

TLC Project Assessment Case Study

Assessment Strategy	Assessing using Concept Maps
Subject and module	Level 2 – Geographical Studies Level 3 – Marine Pollution Management
Useful for students who are:	Dyslexic and dyspraxic
Keywords	Concept Maps, structure, relationships, reflection
Assessment activity	<p>Using Concept Maps (CMs) as a method for improving student learning has been mooted by a range of authors (e.g. Novak and Gowin, 1984; Pendley <i>et al.</i>, 1994; Clarke & Ryder, 2002; Hester, 2006; Lynch, 2006). Whilst the evidence appears to be generally positive, recent research has suggested that case by case evidence is more equivocal (Chaplin, 2007; Doorn & O'Brien, 2007).</p> <p>However, the use of CMs as an assessment tool has been less well considered. This is because that whilst they represent a method of students to demonstrate relationships between concepts, and their knowledge of concepts themselves, they are often very individual representations of understanding. Whilst not necessarily 'faulty', they are often only easily interpreted by the CM author i.e. the student. A number of studies have used CMs in assessment, ranging from the rather time consuming in conjunction with a viva (Fazey & Lawson, 2005), to the highly complicated, and frankly, confusing (Chang <i>et al.</i>, 2005). Other, more often practiced, assessment techniques ask students to indicate 'strength' of or 'confidence' in the relationships between concepts, which are then assessed (e.g. Nicoll <i>et al.</i>, 2001; Lui <i>et al.</i>, 2005;). These techniques, however, do not specifically test for thinking skill such as evaluation of evidence, and decision making.</p> <p>This activity asks students to marshal a body of evidence based on a relatively wide research problem (e.g. What is eutrophication, and why is it 'worse' in one water body than another?), and make sense of it, by establishing a range of concepts and relationships i.e. draw a CM. It then asks students to assess the general CM in the light of answering a specific question (e.g. What would happen to water body x, if you dredged this area?), CHOOSE the relevant sections of the CM, and JUSTIFY this analysis by means of a short statement reflecting upon why certain material is</p>

	<p>EXCLUDED, INCLUDED or ADDED. This short justification requires students to analyse a large data set and specify the most important areas of understanding. This knowledge and understanding, however, is represented VISUALLY through the CM, without the need for specific academic writing conventions. The justification can be written in any form comfortable to the student, and the knowledge and understanding (i.e. the relationships between the concepts) is left within the visual map format.</p> <p>By doing this, it is argued, tutors can engage students in the process of selection and evaluation, without recourse to delivering a highly structured piece of academic writing.</p> <p>The generic map is developed by groups, but each student within the group gets an individual small task. The group map is developed over three weeks, in conversation with the tutor, and by a process of research and reflection, rather than by traditional class based teaching. The assessment artefacts are the Group Map, the Individual Student Map, and the Individual Statement.</p>
How does this assessment improve student learning?	<p>It asks students to consider the relationships between concepts, rather than just the concepts themselves. Therefore, it asks them to test in a formative way, higher order thinking. It then asks students to take a known situation and hypothesise into other areas, challenging them to think more laterally. The process stimulates conversation between the group, and between the group and tutor.</p>
Underpinning theory links	<p>The activity is inherently based upon a social constructivist paradigm (Vygotsky, 1962). Challenging students to think of relationships between concepts, and then think more laterally is often cited as encouraging a deep approach to learning (Biggs, 1999).</p> <p>The process of drawing and using Concept Maps was advanced by Novak and Gowin (1984)</p>
What went well	<p>Group research and feedback sessions. Many groups had researched an awful lot. However, the weekly meetings allowed the tutor to test these concepts, to check links, and highlight areas of concern. This iterative process gave rise to a number of strong group maps.</p>
What could be improved	<p>Students are less clear about the individual task, and some expressed concern. Therefore, the assessments in 2006, also offered a final week of individual sessions to discuss potential ideas. Students still need to use prepositions more within their maps.</p>
What support	<p>Staff need to be confident in the skills of facilitation, in order</p>

for staff is needed to implement this method of assessment?	to foster a better group dynamic, and ensure that all members contribute, and thus understand, all aspects of the map.
What support for students is needed to implement this method of assessment?	Introduction to using Inspiration, and drawing Concept Maps. Students need to be given assurances during the individual process, as this kind of report is atypical of their general assessment experience.
What are the time implications?	There are no direct time savings, but the task took no longer than delivering three to four weeks of more traditionally designed class activities.
Other resource implications?	None. The CMs can be drawn in Inspiration or another CM software package. FreeMind is free to download (http://sourceforge.net/projects/freemind). Failing this, maps can be hand drawn.
What are the risks?	Not typical of many assessments tasks. Students report a degree of anxiety, especially at Level Three.
How can these be minimised?	Careful tutoring and preparation.
Implications for dyslexic students?	The visual interpretation of knowledge and understanding may help some dyslexic students. The more random structure of a CM may help dyspraxic students to better organise their thinking.
Institution where this was trailed	Southampton Solent University
Lecturer	Paul Wright
CATS	20 (in both cases). Assessment is worth 30% of total unit grade.
Level	Two and Three
Compulsory/optional	Compulsory for the unit
Relationship to other modules	None
Delivery pattern	4 weeks of group based tutorials, with a high degree of personal research. Group based discussions last c.30mins per group per week.
Student profile Year 2004/5	
Learning outcomes assessed	Identify the main sources of a pollutant to the marine environment Assess the effects of a pollutant on the environment

<p>References</p>	<p>Biggs, J. 1999. Teaching for Quality Learning at University. Buckingham: OUP/SRHE</p> <p>Chang, K.-E., Sung, Y.-T., Chang, R.-B., & Lin, S.-C. 2005. A New Assessment for Computer-based Concept Mapping. <i>Educational Technology & Society</i>. 8(3). 138-148.</p> <p>Chaplin, S. 2007. A Model of Student Success: Coaching Students to Develop Critical Thinking Skills in Introductory Biology Courses. <i>International Journal for the Scholarship of Teaching and Learning</i>. 1(2). Available at: http://www.georgiasouthern.edu/ijstl/v1n2/articles/chaplin/Article_Chaplin.pdf. Accessed 25/07/07.</p> <p>Clarke, A. and J.Ryder. 2002. Knowledge Mapping. A final Report for LTSN Development Project. Available at: http://ntserver002.liv.ac.uk/ltsnpsc/devprojs/reports/pdfs/knownow_map.pdf. Accessed 25/07/07.</p> <p>Doorn, D. and M. O'Brien. 2007. Assessing the Gains from Concept Mapping in Introductory Statistics. <i>International Journal for the Scholarship of Teaching and Learning</i>. 1(2). Available at: http://www.georgiasouthern.edu/ijstl/v1n2/articles/doorn/Article_Doorn-OBrien.pdf. Accessed 25/07/07.</p> <p>Fazey, D. & R. Lawson. 2005. Promoting a deep approach to study in undergraduate modules. Available at: http://riel.bangor.ac.uk/the/finalpromotingdeepapproach.htm. Accessed 25/07/07.</p> <p>Hester, P. 2006. Teaching to Learn and Learning to Teach: Concept Maps and the Web-Bib Database. Proceedings of the <i>Third Annual Conference for the International Society for the Scholarship of Learning and Teaching</i>. Washington, 2006.</p> <p>Lui C-C, P-H. Don and C-M. Tsai. 2005. Assessment Based on Linkage Patterns in Concept Maps. <i>Journal Of Information Science and Engineering</i>. 21. 873-890.</p> <p>Lynch, E. 2006. SoTL in Teacher Education: An Examination of the Use of Concept Mapping to Support Problem Solving and Meaningful Learning. Proceedings of the <i>Third Annual Conference for the International Society for the Scholarship of Learning and Teaching</i>. Washington, 2006.</p> <p>Nicoll G., J. Francisco and M. Nakhleh. 2001. A Three-Tier System for Assessing Concept Map Links: A methodological Study. <i>International Journal of</i></p> <p>Novak, J.D. and D.B Gowin. 1984. Learning How to Learn. Cambridge: Cambridge University Press.</p> <p>Pendley, B. D., R.L. Bretz, and J.D. Novak. 1994. Concept Maps as a Tool to Assess Learning in Chemistry. <i>Journal</i></p>
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	<p><i>of Chemistry Education. 71(1). 9–15. Science Education. 23(8), 863 – 875.</i></p> <p>Vygotsky, L.S. 1962. Thought and language. Cambridge: M.I.T. Press.</p>
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Assessment Criteria

SOUTHAMPTON SOLENT UNIVERSITY FACULTY OF TECHNOLOGY

COURSE: Marine Environmental Science

UNIT: Marine Pollution Management

Assessment No.:1 **Assessment Type:** Report

Weighting %: 30

The current version of “The Students Guide to Assessment” should be consulted for the regulations that apply to all assessments. This guide was handed out at enrolment and is also available from the Faculty Office RM304.

Hand-out Date to students: WEEK EIGHT

Latest Hand-in Date (by student) : **WEEK ELEVEN**

[Note: Extensions to the published hand-in date will **not** be given, but refer to the current guidelines and form for extenuating circumstances, available from the Faculty Office RM304.]

Planned Feedback Date (by Tutor) : **WEEK THIRTEEN**

[Note: Normally, you will not receive your original work back after marking, therefore, always keep a copy of what you hand in. However, you should always receive feedback on your performance.]

Learning Outcomes/Objectives Assessed:

- Identify the main sources of a pollutant to the marine environment
- Assess the effects of a pollutant on the environment

Assessment Criteria: See Marking Rubric

Brief:

During the meetings we have had in small groups, you have been asked to produce a concept map of the how the group have researched the problem of eutrophication, and its potential impacts on Chichester Harbour and

Southampton Water. You will then be given a SPECIFIC problem to think about, where your group map will help you think about the potential issues.

GROUP WORK

You are required to construct and present a legible group concept map using Inspiration, as shown earlier in the year. It is important that you use tutorial sessions to discuss your individual work amongst the group, so that everyone has a good grasp of the map, what the relationships between concepts are, and what the concepts actually mean.

INDIVIDUAL WORK

You will be set a small problem. Individually, you should edit the group map to show which bits that are ONLY relevant to the investigation of the problem. You may find that you need to discard some information. You might find that you need to add some more concepts and links. You might find that you need to make new links (or delete others) as you think about the problem. This map should, again, be constructed in Inspiration and be legible in a suitable print format.

Once you have done this, you should write a 1000 word report documenting the process by which you arrived at this edited map. Why did you discard information? Why did you add information? What does that new information mean to you, and why is it important? What evidence do you have for putting in new links, or deleting old links? Does the map help you SOLVE the problem, or are there gaps?

ASSESSMENT ARTEFACTS.

Each student should hand in:

1. The group map.
2. Their individual map.
3. The 1000 word narrative documenting the construction of the second map, from the first. THIS IS THE ONLY ARTEFACT THAT WILL BE MARKED. THE OTHER TWO MAPS MUST BE INCLUDED FOR PURPOSES OF EVIDENCE. FAILURE TO DO SO WILL RESULT IN A FAIL.

Table 1. Group Proposal and Individual Report assessment criteria

Stated ILOs	Threshold Characteristic
<ul style="list-style-type: none"> ▪ Identify the main sources of pollution to the marine environment. ▪ Assess the effects of these pollutants upon the marine environment. 	<p>The student establishes a meaningful relationship between a pollution source and its potential environmental effect.</p>

Discriminatory Considerations

Lower Second	Upper Second	First
<p>The student establishes a number of relationships between a series of sources, and explains the potential effects upon the environment. This explanation is fully justified by reference to literature, which supports the conclusions reached.</p>	<p>The student takes these various sources, which might support the development of the discussion of the problem, but justifies which one(s) might be important, explaining why. This justification will need some consideration of literature and data from the specific contexts.</p>	<p>Once the student has justified their choice of important concepts in the map, a first class answer is gained by the student explaining the evaluative process that was used to identify which information should be added or taken away from the group map, or by which new links were made, or old links rejected. Use of literature is key here, rather than intuition or guesswork.</p>

Hints and Tips for a successful assignment

1. Concentrate on the processes not the contexts:

Too many students worry about finding stuff out about the two environments. There is nothing you do not need either on the internet, in journals, in the library, or on the Learnwise site (comparative nutrient data, for example).

Do not get hung up on knowing exactly how many sewage works there are, and where they are etc. You will NOT be able to find out as much about Chichester as you can about Southampton Water. You will HAVE to hypothesise. THIS IS OK. This is an intellectiula exercise, so base your hypothesis on evidence rather than guessing!!!

2. Build your Concept Maps properly

Use 'prepositions' i.e. words on the arrows between links. These should be noun or verb phrases, and be meaningful.

Try and keep a 'hierarchy' to you map, from the general to the specific. This is not always possible, but one idea should flow from another and suggest a drilling down into your understanding.

Build in references by using a number in the concept or node. So, after writing a phrase use (1), (2) etc. Then link these through a reference list (1), (2), with refs in HARVARD.

3. Build you map each week

Do NOT turn up to meetings with nothing to say, or nothing to show me. This exercise WILL take three weeks, of quite intensive study

Set aside time to talk to each other each week. This is ok, until the last bit, when you should be on your own. However, you cannot get a grasp on the concept (especially if someone else has worked on that area of your map!) unless you talk things through.

Do NOT worry about slackers. DO not feel you have to talk things over with them. This is a reciprocal process, they should get out of it what they put in. However, NO ONE should be without a group map, unless you have evidence of NO ENGAGEMENT WHATSOEVER!