

No: FE35
Title: Developing a flexible A-Level Strategy using ICT
Author: Will Ellis, Sandwell College

Background – Traditional A Level Teaching

As a science teacher I have always been keen on using technology in teaching either to enhance practical work or to add value and interest to theory work. At the beginning of this academic year I decided to adopt a very different approach to the delivery of AS Level Biology. This arose from a range of key developments in the college involving the introduction of new technology, and from a realisation that a change of approach was needed for more learners to be successful on the programme.

A very diverse group of learners generally enrol on the AS Level Biology course. It is often one of the more popular subjects, attracting students who see the other sciences as being more difficult. Commonly the learners that enrol for other sciences see them selves as more dedicated scientists but biology is often chosen as a third option for learners focusing on English or humanities subjects. Biology also attracts many mature students including people who have an interest in health and nature, and people wanting to move into a career in these areas. As a result, biology groups often include learners who may have an interest in the subject as they perceive it but do not necessary have a strong background in science.

This age and ability range can result in issues that impede success. While some learners may show an early aptitude for the subject, others need much longer to develop an understanding. Mature students often find it difficult to fit attendance at classes around family and work commitments, and although they may have the motivation to succeed they can quickly lose confidence if they feel they are falling behind. Lack of confidence and difficulty keeping up with the course can be a common cause of learner "drop-out". It can also be common with the 16-19 age group that learners who have chosen to do biology find that it is a more challenging subject than they imagined, and although they may remain participating in the subject for some time they eventually find that they are not able to grasp and retain concepts sufficiently enough in order to pass exams.

The traditional approach for the delivery of A Levels is very teacher led. The programme of study would be drawn up at the beginning of the year, with subject delivery planned out in weekly sessions in a way that all learning content was covered in time for the learners to sit the exam. Learners would have to keep pace with the teacher's programme of study regardless of their ability to grasp concepts or attend sessions. Because of the volume of learning material that had to be covered each week much of the teacher's time would involve lecture and some discussion, with little time left for investigative work or reinforcement activities. The success of a learner would be very much dependant on their ability to grasp concepts unaided and having the intrinsic motivation to work independently outside of lesson time. This last factor tends to suit the mature students but not those recently moving up from school. In the case of these learners the recent experience of GCSEs tends to involve very little self-directed study, and any work they do carry out independently is commonly as a result of guidance and pressure applied by teachers.

The Technology Supported Flexible Learning Approach

To tackle these issues I decided to adopt a very different approach to delivery in several ways. The key difference would be that very little lecture style teaching would take place. I decided to redefine my role as a "learning director" rather than a teacher. My role would not be to attempt to teach the learners but instead to provide a learning experience and guide the learners in the learning process. From the learner point of view the most significant change would be that they would be able to work at their own pace, and not have to try to keep to mine. This would enable the learners who needed more time to maintain progress and confidence and would ensure that the more able learners were given the opportunity to progress more rapidly and work on improving their knowledge to reach a higher grade.

In practice I would need to provide the learners with a series of effective learning experiences through which they could pick up knowledge and skills and develop an understanding. I would then need to develop a strategy for assessing individual progress, and set individual targets.

The course takes place over 36 weeks with two timetabled session per week. The strategy devised involved using the weekly 2 hour session for practical work and the practical assessment. The 3 hour session involved the following elements:

Learning Packages - I provided the learners with a series of learning packages (10 packages for each AS Level Unit). The learning packages were created using a range of multimedia elements imbedded in PowerPoint. They were delivered to learners through the college's VLE (Virtual Learning Environment).

Weekly Assessment – Each week learners were given a written test which lasted about one hour. There was one test for each learning package. The tests provided the evidence required to assess whether learners had achieved the learning objectives of each package.

Presentation of Materials – each week a new package was released to the learners, and a short presentation of about 30 minutes was given to introduce the topic and discuss its relevance to the unit and its main concepts.

Individual support – most of the lesson involved the learners working through the learning packages independently or with fellow learners. If learners found that they struggled with concepts they would be able to discuss them with me. I would also use this time to talk to learners who needed additional support either to progress at a sufficient rate or to maximise their grade potential.

I had anticipated that only a small amount of the required learning would take place during the lesson time. The greatest challenge was to ensure that learners took responsibility for learning in their own time. This required the introduction of elements that would motivate learners to study i.e.:

Exam entry – A level exams are set in June and January of each year. Learners were instructed that they would only be entered for exams if they made sufficient progress on the learning packages.

Weekly assessments - The results of the weekly assessments were used as evidence of progress on learning packages. The key motivational factor relating to the use of these assessments was that learners had to pass each assessment in order to progress to the next. Therefore, if a learner did not study they would not pass a test, and would reduce their likelihood of gaining entry to the next exam session.

Learning materials – The learning materials were designed to be easy to use, interactive and engaging to ensure that learners did not find the learning process difficult or challenging. Activities and formative assessments were included in the packages to make them interactive and provide feedback as a reward for participation.

Use of technology was not central to this flexible learning approach but did make the delivery and management of learning much more achievable. Learners were provided with a book that provided all the information required to gain a good pass grade in the exam, however, e-learning materials were provided to engage and motivate the students by providing challenges and rewards. Paper based materials could have been handed out to students but the use of a VLE ensured that all learners could access the materials at any time even if they missed lessons, or were late. The VLE also provided a valuable communication tool in particular for publishing progress on tests.

Risks and Concerns

From the beginning of the course experience had prepared me with the following concerns regarding this approach:

Poor engagement - It is not uncommon to set assignments, homework, class activities etc to find that very few learners are willing to participate in independent study. If this appeared to be the case with this group of learners the result would be a very poor progress rate.

Learner dissatisfaction – Learners may have expectations about how an A Level programme should be delivered. They may be comfortable with the unchallenging traditional; approach of lecturing while they passively observe. It was possible therefore that they would reject this alternative approach, and an ethos of resistance and non-participation would develop.

Poor learning materials – The materials developed for the course were being used for the first time. Their effectiveness for independent learning had not been fully tested and it was possible that they may not have been fit for purpose.

Poor learner progress – It was possible that all learners would find this approach too challenging and as a result fail to progress in the course. This would create a generally de-motivating atmosphere.

Poor learner IT skills and resources – Because of the dependence on IT as a delivery method it was possible that learners who could not use IT or who did not have access to a PC with a broadband connection would not be able to use the materials.

Evaluation

The programme started with 21 registered learners giving an average AS Level group size. In the first session I described the approach I was going to use and the learners responded with general acceptance although the idea of weekly tests did appear to concern some. I started the first week with a short introductory topic by discussing it with them, teaching it in a fairly traditional way, and making it clear that in order for them to continue on the course they would need to demonstrate their ability to learn the materials ready for the next session. The group left at the end of the session clear that they had to pass the following

weeks test to continue on the programme, and had the opportunity in the session to raise concerns and clarify their understanding of the topic with me.

In the following weeks session I allowed the group 30 minutes to go through the materials again, with my individual support where necessary. I then gave the learners the 10 questions they were expected to answer and as a group we discussed the answers. I then gave the Learners up to 40 minutes to answer the questions by themselves. An example question is given below:

"Describe 3 special features of the human lungs as an exchange surface."

The results of the test are included in the appendix of this report.

For each test I set the pass mark at a minimum of 50% for the first attempt. I felt that any mark lower than this indicated that the learner would not be successful on the AS Level programme and would benefit from reconsidering their programme of study. The results gave 6 learners a score below 50%, 7 learners scored from 50 – 70% and the remaining 8 scored over 70%.

In order to give the learners the opportunity to adjust to the approach I gave the learners with the score below 50% the opportunity to redo the test the following week and gave them additional individual support while the rest of the group moved on to the next package to learn independently.

The following week those learners that passed the initial test with 50% or more took the second test and 9 passed this first time. Of the 6 learners who were required to re-sit the first test, 3 passed. The 3 who did not (Learners Q, S and T) were then given the necessary support to find alternative more suitable programmes.

Those learners who remained had demonstrated the ability to learn independently, understand the concepts involved in the biology programme and produce written interpretations of their understanding. This meant they had the necessary skills to pass the AS Level exam, and therefore would remain on the programme. Over the following weeks learners continued to complete the weekly tests which took on average 40 minutes of the session time. The majority of the group tended to pass first time with about half of the group obtaining scores of over 70%. Several group members consistently received scores of just over 50% or had to re-sit, and inevitably some students missed the occasional lesson.

By the middle of the programme (around week 6) the group were at different stages, and sitting different tests. In practice the flexible learning approach was working well as each learner would learn at their own pace. I did become concerned, that some learners did feel left behind, and those with persistently low scores did feel frustrated. To tackle at least one of these issues I allowed some learners to catch up by sitting more than one test per week.

By the 7th Week It was apparent to me which learners would be able to pass their first exam, and which learners required more time and would therefore not be entered until later in the year. By this stage some of the less able learners were beginning to show signs of improvement by either working harder, developing better learning approaches, or gaining a better understanding of what they were required to do. There were of course some learners who continued to find the course a great challenge for a variety of reasons e.g. poor written English or insufficient time given to private study. For these learners the flexible learning approach did not provide a solution.

With reference to my previous concerns, I was encouraged to find that all the learners appeared to accept the need to carry out private study, and the tests proved to be an effective motivator. The learners all accepted the approach I used even though it was significantly different to the more traditional approach used by other teachers. The learners all appeared happy with the use of IT and the quality of learning materials. And although a couple of learners did not have access to a computer at home they were still able to access them in college. The learners also all had the necessary IT skills required to allow them to use the materials.

The learners did ask for paper-based versions of the materials. I chose not to provide these as by doing so I felt it might stop them from using the interactive elements of the packages. However, one learner (Learner R) did complain frequently of headaches and so in this case I did supply paper based materials. It was clear from the feedback received that this learner did not benefit from the technology-supported approach. Their progress was very poor, but this may have been due to other factors including poor attendance, and it was noted that their progress across all AS Level subjects was consistently poor.

At the end of the first unit I asked the learners to complete a questionnaire to provide me with their feedback on the approach and the learning materials used. The following bullet points give a summary of the findings:

- All the learners agreed that the materials were easy to understand but some wanted them to provide further detailed information.
- The learners found the use of animations, images and activities helpful as it made the topics interesting and the concepts easier to understand.
- Most students felt that the materials could not be improved but there were some who requested more information with more detail, and pages that summarised what they had learnt.
- All students agreed that the online tests helped them establish what they had learnt and what topics they needed to study further.
- Some of the learners felt that it would have been useful to be able to print off the materials for revision and found difficulties with reading from a screen. One had difficulties due to the lack of a home PC.
- All learners apart from one said that they preferred the interactive materials to traditional handouts and that they felt they improved their learning.
- The majority of learners would have liked to see similar materials used in other subjects. Those that did not felt that the approach would not be appropriate or that they would like to see more of a variety.
- Most learners felt that the weekly assessments motivated and helped them to learn although a couple suggested that this may have limited their learning as they only did what was necessary to pass the test.
- Most learners did not agree with the strategy of only entering them for the exam after they had passed sufficient tests. Reasons given included the need to give everyone a "chance", the need to take into account other pressures that may have held them back and that learners may prefer to "cram" before exam rather than fully assimilating the information as they progressed on the course.
- All Learners agreed that the VLE was a useful tool for learning and obtaining information.

Conclusions

The approach proved popular with the learners who felt that the learning materials helped them to understand the topic better than they would from

traditional paper based learning materials. There were requests for the materials to be produced for them as paper resources but this would not have been possible due to the cost, and the learners were already provided with a course book.

The learners responded well to the weekly tests, and they did feel that they were a valuable way of determining how well they were progressing on the course. Although the learners felt the test helped to motivate them to learn and keep up with the programme of study it was clear that the weaker learners could become de-motivated, and that the stronger learners required a greater challenge. To support the more advanced students in future I plan to include Web Quests (structured mini research assignments) to allow them to build upon and consolidate their knowledge of each topic covered. I have also recently bought in one of the packages available that allows the easy creation of sample exam papers using an archive of past paper questions. This is intended for use by all learners but the more advanced learners would be able to improve their grade with more exam practice.

When considering how this strategy may be applied to other areas of the curriculum it is worth taking note of the learners' concerns that the approach may not suit other subjects. The online materials used are very visual and interactive. It is easy to produce materials like this for science subjects due to the nature of the content, and it is notable that science is one of the areas of the curriculum that is well supported by commercial e-learning materials. Other subjects e.g. English and the humanities would probably require more text based materials and these may not be so engaging. It is easy to see how an animation of the heart can help a learner understand its form and function but less easy to see how a similar approach can be used to help a learner appreciate Hitler's reasons for invading Poland. It is also important to consider that the success of any approach is very much dependent upon the skills of the practitioner.

The approach used in this AS Biology course has helped to promote independent learning. This is a feature more commonly found in A2 studies as learners develop maturity in their approach to study and develop the skills required for University. The success of this approach to AS Biology suggest that it would be even more suitable to A2 delivery, and with smaller group sizes being common it may allow a more efficient curriculum model.