Project title  | STOP, THINK - Improving student engagement using learning preference feedback and reflective practice intervention.
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Project leader  | Dr Richard Guy
Team members  | Assoc. Prof Marian Dobos, Dr Heather Pisani and Faye Partridge
Funds approved  | $5364
Funds acquitted  | $4752

Introduction (give a brief overview of the project)  
Although student performance and satisfaction in first year courses may be high this does not necessarily mean that they are developing higher order thinking skills appropriate for related or subsequent courses. First year students experience difficulty in the transition to university. This is related to the different approaches to learning e.g. the development of associations between knowledge components (i.e. concepts and higher order thinking). The results for first and second semester Biomedical and Physical Sciences nursing courses are high (average mark approx 70%) and the GTS scores are also high (approx 80%). However the student ability to answer related conceptually based questions in another nursing course (Foundations of Nursing Practice NURS 1125) did not reflect their performance in the Biomedical courses. The current project attempted to stimulate reflective thinking within a Biomedical and Physical Science course (BIOL 2062) and to concurrently improve performance in Foundations of Nursing.

The project was designed to initially assess the reflective and deep learning abilities of the students, to enhance reflection about deep learning using an intervention and to finally assess the impact of the intervention by measuring deep learning ability and academic outcomes. The impact of the intervention was also assessed by written student feedback at the end of the semester.

The need for improving reflective thinking has also arisen in a first year second semester biochemistry course (Introduction to Medical Biochemistry). This course was used as part of the study and provided a useful comparison with the nursing course.

Notes: Include changes to the project scope, methodology, and outcomes of the project as it progressed, and the rationale for this.

All of the components of the study (as outlined above) were completed. However at this stage only the data from the nursing cohort has been fully analysed due to the large amount of data acquired. The data from the biochemistry data is now being analysed and will be compared with the nursing data when completed. In fact the analysis conducted was more extensive than originally anticipated due to some interesting findings related to the intervention (concept map analysis).

Several approaches/tools were developed with respect to the measurement of deep learning and the use of concept maps:

1. Ethics approval was obtained for individual tracking of students including their academic outcomes
2. The Felder instrument was shortened to focus on only the active – reflective dimension.

3. An excel-based approach was developed to analyse the student responses to the Felder instrument and to the Biggs SPQ instrument. Data was collected on computer-based multiple-choice sheets and the data scanned using the exam marking apparatus. The final data files were exported to excel and the active-reflective and deep-surface learning outcomes calculated for each student. This approach provides a fast method of determining learning approaches and may be of use to others at RMIT.

4. A series of three specially developed clinical scenarios was developed for use as the reflective intervention. The scenarios were distributed amongst academic colleagues and the resulting concept maps used to form a template (used later for assessing the student concept map results). The student was requested to read the scenario and then develop a concept map that included and linked appropriate aspects of body systems. The scenario included systems that the students had previously learnt. A full list of body systems was provided to provide some assistance in the generation of the map. In addition to completion of the map the student was requested to gauge the level of difficulty of the exercise before and after they had completed it (following the TERISSA approach).

5. An extensive literature review was conducted to determine the most appropriate method of concept map analysis. The initial approach involved counting the number of relevant links however it was later extended to include hierarchical levels, cross links and examples.

RESULTS

Student reflective learning, deep and surface learning were measured before the intervention. The intervention consisted of student – generated concept maps based on three clinical scenarios. Student deep/surface learning was measured after the intervention. All the data was compared with student final results in BIOL2062 and NURS1125.

Reflective Learning

Reflective learning was assessed prior to the intervention using the Active-Reflective dimension of the Felder instrument. The following correlations were found:

Reflective preference was not correlated with the pre-intervention DA but was positively correlated with the post-intervention deep learning preference (0.27 **).

Reflective preference was positively correlated with exam performance in BIOL 2062 (0.35**) but not correlated with the Foundations in Nursing exam performance.

Reflective preference was not correlated with the student performance in the intervention (concept map assessment).

Deep Learning

Deep learning was assessed using the Biggs SPQ.

Pre-Intervention Deep Learning (Pre-DA)

The pre-DA measurement was positively correlated with the future intervention performance (0.33)

The pre-DA measurement was positively correlated with the final exam result in BIOL
2062 (0.188**) but not the final result in Foundations in Nursing.

The pre-DA measurement was negatively correlated with the initial surface learning measurement (-0.18).

**Post Intervention Deep Learning (Post-DA)**

The post-DA measurement was positively correlated with the intervention performance (0.28**)

The post-DA measurement was positively correlated with the final exam result in BIOL 2062 (0.217**) but not with the final result in Foundations in Nursing.

**Surface Learning**

**Pre-Intervention Surface Learning (Pre-SA)**

The pre-SA measurement was negatively correlated with the initial deep learning measurement (-0.18), the future intervention assessment (-0.22**) and the post intervention deep learning measurement (-.28**).

The pre-SA measurement was not correlated with the final exam result in either BIOL 2062 or Foundations in Nursing.

**Post -Intervention Surface Learning (Post-SA)**

The post-SA measurement was negatively correlated with the intervention assessment (-0.33**) and with the post intervention deep learning measurement.

The post-SA measurement was not correlated with the final results in BIOL 2062 and Foundations in Nursing.

**Results of the Intervention.**

The deep learning measurements (pre intervention and post intervention) were positively correlated with the intervention assessment and with the results of the final exam in BIOL 2062. However there was no correlation between the deep learning measurements and the results in NURS 1125.

The pre-DA measurements did not differ significantly from the post-DA measurements in terms of the average. Although this might be interpreted as a lack of effect of the intervention other differences were observed between the pre and post intervention deep learning data e.g the reflective learning preference was not correlated to the DA data prior to the intervention but was positively correlated to the post-DA data.

**FINAL QUESTIONNAIRE**

Correlations were investigated between the response to 11 questions about the study and the final results.

Students who agreed with the statements below regarding the intervention showed a strong negative correlation with the final results in NURS 1125 (q1 – 0.84** and q 2 – 0.807**) 

_The reflective practice exercises (concept maps) helped me understand how anatomy_
and physiology facts can relate to a ‘real life’ situation (q1)

The reflective practice exercises (concept maps) provided me with immediate feedback on my knowledge of the areas of anatomy and physiology that I have covered (q2)

Students who agreed with the question – ‘I have changed my approach to learning as a result of the reflective exercises (concept maps) showed a negative correlation to the final results in NURS 1125 (q5 – 0.205*).

Students who agreed with the question – ‘The “STOP THINK” project has made me think about how I approach learning showed a negative correlation with the final result in BIOL 2062 (q6 – 0.246*).

FOCUS GROUP
A final focus group was held which supported the use of concept maps as a means to support student learning and enhancement of deep learning.

DISCUSSION
The results of the project support the use of measures of learning approach such as reflection (Felder) and deep and surface learning (Biggs). Students who demonstrated higher levels of reflection or deep learning also showed better academic outcomes in BIOL 2062. Surface learning was negatively correlated with deep learning but not correlated with academic outcomes in this study.

The use of concept maps as an intervention to encourage deep learning was supported by the positive correlation between deep learning and the results of the concept map assessment. Student feedback in the questionnaire and focus group also supported this mode of intervention.

The original aim of the project was to encourage deep learning within BIOL 2062 with the hope that this benefit would transfer to a concurrent course, Foundations in Nursing. Although positive outcomes were found within BIOL 2062 these did not seem to transfer to NURS 1125. Those students who agreed that the intervention had helped them performed poorly in NURS 1125. The negative correlation of -0.8** was the strongest seen in this study.

In summary although the project did not succeed in the ultimate aim of improving student performance in Foundations in Nursing it demonstrated the utility of learning approach tools and has also suggested that concept map interventions may be a useful method of improving student deep learning


Dissemination is increasingly important for project funders. Please consider innovative ways in which you might more effectively disseminate your project outcomes. ADG is happy to coordinate and promote such events or strategies.

**Provide a summary of the project, outcomes, impacts and dissemination**

**Note:** This is the summary that will appear on the staff intranet, and needs to be a well-formulated and succinct statement of ~500 words. Your more extensive report covering the above headings will be linked to this summary on the website.

Although student performance and satisfaction in first year courses may be high this does not necessarily mean that they are developing higher order thinking skills appropriate for related or subsequent courses. The current project used different measures of learning process (Felder – reflective; Biggs SPQ – deep (DA)/surface learning (SA)) as a means of tracking individual students. The student learning approach was compared with academic outcomes in two concurrent first year nursing courses (BIOL 2062 and NURS 1125). A reflective intervention (concept map generation from three clinical scenarios) was used to stimulate deep thinking in one of the two courses (BIOL 2062). The results of the project support the use of measures of learning approach. Students who demonstrated higher levels of reflection or deep learning also showed better academic outcomes in BIOL 2062. Surface learning was negatively correlated with deep learning but not correlated with academic outcomes in this study.

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The deep learning measurements suggest that the Biggs SPQ may provide a useful method of tracking student progress during their studies. The project has also demonstrated that the use of concept map interventions should be further investigated as a method to improve deep learning outcomes. We are currently analysing data from a subsequent study using first year biochemistry students (using the same tools and intervention). A comparison between different courses should provide some extra insights into student deep learning.
You should also attach pictures, presentation material, web site links etc that may be important.

Please make any other comments.

*Please send completed report to Claire Brooks by close of business 21 December 2010.*

*Thank you*

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