involves setting up a map linking concepts and then in a presentation moving around the map focusing upon relevant concepts zooming in and out as required.

Benefit and problems of concept maps prepared and provided by lecturers

However, the lecturer is now faced with a dilemma. If s(he) makes their concept map available to students there is a danger that some students will simply memorise the concept map and deep learning will not occur. If students are asked to construct their own concept map, unless it is formally assessed, very few will undertake this difficult and time consuming task. Therefore I recommend the map is given to students in some incomplete form with the students needing to engage with the material to make it complete. Such incompleteness might be achieved by omitting selected concepts, turning the map into a quiz. The missing concepts can be either listed at the foot of the map or available from the accompanying PowerPoint slides or recommended reading. A simplified illustration of such a concept map quiz is shown as Panel B of Figure 2. Students can them be encouraged to add some of their own concepts and examples and change linking word or change the structure of the map. This is greatly assisted if the lecturer prepared map is provided electronically so it can be more easily changed. It can be pointed out that this process of building concept maps is a knowledge construction process rather than being handed down from above.

The concept mapping quiz can be seen as simply a recall exercise. Therefore it is important that the tutor follows up student suggestions by asking questions that address higher levels of Bloom's cognitive learning skills (Bloom, 1956) – such as: Why do you think that particular concept fits the map? Can you think of any examples relating to that concept?

I hand out such concept map quizzes at the end of most of my accounting lectures (yes I also use PowerPoint slides) and expect students to have completed the quiz before attending the related tutorial, usually occurring in the following week. Completing the map requires students to use their lecture notes (even if these are just the provided PowerPoint slides) and hopefully do some thinking and reading on the topic, as some missing concepts cannot be found in the lecture slides.

A useful by-product of using such concept map quizzes is that it helps with student participation in tutorials as I have found that most students are willing to volunteer a one/two word answer to a quite specific question, such as what concept best fits space A in Figure 2? Of course such answers merely show recall of knowledge, so I then ask follow up questions to test higher level learning skills (Bloom et al., 1956). Such questions might be:

- Can you describe depreciation to a non-accountant?
- Predict what will happen to profit if deprecation increases?
- How has Microsoft's profit increased from last year?
- How might Microsoft go about manipulating its profit?

Once a student has broken the ice by providing a one/two word answer and the answer is meaningful, I have found they are generally willing to answer a follow up question such as one of those illustrated above. By meaningful I am acknowledging that more than one concept may fit a blank concept node on the map. To see if the student answer is meaningful it is necessary to ask them to explain why they thought that particular concept fitted.

Benefit of concept maps self-constructed by students

For a critique of the benefits of students constructing concept maps themselves see Simon (2007). However, it should be noted that constructing a well integrated concept maps is not an easy skill to develop. However, as learners gain in experience their concept maps tend to become less linear and more integrated (i.e. more cross-links between different sections of the map). However, if a student is determined to learn by rote they will do so whatever the learning process, even with such tools as concept mapping. Concept maps can of course be learnt by heart and reproduced in an exam! However, many students do take up the challenge and use concept maps for deep learning. A few students start constructing concept maps in lectures but this is rare.

Conclusions

This Postcard has shown how concept maps explicitly emphasis connectivity that is very difficult to show in PowerPoint slides. However, PowerPoint slides are a convenient and useful way to convey knowledge. Therefore, I encourage my student to

come to a lecture with printed PowerPoint slides and make notes on these printouts during the lecture. Then I encourage them to go away and produce a concept map linking up relevant issues, or I present them with my concept map in a follow-up tutorial as a quiz and basis to discuss the issues. Therefore PowerPoint slides and concept maps are a great double act. While most accounting educators are familiar with PowerPoint, they are likely to be less familiar with concept maps. By constructing their own concept maps students can be encouraged to learn meaningfully. In addition, educator constructed concept map quizzes can be used to encourage more student participation in tutorials.

References:

Bloom et al., 1956, *Taxonomy of educational objectives: The classification of educational goals*, NY: D. McKay.

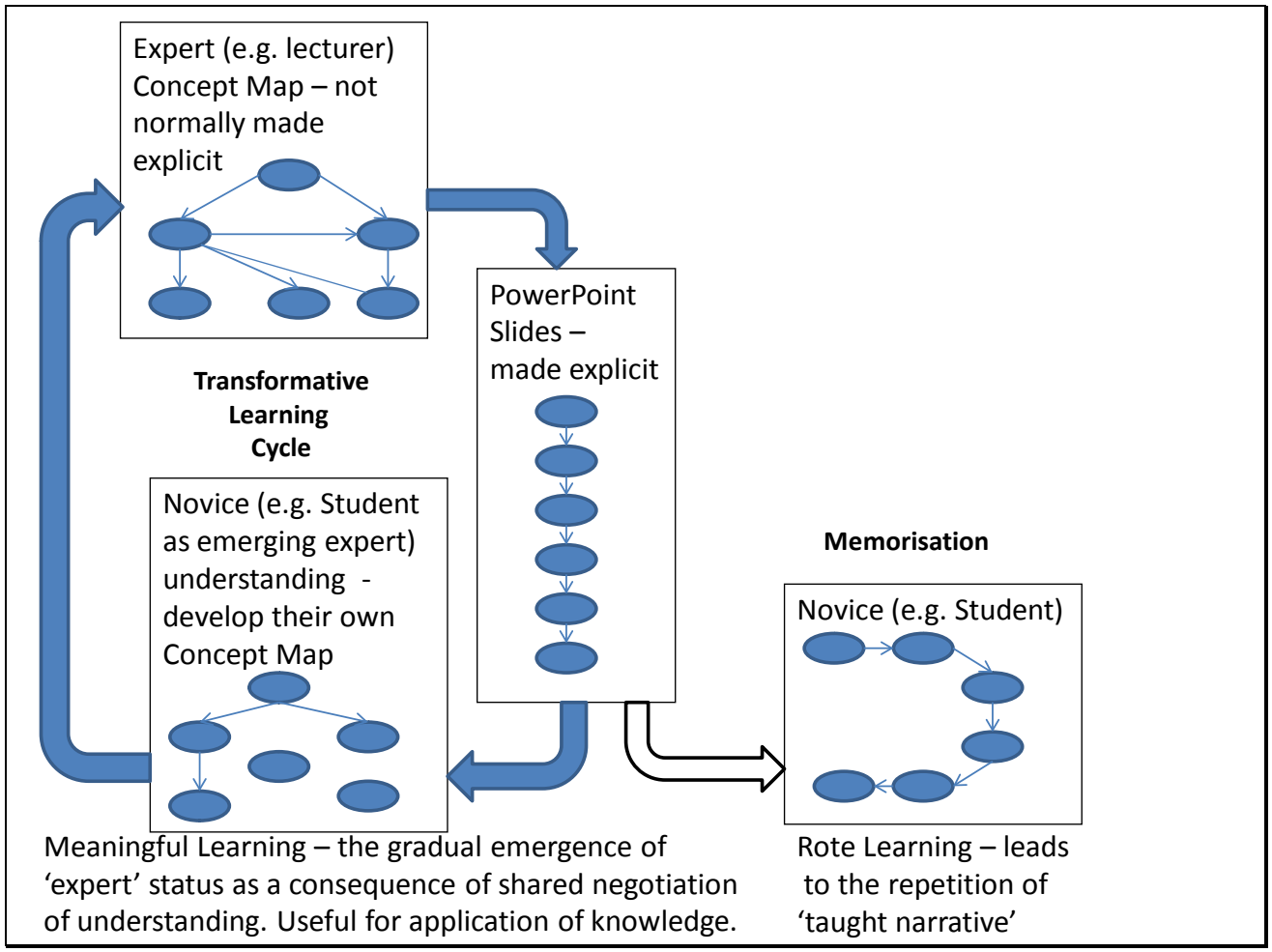
Buzan, T. (2002) *How to mind map*, London: Harper Collins.

Hay, D., Kinchin, I. & Lygo-Baker, S. (2008) Making learning visible: The role of concept mapping in higher education, *Studies in Higher Education*, 33(3), 295-311.

Marton, F and Saljo, R.(1976) On qualitative differences in learning - 1:outcome and process, British Journal of Educational Psychology, 46, 4-11.

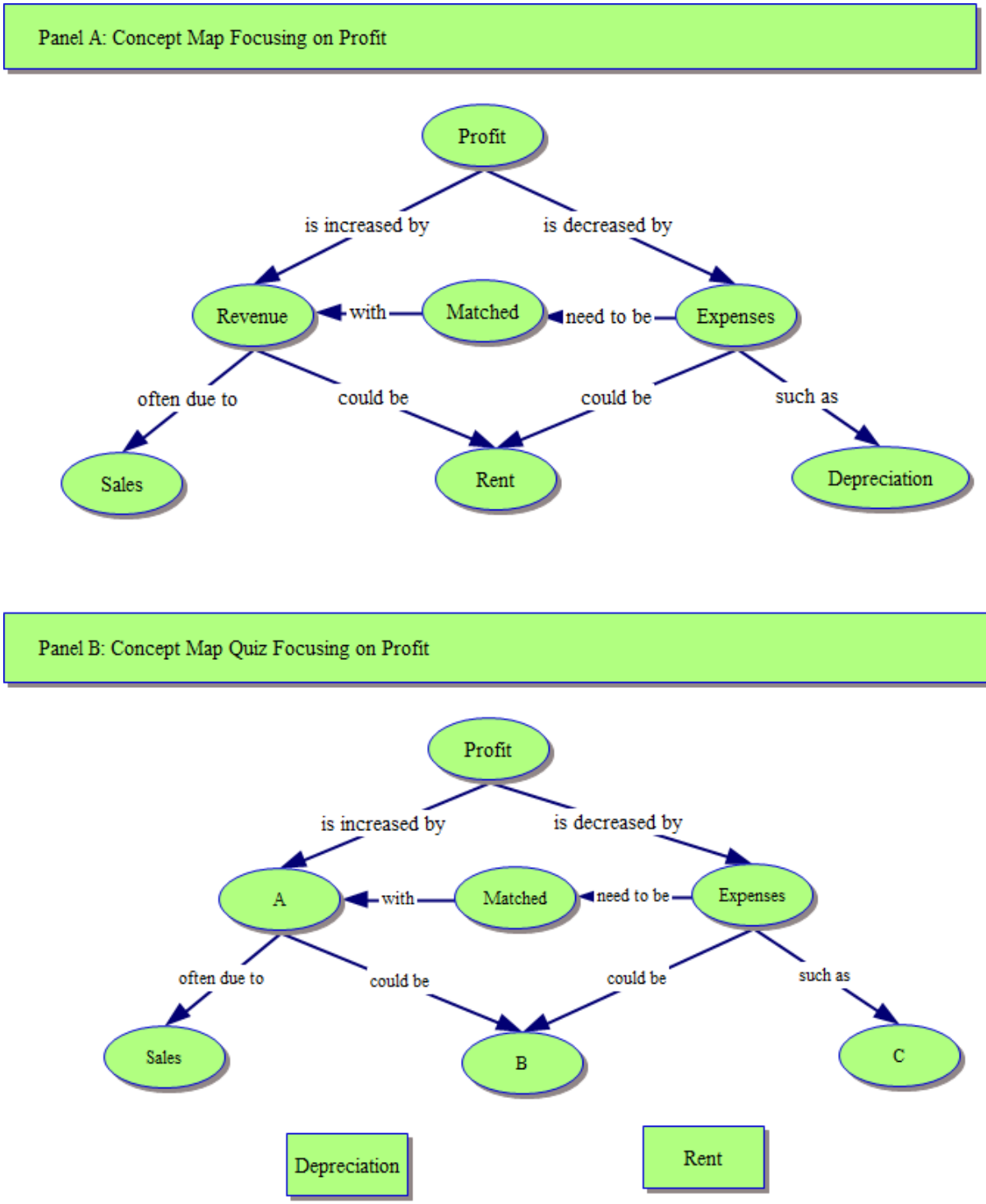
Simon, J. (2007) Concept Mapping in Accounting Education, *Accounting Education: An International Journal*, 16(3), pp. 273-308.

Figure 1:Two Learning Routes.



Based on Hay et al. (2008, p. 307)

Figure 2: A Concept Map Focusing On Profit and Its Quiz Version



1. Recognising missing concepts located at the foot of the concept map: e.g. C=Depreciation and B=Rent, or
2. Recalling missing concepts from memory of a previous lecture/text; e.g. A=Revenue