

VCE Practical Workshops in Nanotechnology

Project title for HEESP grant

Provide students in a number of SALT schools in local and regional areas with financial support to attend VCE practical workshops in Nanotechnology.

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Table of contents

Background	3
Milestones	3
Participation lists	4
Student and teacher feedback	4/5
Budget	5
Evaluation	6
Conclusion	6
Appendix 1 Publicity Brochures.....	7
Appendix 2 Student notes.....	7
Appendix 3 Student and teacher feedback forms.....	7



Background

The Department of Physics conducts nanotechnology outreach programs but these are not directly aligned to or targeted towards the VCE chemistry curriculum. There is no particular emphasis on ensuring participation by SALT schools.

A need was identified to both develop an experimentally-based nanotechnology program more aligned to the VCE curriculum and requirements (such as SACS) while simultaneously ensuring SALT schools representation in the program.

HEESP funding was granted for a project aimed at:

- 1) Developing the curriculum for nanotechnology practical workshops
- 2) Encouraging greater participation by local and regional SALT schools through direct contact with schools, providing promotional material, student notes, facilitating booking arrangements and subsidizing the workshop fee or travel costs.

This final report provides a summary of the milestones, participation, budget considerations and project evaluation. The appendices show examples of the variety of documentation developed over the life of the project.

Milestones

The project commenced in February 2009. Its progress has been marked by the continual development of curriculum, an emphasis on teacher education, production of workshop student notes, and promotional material, publicity activities and increasing student interest.

Summary of Milestones

Date	Task	Progress
Feb-March 2009	Curriculum was developed.	Completed
	Networked with SALT schools	
	Created and distributed flyers to schools	
	Publicised the program at selected conferences	
	Organized workshops	
May 2009	Interim report was written for Holly Langfield	
June 2009 to November 2010	Conducted workshops and continued to distribute publicity	Completed with workshops conducted between June 2009 to Nov 2010 and presentations at Science Teachers Conference in 2009 and 2010

Participation

A breakdown of school participation in the practical workshops is shown in Table 1.

Table 1. School Participation in Nanotechnology Practical Workshops June-November 2009

Schools	No. Students	SALT and /or Regional School
Box Forrest	10	Y
Diamond Valley SC	10	Y
Doncaster East	40	N
Preston Girls	20	N
Pascoe Vale Girls SC	85	Y
Reservoir District SC	25	Y
Wangaratta SC	40	Y
St Helena SC	10	Y
Banksia College	10	Y
9 schools	250	7 SALT schools

An important feature of the program was to engage teachers and maintain their interest by providing opportunities for them to become familiar with its various elements. The latter was achieved by holding workshops and seminars and the participation in these events is shown in Table 2.

Table 2. Teacher Participation in teacher-orientated nanotechnology seminars/workshops

	Metro SALT Schools	No. Teachers	Regional SALT Schools	No. Teachers
	Brunswick SC	1	Birchip P-12	1
	Epping SC	1	Swan Hill College	1
	Gladstone Park SC	1	Rochester SC	1
	Keilor Downs SC	2	Tallangatta	1
	Lalor SC	1	Wangaratta HS	2
	Macleod SC	1		
	Montmorency SC	1		
	St Helena SC	2		
	Sunbury College	1		
	Viewbank SC	1		
Totals	10	12	5	6

Student and Teacher feedback

Student and teacher feedback on workshops was sought using the standard feedback forms (Appendix 3). Responses were overwhelmingly positive.

Summary of student feedback

200 surveys completed as of August, 2010

93% of students said the program was enjoyable.

90% of students said the program helped their understanding of nanoscience.

61% of students said the program inspired their interest in a career in science.

Other comments:

- Students enjoyed lunch in the Agora
- The notes were good but students could have done with more time to read them.
- Students commented on the usefulness of the 'hands-on' aspect of the prac.
- Making ferrofluid and testing it with a magnet was a highlight.
- Staff was friendly and most helpful.

Summary of teacher feedback

10 surveys completed as of August, 2010

Teachers' responses were very positive with the main messages being the:

- Value of the hands-on approach for the students
- Opportunity for students to participate in experiments and surroundings neither possible nor available in the school environment
- Relevance to the VCE curriculum
- Helpful and knowledgeable demonstrators

Budget

Amount granted for this project was \$10000. Funds were spent according to plan.

Detailed Budget Items	Amount spent (\$)
Personnel (include on costs)	
Short term contracts (demonstrators)	2754.00
Technical assistance to optimize experimental methods and prepare solutions for each workshop	900.00
Curriculum development	950.00
Administrative costs	1750.00
Equipment / Maintenance	1900.00
Maintain specialized equipment/ chemical stocks/ glassware	
Travel:	1290.00
Subsidize regional and rural students travel to La Trobe Conduct school visits and visits to regional La Trobe campuses	
Other:	1000.00
Preparation of promotional material, photocopying and collation of survey data	
TOTAL	\$10544.00

Evaluation

The principle objective of the grant was to use it to raise SALT school participation in the nanotechnology practical workshops. Having developed a workshop curriculum to align the experiments with VCE study design, the central thrust of the project was to publicize the presence of the workshops by direct networking

and public presentations at events such as the Chemistry Teachers Conference in February 2009 and 2010. The success of this approach is shown by the data in Tables 1 and 2.

The number of local and regional SALT school teachers who availed themselves of the training workshops bodes well for nanotechnology becoming an integral part of the science curriculum in these schools.

Interest in the nanotechnology practical workshops continues to be strong. Publicity material (Appendix 1) the availability of student notes (Appendix 2) and presentations at the Science Teachers Association of Victoria annual Conference held at La Trobe continue to raise teacher awareness of this program. The workshops are also popular with students visiting the university as part of the annual three day "Science Experience" program. This ongoing interest means the workshops are now sustainable. However, it is critical that this "success" does not adversely impact SALT schools participation.

Following its successful implementation at the Bundoora campus, the scope of this project was expanded through collaboration with staff at the Bendigo and Albury-Wodonga campuses and ultimately, the introduction of the nanotechnology practical workshops program at these two sites.

While not directly associated with this grant some additional beneficial outcomes have arisen with the development and conduct of this nanotechnology program. These are:

1. La Trobe's Outreach efforts and programs are more widely known
2. Networks between La Trobe and a diverse range of secondary schools have been established
3. Having VCE students visit and work in university facilities provides them with a great experience, which hopefully translates in increased student interest in studying here.
4. The interaction between students and demonstrators (some of whom are current postgraduates) enables postgraduates to put something back into the university while simultaneously enhancing their own skill set.
5. La Trobe's interest in providing a meaningful educational experience for students from a diverse range of schools can only enhance the university's status among secondary schools and their staff.

Conclusion

A successful model has been established for engaging VCE students and staff of local and regional SALT schools in nanotechnology. Its implementation and conduct has led to it becoming a sustainable program. Nevertheless, it is important that the primary objective of equal access be of ongoing concern and addressed through appropriate funding. Initially offered from the Bundoora campus, the program is now operational at La Trobe's two regional campuses.

The basic elements of the model such as direct contact with schools, planned publicity / awareness events, training and facilitating contact with the university can be readily adapted to foster schools' interest in other VCE subjects.

Development and conduct of programs such as the nanotechnology practical workshops also proves beneficial to the university.

APPENDIX 1

Publicity Brochures files attached

[appendix 1 nano_publicity2009.pdf](#)

[appendix 1_LaTrobeScienceTeacher.pdf](#)

APPENDIX 2

Student Notes

[Appendix 2 nano_studentnotes 2009.pdf](#)

APPENDIX 3

Student and teacher feedback forms

[appendix 3_feedback nano.pdf](#)