eBiology Project 2011

Final Report

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Country Education Project
cep.org.au
admin@cep.org.au
0428171145
PO Box 1255
Wangaratta, VIC, 3676
Patron: Mr Bailieu Myer AC

INTRODUCTION

The eBiology project was the latest project developed within the eKids initiative established by the Country Education Project (CEP) during 2007.

The program was developed to provide learning for a number of rural schools whose enrollment in VCE Biology (Units 3 and 4) was less than five students during 2011.

Supporting, 40 students; nine teachers of VCE Biology; and the involvement of a mentor (Andrew Douch), the program offered a blended learning approach to the development and provision of VCE Biology.

The project was made possible with the support of the Innovation and Next Practice Division of DEECD who provided resources to support the development and provision of the blended learning approach.

A key element of the program was the development of an Action Research project focused on the question:

> *Is a blended learning approach to VCE provision a viable option for enhancing learning opportunities and outcomes for rural students?*

Within this action research the key areas of learning outcomes; teacher professional learning; and utilisation of such an approach in other learning areas were focus of reflection and consideration by schools, staff and students.

Through the provision of an online web-based learning forum; weekly online lessons through Blackboard Collaborate; and face to face learning provision supported by the host schools, the students and teachers have indicated that this has been an extremely worthwhile initiative.

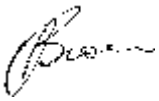
The student outcomes achieved through the eBiology project has seen the large majority of the participating students achieving results higher than their projected results.

Teachers have indicated that their knowledge and skills in relation to blended learning provides a real opportunity to enhance learning provision and student outcomes, especially within a rural context where student numbers are small. The involvement in the eBiology project has resulted in them exploring the use of similar approaches within their own schools and clusters into the future.

In addition, teachers have indicated that the strong collegiate and professional learning approach taken within the eBiology project has provided them with a greater depth and knowledge of the study units and therefore has further deepened the learning provided to the students involved.

The overall conclusion of the eBiology project facilitated throughout 2011 has been that it has enhanced the learning opportunities and resulted in improved learning outcomes for rural student and the approach taken is one worth supporting into the future. It has also concluded that such a blended learning approach could be easily transferable to other learning areas. areas.

This report provides an outline of the eBiology project and the learnings gained through the Action Research undertaken during 2011.



Phil Brown
Executive Officer.

AIM:

To enhance and broaden the learning opportunities and outcomes of rural young people involved in VCE Biology.

OBJECTIVES

- To facilitate the learning of VCE Biology students in rural schools through a blended learning approach
- To build the capacity of rural teachers in utilsing blended learning approaches to enhance student learning
- To undertake an action research of the impact of such an approach on:
    - Learning outcomes of rural young people
    - Enhanced teaching and learning approaches of rural teachers.

PROJECT COMPONENTS

eBiology Learning Approach:

The eBiology utilized a blended learning approach. This specifically involved:

- Web Based Forum: a secure web based forum that provided all the students and teachers with access to resources; podcasts; a forum area for discussions, questions and information; recordings of the online lessons; and links to useful resources either on the web or through other sources.

  Based on a request by individual schools at the beginning of the project, an additional component of the web based forum was the development of individual school forums to allow for individual school classes to undertake their own discussions; work requirements and assessment tasks online.

- Online Classes: a weekly Blackboard Collaborate session, generally co-ordinated and facilitated by the mentor teacher. These sessions occurred on a Tuesday evening and generally operated for about 1.5 hours each week.

  These online class sessions were recorded each week and uploaded to the web based forum so that staff and teachers could access them on an ongoing basis.

  The location from where the students accessed these online sessions varied from their personal home, to schools who organized class sessions at school due to the difficulty that some students had in accessing adequate internet from their personal home.

  As the project developed, the nine teachers involved began to gain confidence and as a result facilitated a number of these online lessons – facilitating both presentation sessions as well as tutorial sessions. All teachers had a number of opportunities to take on this role and during the last two terms, groups of teachers developed and presented lessons.

- School Based Classes: each school provided "regular" timetabled classroom sessions.

Skills and Knowledge of Teachers:

The second component of the eBiology project was the professional development of teachers. Teachers were expected to participate in all aspects of the project, especially as it related to the students learning.

One of the intentions of the project was to build the capacity of the teachers involved to a level that they would then feel comfortable and skilled to undertake a stronger leadership role within their local cluster or network.

To support the development of this capacity the following activities were provided:

- A state-wide forum at the end of 2010 provided an intensive training program for staff on the web based forum; the use of Blackboard Collaborate; and the value of blended learning approaches in enhancing student learning outcomes.
- A one day workshop early in 2011 to develop and organize the practical implementation of the project.
- Regular online training sessions for the teachers focusing on the use of the Blackboard Collaborate technology and other web based tools. These sessions were facilitated by the mentor teacher and provided valuable opportunities for teachers to develop their skills and knowledge
- In addition to the organized online professional development activities, there were a number of times in Term I and Term II where the Blackboard Collaborate environment was open for half a day to allow teachers "to play".

In addition to the individual school face to face class times, the project facilitated a statewide forum for teachers and students to provide an opportunity for the students to meet each other and to explore some common topics such as study techniques; preparing for exams; and identifying relevant resources to support their learning.

Mentor:

The third component of the project was the release of a VCE Biology teacher who had extensive skills and knowledge in delivering learning in an online learning environment. This role was developed to provide a valuable support, facilitation and developmental role within the project.

This role covered three key areas:

- Supporting student learning through the facilitation of high quality weekly online learning activities and lessons.
- Supporting the operation of the web based forum.
- Supporting teachers in the development of skills and knowledge to enable them in utilising online learning approaches.

The project was extremely lucky in gaining the services of Andrew Douch, who has been recognized worldwide for his expertise and knowledge in delivering Biology learning through a blended learning approach.

The role provided an invaluable resource and support to both teachers and students.

Action Research:

To assist the project in gaining valuable feedback and input on the learnings an Action Research approach was developed to collect and document the response; reactions; and views of schools, teachers and students involved in the project.

The research focused on the question:

> *"Is a blended learning approach to VCE provision a viable option for enhancing learning opportunities and outcomes for rural students?"*

Within this overall focus question there were two key areas to be explored:

(i) What are the key impacts of the project on student learning?

a. *Academic outcomes of students – comparing actual against predicted.*

b. *Attitude, enjoyment, engagement in learning.*

(ii) What are the changes to teaching and learning approaches utilized by teachers involved in the project?

a. *Capacity of teachers enhanced – catering for the professional learning needs of teachers.*

b. *Involvement of teachers in delivery of learning online.*

c. *Plans for provision of blended learning within their own cluster.*

The methodology utilized to inform these areas of focus included in summary:

(i) Students:

a. *Student performance in assessment tasks and exams – provided through comparing actual against projected; teacher reflections and student feedback.*

b. *Participation and contribution of students in the web based forum and online class sessions.*

c. *Online Survey of student experiences, involvement, engagement, enjoyment and attitude to a blended learning approach.*

d. *In depth group discussions to further explore the benefit, or otherwise, of the blended learning approach.*

(ii) Teachers:

a. *Teachers reflection on their own learning especially as it impacted on teaching and learning practice.*

b. *Interviews undertaken to ascertain teachers reaction and feedback to the blended learning approach – challenges, learnings, access to other resources developed, etc.*

c. *Participation and contribution of teachers to the web based forum and online class sessions.*

d. *Student reflections (through the online survey) on changes they observed on changes in the way their teachers provide learning.*

e. *Teachers reflections as to the impact of the eBiology project on student learning outcomes.*

RURAL SCHOOL INVOLVED:

In November of 2010, information relating to the eBiology project was circulated to all rural schools throughout the state, inviting interested schools to be involved using the following selection criteria:

- being a rural school as defined by Country Education Project
- schools who were providing a VCE Biology class in 2011 with less than five students
- both the teacher and the students committed to be involved in the eBiology project
- biology teachers being prepared to work as part of a team in developing and providing learning through a blended learning approach.

A total of 17 rural schools involving 83 student studying VCE Biology expressed an interest to be involved in the project. Following further discussion with each of these schools, 9 schools, involving 36 students committed to the project.

The following schools participated in the project during 2011.

School	***Student Numbers***	***Staff Numbers***
Swifts Creek School	4	1
Corryong College***	9	1
East Loddon College	5	1
Wycheproof College	3	1
Werrimul College*	2	1
Heywood and District High School	5	1
Camperdown College	5	1
Hawkesdale College*	3	1
Warracknabeal Secondary College**	3	1
TOTALS	***39***	***9***

Notes:

- Corryong College had 9 students enrolled in their Year 12 Biology, but only six of these students indicated that they wanted to be involved in the eBiology project totally.
- Both Werrimul College and Hawkesdale College were initially involved in the project participating in professional development for staff and the online classes provided. However, due to connectivity and timetabling issues these schools slowly withdrew from the program during Term II.

  Some students from both these schools still participated in the project through irregular participation within the online class sessions and accessing resources provided through the web based forum.
- Warracknabeal Secondary College was added to the project at the end of Term II as a result of interest from the Biology teacher within the school. Four other schools expressed a desire to be involved in the project during Term II, but after exploring the possibility of involvement further chose not to become involved, but expressed a strong interest to be involved in 2012.

LEARNINGS AND FINDINGS

Student Involvement:

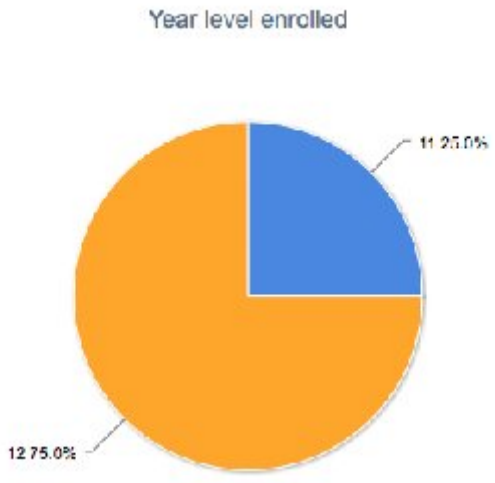
The students involved in the eBiology project participated to varying levels. As mentioned earlier, the students from Werrimul and Hawkesdale Colleges (a total of 5 students) were involved in all aspects of the project at the beginning but due to connectivity issues, and in one case teacher support, these students participation decreased after Term II.

In addition, Warracknabeal Secondary College joined the program in Term III and Term IV and were totally engaged in all aspects of the project during this time.

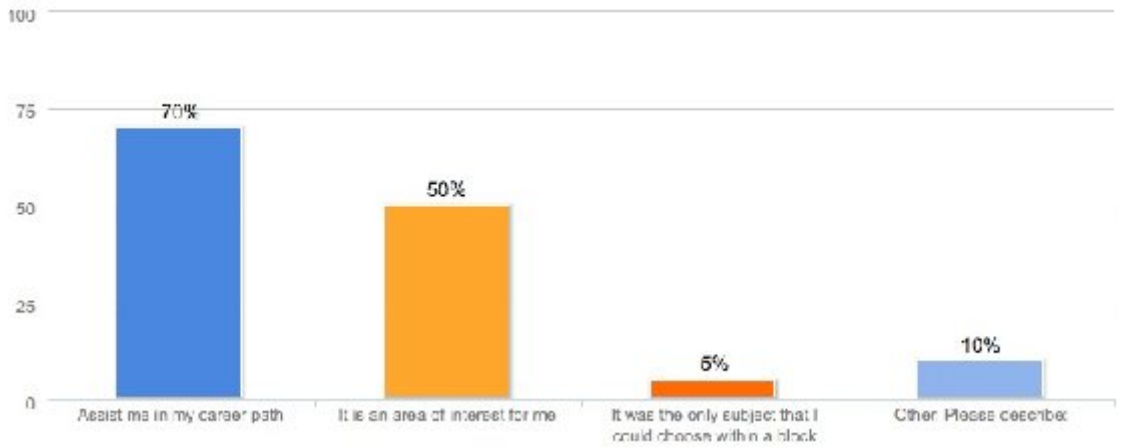
The table below outlines the level of involvement for each student throughout the year. While all students utilized all aspects to some degree throughout the year, the table details the majority of involvement these students had.

Participated in all aspects of eBiology – online classes, utilized web based resources, involvement in school class activities	24
Utilised the web based resources and involved in school class activities	12
Involved in school class activities	3

The students involved in the eBiology project included a combination of Year 11 (blue) and Year 12 (sand) students – the graph below details breakdown of year levels.



As part of the action research component of the project, the students were asked why they chose Biology as a VCE subject. The table below indicates that the majority of the students involved in the eBiology project had selected the subject because they were planning a career path around it, or had selected it with a real interest to study the subject.

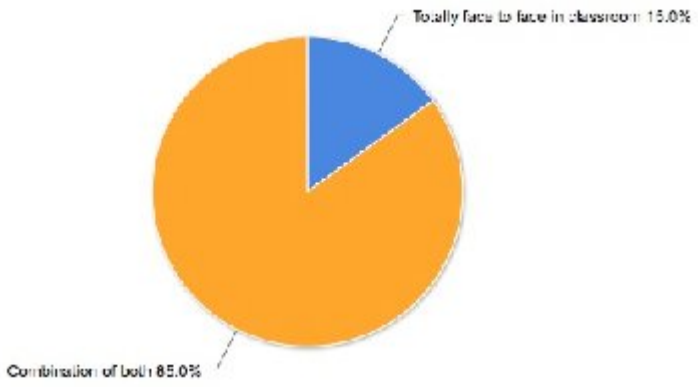


Blended Learning Approach

Through the student survey data, and follow up discussions with both students and teachers, the use of a blended learning approach utilized within the eBiology project is seen as a real advantage for student learning and the development of teachers skills and knowledge. For those students involved in the eBiology project during 2011, both students and teachers agreed the blended learning approach had a significant impact on the student learning outcomes – see student outcomes later in this report.

As part of the research, students were asked to consider the blended learning approach utilized within eBiology and consider this approach to learning compared to the learning provided in their other subjects – the majority of which were delivered through a classroom centred approach.

The graph below details the students response to their preference of learning approach.



As one student highlighted:

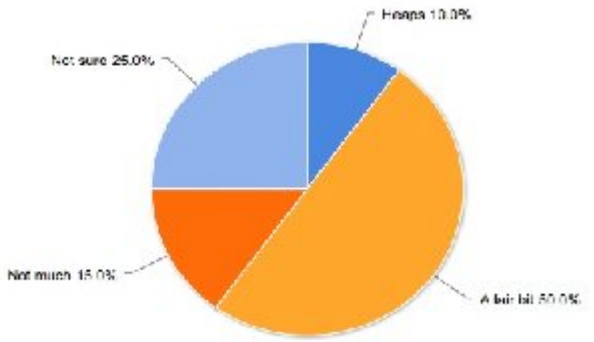
> *"Online learning allows collaboration and discussion with a wider range of students and teachers."*
>
> *"Face to face is good for writing notes and answering questions, especially because I am in a small class. However the online class gives a different way of approaching questions, and I found it great for revising things – it also showed me where my weaknesses are and how close my answers are to other students."*

From a teacher's perspective, there was agreement that the blended learning approach provided the opportunity for students to study Biology in greater depth. As indicated by one teacher:

> *"This year students have been provided with explanations and depth that I have not previously attempted. Study of individual topics has often been to a depth not strictly required by the course requirements. My thoughts are that students who have a deeper understanding of the theory should be better equipped to deal with the situations and examples outlined in exam questions."*

Students were also asked to reflect on whether the blended learning approach had helped their study of Biology over the course of the year. Over 60% of students indicated that they believed it had enhanced their learning of Biology.

> *"I was able to get course content in a different way, I was able to look at things in new ways and in some cases made it easier to understand."*
>
> *"It has given me other opinions on what we need to know and it also taught me things that were not otherwise covered in our face to face class."*



An area referred to by the large majority of students and teachers was that students were engaged highly in their learning. While there were a small number of reflections that highlighted some student's engagement varied from week to week, the majority of the feedback from teachers and students indicated that they were engaged in all aspects provided through the eBiology project.

Teachers and students in a number of the schools also highlighted that the blended learning approach seemed to result in students enjoying their Biology studies. While this was not reflected in all schools, there were strong indications by the majority of the schools that students valued the variety of teacher presentations; the breadth of resources available; and the skills and knowledge; along with the entertaining presentations, provided by the mentor teacher.

> *"I have found there have been more 'wow' moments this year than has previously been the case. Whether it has been Andrew or some other factor I am not sure. Students do genuinely seem to be more deeply engaged with the material being covered. I can say for certain that the students from my school are more involved with their Year 12 Biology class than they had been with the Year 11 classes."*

> *"I meet up with 3 of my 4 students each Tuesday night at the school and it has become a fun thing as we share thoughts, lollies, chocolates and jokes. My other student lives further away and with the advent of the football and netball season chose to link in from home as Tuesday night is netball training. She is not as enthusiastic as the others."*

Student Learning Outcomes:

Prior to the schools knowing the students VCE results, there was general agreement amongst the teachers that they expected the majority of students to have higher achievement outcomes than anticipated at the beginning of the year – these were strongly reflected in heir reflective writing at the conclusion of Term II.

Teachers involved in the eBiology project were asked to reflect on whether their students would achieve results above what they expected them to achieve. The large majority of staff believed that students involved in the project would perform better, and in one teachers view:

> *"Overall I would have to say that it has improved their learning as they have been exposed to excellent resources and to multiple teachers and students."*

During Term III students were also asked to reflect on whether they believed the eBiology project would assist them in achieving better results than they expected at the beginning of the course. Approximately 65% students believed that they would achieve results above the level they initially expected.

At the beginning of 2012, student results were gained from participating schools and compared to the "projected result" provided through the GAT. A total of 34 student results were gained from the schools – 31 of these involved in the eBiology project.

As a large number of participating schools involved less than five students, the projected results for individual students through the GAT were not available for VCE Biology. To gain an understanding of the outcomes for these students the project utilized the "Indicative School Projections (mid year)" and moderated these projections utilising the "Projected Results" provided through GAT for the Maths/Science area for each student.

The table below provides details of the students' results and their variation on projected results indicated by the GAT mid year reports.

The highlighted students are those who were not involved in the online aspects of the eBiology project, but were enrolled in one of the schools and attended face to face classes.

	Actual Results	Difference against Predicted Results
Student 1	41	5.60
Student 2	36	11.20
Student 3	38	8.40
Student 4	23	-5.10
Student 5	23	3.70
Student 6	27	0.90
Student 7	27	-0.9
Student 8	33	2
Student 9	26	1.2
Student 10	28	4.6
Student 11	18	-5
Student 12		
Student 13	17	-8.6
Student 14	23	-0.9
Student 15	26	-0.9
Student 16	33	-2
Student 17	32	-2
Student 18	21	3
Student 19	45	4.5
Student 20	22	-6
Student 21	30	2
Student 22	32	0
Student 23	32	0
Student 24	26	9
Student 25	32	4
Student 26	30	2
Student 27	27	2.5
Student 28	31	6.5
Student 29	21	6
Student 30	22	3
Student 31	28	9
Student 32	36	1
Student 33	20	5
Student 34	37	0
Student 35	21	5.5

Of the 31 students directly involved in the eBiology project (either through full participation in all aspects of the project, or through accessing the web based resources):

- a total of 25 students achieved results above, or equivalent to, their projected scores - representing 81%.
- A total of 6 students achieved result lower than their projected – representing 19%

As detailed in the previous table a number of students actual results were significantly higher than their projected score (9 students achieving above a 5 mark increase) – 11.2 by one student, which represents a 50% increase to his projected score. As his teacher reflected:

> *"Bill went well with the fantastic support he received from Douchy and the eBiology sessions. He sat a set of science exams; Biology, Chemistry and Physics. He received a High Distinction in Biology and was accepted into the summer School for Australian Science/Biology Olympiad team. He has a real passion for science and I believe this was fostered by Douchy and the great resources of eBiology - podcasts and elluminate sessions."*

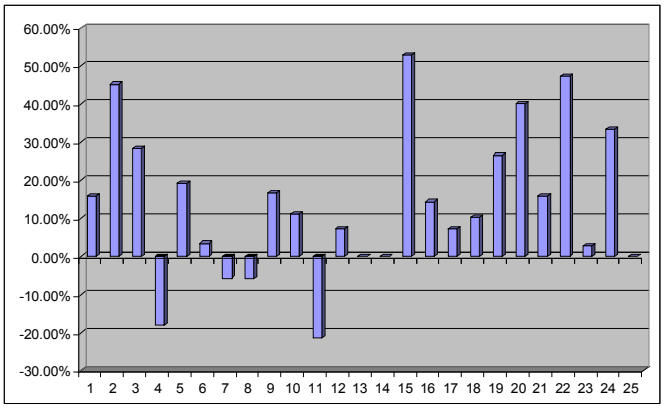
The table below provides more specific information on the students' performance against these projected results and details them across the three levels of involvement.

Level of Participation	*Student Outcomes*	*Average Difference between Actual and Projected*	*Variation*
Participated in all aspects of the eBiology program – online classes; utilized the web based resources; attended school classes.	Above Projected: 18 Equivalent to Projected: 3 Below Projected: 4	+ 3.25 marks	-6.0 to +11.2
Utilized web based resources; and attended school classes	Above Projected: 4 Equivalent to Projected: 0 Below Projected: 2	+ 2.14 marks	-5.0 to +5.5
Attended school classes	Above Projected: 0 Equivalent to Projected: 0 Below Projected: 3	-3.47 marks	-8.6 to -0.9

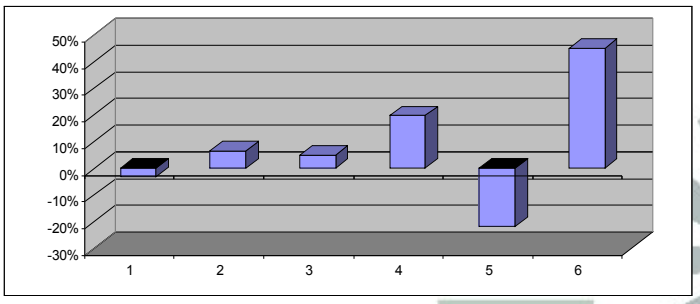
The difference in achievement across the participation levels of the eBiology project indicate that those students who participated in all aspects of the project were able to achieve greater result improvement than those who participated in the school based classes only.

To provide a more detailed picture of the individual student score outcomes compared to projected results (detailed in percentage difference), the graphs below provide this detail across the three participation levels.

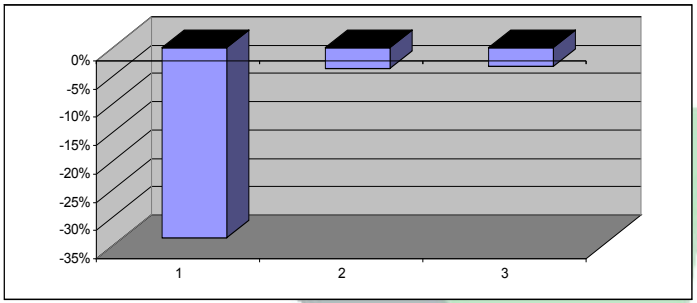
1. *Participated in all aspects of the eBiology program – online classes; utilized the web based resources; attended school classes.*



2. *Utilized web based resources; and attended school classes*



3. *Attended school classes only*



Prior to the results being known, teachers were asked to reflect on whether the eBiology project would benefit some students above others. From this reflective writing undertaken by each of the teachers at the end of Term II, and followed up with interviews with each of them, there was a view that those students who were academically stronger would benefit from the blended learning approach more than those who were slightly weaker academically.

> *"I think it has been very useful for my bright student, because she has been exposed to other students who are bright and it has improved the quality of her answers. It has shown her that there are other bright students out there that she has to compete against and she will need to develop a similar level of knowledge to be successful. I think it has motivated her to study harder for her mid-year exam."*

Having said that, there were some teachers who indicated that the weaker students were also benefiting from the eBiology project. The interaction between students and across schools, and the access to a team of teachers, seemed to be the catalyst for engaging these students at a higher level.

> *"In terms of weaker students, it has been good for them to observe the standard of answers given. It has also been good to hear the information in a number of different ways for them e.g. podcast, PowerPoint, Questions and Quizzes etc, which makes it more likely they will remember the information. I am waiting to see the exam results though as one of my students lost motivation 3 weeks before the exam as her Nan passed away, but I think it has certainly improved their overall knowledge."*

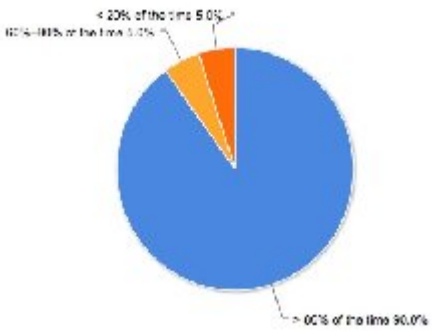
The actual results indicate that students from all academic levels benefitted from the eBiology project.

<u>Online Sessions:</u>

Each week the mentor teacher would facilitate an online class through the utilization of Blackboard Collaborate occurring on a Tuesday evening. The ways in which students and teachers participated included individual students linking in from home, or a group of students congregating around one laptop or PC at a students home or at school. While the actual numbers of students and teachers involved each week was difficult to ascertain due to the various link ups used, at least 30 students and teachers would participate with some classes involving 40 students and teachers.

Analysis of the participation rates within these classes indicated that students and teachers regularly participated each week.

The regularity of the students' involvement in the online classroom is indicated within the graph below. It indicates that in excess of 90% of students participated in at least 80% of the online classes scheduled.



Many students initially saw the timing of the online class as an area for improvement. In their early feedback many indicated that they would prefer a time during the day. The impact on social and sporting activities, that many rural young people participate in as part of their local community, was seen as one area of concern. However, as the program developed, the students involved continued to commit to the evening class time with numbers remaining constant for the duration of the project.

As students became more comfortable with the blended learning approach, student participation within the online classes increased.

> *"To start with my students were not keen, as they were a little intimated by talking on the microphone. They thought this was going to be more of a regular thing, but now realize they can express opinions via the use of polls, the text screen and the use of icons, etc and not necessarily just over the microphone. So they are now more comfortable with the technology. They also feel better about on each week after meeting the other students in Melbourne as thy can put a face to a name. They can certainly text faster than me and use the icons in the chat window that I can't."*

A reflection often identified by the students as a real advantage of the blended learning approach was having the support of a team of teachers"". The opportunity to converse with these teachers within the web based forum, and contributions made during the online class sessions often provided students the opportunity to gain different perspectives on what they were learning.

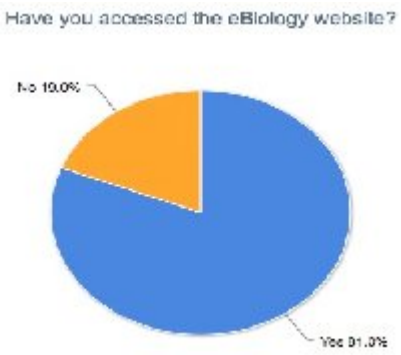
As the project grew and the teachers provided learning within the online classes, students reflected that hearing from a range of teachers provided that added advantage of gaining differing perspectives on topics.

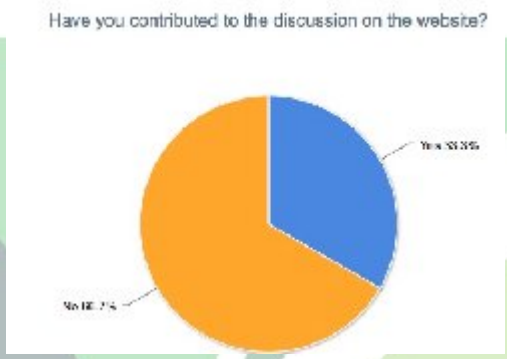
<u>Web Based Resource:</u>

A web based forum was developed to provide valuable resources and a discussion forum for students and teachers involved in the eBiology project.

Students utilized the web based forum for a range of reasons, the main one being to access the resources and information which were integral to the forum.

While the students visited the web based forum to access podcasts, resource materials, observe discussions in the forum area, and revisit the recordings of the online class, students took time to feel comfortable in contributing to the discussion forum area and asking questions, contributing to discussion and seeking further information. This variation is detailed in the following two graphs.

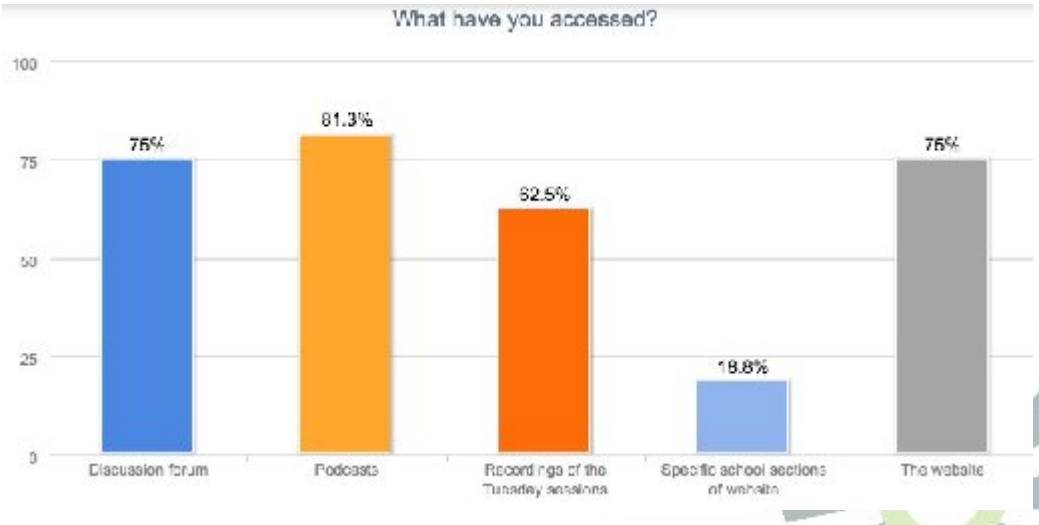




The participation, and use of the forum seemed to increase during critical times of the year – generally there was a greater use of the web based forum close to assessment tasks and especially exams. The analysis of participation rates within the web based forum increased significantly at these times focusing on questions to the mentor and others; clarification of understandings; and comparison of thoughts and ideas.

As highlighted in the graph below the students utilized the web based forum predominantly for the areas of following the discussion forum; accessing the podcast developed by the mentor; and revisiting the online class sessions. The students felt that the forum was easy to utilize and navigate.

> *"its clear and easy to follow, has revisions and extra worksheets to complete rather than just written information."*
>
> *"It allows people to ask their questions through the discussion forum without people really knowing who they really are, and it is good for revision as I can answer questions that people which are often problems they have."*



A specific area highlighted within the student survey indicated that 63% of students accessed the recorded online lessons on numerous occasions. In addition, the teachers also utilized these recorded sessions as part of the revision process throughout the year.

At the beginning of the project, teachers in each of the schools requested the development of a section within the web based forum for each school class, to allow for teachers to upload work tasks, assessment tasks, student work and assessment of students work. The use of these forums varied significantly from school to school – some using it as a forum to upload revision task; and access resources, while others used it as a whole of class communication tool where teachers would upload work tasks; students work would be uploaded to be assessed; teachers would provide feedback to students learning; and assessment.

One exception to this was a teacher in one school who utilized this space as the area that all student assessment tasks were uploaded, and students assessment work was uploaded. Not only was it an easy process to follow the work undertaken, students could reflect on each other's work and learnings from the peer support mechanism developed. It also provided the opportunity for the mentor teacher to provide feedback to students – this occurred often.

Skill and Knowledge Development of Teachers

Generally speaking, all teachers have indicated that the eBiology project has provided a rich experience and it has facilitated a review of their current teaching and learning approaches. Some have indicated over the year they utilized there allotted class time in different ways in partnerships with the online classes delivered on a weekly basis.

Teachers also indicated that the professional dialogue that was developed as a result of a team approach to the delivery of the project provided a real opportunity to reflect on their practice and to explore "new" ways of delivering learning into the future.

Throughout the interviews with teachers involved, there were a number of key elements they indicated were essential in ensuring their skills and knowledge were enhanced and developed.

Firstly, the initial two professional development activities provided by the eBiology project were seen as an absolute essential component of the project. Not only did they provide valuable opportunities to gain an understanding of the various communication technologies to be utilized within the project, it also built a strong collegiate team approach to the provision of Biology across the schools.

> *"I found the two professional development activities I did really helpful, although I must admit to forgetting a few things between sessions. I have gone back into the training room often and used the various tutorials to refresh my understandings."*

While these professional development days provided some very useful learning in the blended learning approach, they also provided the opportunity for the team to develop a number of common understandings, expectations and approaches that would be utilized in all aspects of the project. While not perceived to be an essential component of the planning, this was seen as one of the key discussions that resulted in the project being so successful.

Secondly, the ongoing professional development provided by the mentor teacher throughout the project provided valuable opportunities for teachers to reflect on their learnings and to be involved in further professional development. These activities were provided utilizing the online Blackboard Collaborate forum.

A key element of these activities was the provision of "focused play time" allowing teachers the opportunity to access the online environments in their own time. Specifically, half days were established where teachers could access the environment to explore and experiment.

Teachers have expressed component or their professional development was one of the best ways to develop their online skills and knowledge.

In all interviews, these opportunities were a key factor in the success of the teachers' utilization of the blended learning approach.

> *"Being able to access the online room prior to class sessions, just to play, was extremely valuable for me. The opportunity to play at my pace and explore where I wanted to, make mistakes with no-one watching, and try things that I may not be willing to do in a group scenario were extremely valuable in me feeling more confortable in the use of a blended learning approach."*

One of the key areas of focus of the action research was that of exploring whether teaching and learning practice changed as a result of the eBiology project.

Students were asked to reflect on whether they felt the way in which their teachers delivered Biology had changed as a result of the eBiology project.

Over 50% of students believed that their teachers had changed their teaching and learning approach over the year.

> *"My teacher now uses a couple of our lessons each week as a tutorial allowing us to explore areas that we need more support and information on."*
>
> *"We spend more time learning the topics in different ways, making use of the screencasts as well as the podcast."*

When teachers were asked whether their teaching and learning practice had changed as a result of the eBiology project, all indicated that it had done so in one form or another.

> *"I feel that I have learnt a lot from participating in eBiology. I have picked up a lot from discussing aspects of the Biology course with Andrew and the other teachers. My approach to how I teacher Biology has changed somewhat – and the depth of detail I provide has increased considerably. I have access to a greater range of resources than previously, and have seen how a number of other teachers go about teaching biology. This has provided me with a range of techniques and approaches to teaching aspects of the biology course that I had not previously considered. I have developed skills in the presentation of lesson through the use of blended learning approaches. While initially stressful, I found it to be a positive experience."*

Through the reflective writings teachers indicated that the two areas of change they had noticed after being involved in a blended learning approach included:

(i) Face to Face Class time use: teachers indicated that as a result of the online weekly class sessions facilitated by the mentor teacher, it allowed them to utilize their face to face time in different ways.

The first area of change identified better use of time to allow students to clarify and explore areas that they would like further information about. Allowing for questions, and discussing areas they were not totally comfortable about. A number of teachers also utilized this time for revision in greater depth, often using exam questions and topics as focus for these discussions.

The second area of change within their class time was the opportunity to provide greater depth of learning in each of the units covered. As the units were presented through the online class sessions, teachers indicated that they then utilized their class time to allow for deeper discussion and exploration, thus increasing the understanding level of the students.

Thirdly, the project developed teachers have commented on how they began to manage their classroom content differently to accommodate the information provided through the online classroom. Many indicated that they began using a couple of their scheduled classroom times as tutorial and problem solving sessions.

Students observed this as well. As one students commented:

> *"We have been able to move through the chapters more quickly than normally, allowing more time for revision at the end of term. We need less time in class to explain areas covered in class, more focus on problem areas."*

(ii) Online Learning: through the provision of professional development, and the team approach to the development and delivery of lessons, teachers indicated that they saw real value in utilizing communication technology as a learning approach for Biology. Whether this was seen as an opportunity to access additional resources such as podcasts, youtube, and internet resources, or as a potential to deliver the Biology program within their school differently they all saw the potential that such an approach could provide.

Many have indicated through their interviews that they would be very happy to work with neighboring schools within their cluster to deliver a blended learning approach into the future. Some have indicated that they have begun this discussion as a possibility for 2012 already.

> *"I would be happy to do this again and deliver Biology in a different grouping, or with the same people, or with a different subject. Lets be realistic here this model will become more and more the norm with an ageing profession and with the realities of teaching in a remote school with declining enrolments or with patchy classes from year to year. This is by far a better delivery option than a Correspondence subject. Having the teacher in the school teaching the subject together with the online delivery is more effective, dare I say maybe better than a stand alone class. It is capacity building improvise teachers skills, knowledge and expertise and it is more in line with how students learning and interact with their world, so more engaging. It give schools greater flexibility with staff and means more subject choices for students."*

Mentor Role

From both the students and teachers perspective, one of the key reasons to the success of the eBiology project was the provision of a mentor teacher.

Established to support the professional development of teachers, as well as facilitate student learning provision through a blended learning approach, the role was seen by all as the essential ingredient to the project.

The project was privileged to have one of the most talented teachers as its mentor teacher – a Biology teacher who had won many awards for his use of blended learning approaches in the delivery of the subject.

His facilitation of the professional development activities, the support of teachers in building their capacity in the use of blended learning approaches, and the facilitation of the weekly online learning class were greatly appreciated by all involved.

> *"the mentor role was critical for the success of the project – my skills were enhanced through this role; my comfort level in using communication technology as a way to deliver was increased; and the engagement of the students in the learning provided was sensational."*

The added role the mentor provided in the development of extra resources and information was also greatly appreciated by both teachers and students. The podcasts developed on every unit within the course, for example, were keenly sort.

> *"Douchys notes at exam time were really useful, also it was handy having a different teacher as they explain things differently which is good for retaining information."*

The strong recommendation from teachers involved in the eBiology project was that such a role is critical in any blended learning initiatives.

CONCLUSIONS

As a result of gaining input from both students and teachers as part of the reflection undertaken within the eBiology project there are a number of conclusions that are worth making.

- The blended learning approach developed within the eBiology project (including online delivery, web based resources and face to face classes) was seen as a very effective approach for improving student outcomes and enhancing the capacity of rural teachers. It is an approach that all involved agreed would be worth further developing into the future.

  CEP would recommend the further development of the eBiology project to involve greater number of rural schools through the following strategies:

  - ***Expand the eBiology blended learning approach to allow rural school community to participate.***
  - ***Resourcing the engagement of a mentor teacher to support teachers in developing skill and knowledge and provision of online student learning for rural students.***
  - ***supporting those teachers involved in the initial project to support tutorial session with "new schools" thus further developing their skills and knowledge and exploring the development of sustainable approaches within the clusters and networks.***

- The role of the mentor teacher was essential in the development, delivery and success of the project. The role they played in facilitating the student learning component of the project; the development and support of the web based resources and the professional development provided to teachers involved was critical to the success of the project.

  CEP would recommend the use of a skilled mentor teacher to support blended learning approaches to support student learning and build the capacity of teachers. It would also recommend the allocation of resources to support this role.

- As a result of the success of the eBiology project, there have been many rural schools who have indicated their desire to be involved in a Biology project in the future.

  In addition, a number of other teachers with skills in the delivery of blended learning initiatives have indicated their desire to be supported to provide learning for rural students and teachers on a similar basis as the eBiology project. Curriculum areas offered include Outdoor Education; Environmental Science; Accounting; and Maths.

  CEP would recommend that resources be allocated to expand the blended learning approach developed within the eBiology project to these other curriculum areas.

- ***CEP recommends that partnerships are built between the government school sector and the catholic education sector to ensure that all rural students and teachers have the opportunity to access such blended learning approaches.***