Directed Inquiry Proposal
Applying Learning Theories
to the
Learning of Mathematics

Prof R Dunwell

1 Overview

Week	Topic	Emphasis
Week 1	Orientation/Motivation	Definition of terms
Week 2	Orientation/Motivation	Learning behaviours
Week 3	Lesson planning	Essential components
Week 4	Orientation/Motivation	Application to lesson planning
Week 5	Kolb's Learning Cycle	Definition of terms
Week 6	Kolb's Learning Cycle	Learning behaviours
Week 7	Kolb's Learning Cycle	Application to lesson planning
Week 8	Bloom's Taxonomy	Definition of terms
Week 9	Bloom's Taxonomy	Learning behaviours
Week 10	Bloom's Taxonomy	Application to assessment of learning
Week 11	Review	Personal experiences of learning

This DI will compliment the study group mentoring that is undertaken by peer tutors. To participate in this DI a student must lead one or two study groups in one of the Mathematics courses supported by the Math Support Center.

For each of the weeks listed above the participant in this DI will:

- Have a 50 minute discussion with Prof Dunwell on that weeks topic.

- Write a list of student behaviours they observe in the study groups that they are leading.

- Complete a reflective activity on that week's topic. These are listed below.

In addition to these weekly activities the DI participant will be asked to write an essay (approximately 1500 words) on how their own understanding of a topic in Mathematics developed. The description should use the concepts introduced in this DI.

By the 16th December, therefore the student should have a portfolio of work consisting of: 11 obsevations of the students in the study groups; 11 reflective exercises; and one 1500 word essay. Students will be assigned a percentage grade, 22% being awarded for participation in the weekly discussions; 33% being awarded for the observations; 33% being awarded for the reflective exercises; and the final 12% being awarded for the essay.

2 Students' Orientation to Learning

2.1 Reflective Exercises

Week 1. Write notes on the six orientations, outlining how each of the orientations may lead a student to study mathematics

Week 2. Listing examples of observed student behaviour that indicate their learning orientation

Week 3. Write notes on what consistutes a lesson plan

Week 4. Design a sequence of lessons that aim to teach a topic to a group of students with a range of orientations.

2.2 Reference

"Improving Your Students' Learning" by Alistair Morgan, from Kogan Page, ISBN 0-7494-0712-3

3 Kolb's Experiential Learning Cycle

3.1 Reflective Exercises

Week 5. Write notes on the elements of the learning cycle, outlining their meaning and giving examples from mathematics.

Week 6. Listing examples of observed student behaviour that indicate the student is using one of the four processes of the cycle

Week 7. Design a sequence of lessons that would take the students through a complete cycle for a particular topic.

3.2 References

- http://www.nwlink.com/~Donclark/history/kolb.html

- http://www.ldu.leeds.ac.uk/ldu/sddu_multimedia/kolb/static_version.php

4 Bloom's Taxonomy, the Cognitive Domain

4.1 Reflective Exercises

Week 10. Write notes on the elements of the cognitive domain of the taxonomy, outlining their meaning and giving examples from mathematics.

Week 11. Listing examples of observed student behaviour that can be classfied under the cognitive domain or the affective domain.

Week 12. Write test items that would assess the student's proficiency in each of the cognitive skills.

4.2 References

- http://www.nwlink.com/~donclark/hrd/bloom.html

- http://en.wikipedia.org/wiki/Bloom's_Taxonomy

- http://tlt.its.psu.edu/suggestions/research/Blooms_Taxonomy.shtml