

Overview

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ECAD 6008

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Portfolio illustrating critical reflection of the student teacher's development and application of pedagogical principles during Professional Teaching Experience

by

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Module ECAD 6008

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Introduction

As a part of the Post Graduate Certificate in Education (PGCE) course the student teacher is required to undertake Professional Teaching Experience (PTE) in a placement school. This PTE gives the student teacher the opportunity to develop their practice under the supervision of class teachers whilst giving them whole class responsibility. With the pending introduction of the new curriculum that is based on the Successful Futures

this report will focus on the development of three of the pedagogical principles from this report and demonstrate and critically reflect on the students application of them during the teaching placement by demonstrating evidence from lessons used during PTE 1 Block 1 and reflecting on their use a guide to good teaching and learning and further identify recommendations for further progress during PTE1 Block 2.

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Employing assessment for learning

29 December 2019 15:07

Assessment for Learning

Professor Donaldson finds that Assessment for Learning (AfL) is fundamental to the Progression Steps that replaces the previous Key Stage system. Key stages are set age brackets at the end of which a student will be tested to define their learning through to that point.(UK Government, 2019). Since Progression Steps is designed to provide a continuity of learning where enable students to reach and more importantly to go beyond the aims of each of 5 steps within the three year window(Donaldson, 2015, p. 56). The achievement of these progression steps is assessed by AfL. Christodoulou (2016, p. 24) opinions that any reference to assessment that is heard by government may produce a bias toward summative assessment and a desire for statistical evidence. This leads to the question as to whether AfL within the new curriculum will remain formative as defined by Donaldson(2015, p. 76). Therefore, it would seem that the student teacher's development of good AfL practice would be fundamental to their development as effective teachers. Within PTE1 the student teacher has attempted to develop their AfL techniques to improve its effectiveness.

Danley et al find that the use of exit tickets / exit passes can encourage students to reflect on their learning and provide a low pressure method of assessing student learning and allow the teacher to adjust future lesson planning to meet the revealed requirements of the student(2016, p. 48).

Figure 1 shows the lesson plan for Year 7 class where the students were required to mix a solution of salt and water, make a prediction of the increases of mass and volume followed by testing this hypothesis by experimentation. This aim of this AfL was to allow the students to reflect on the experiment and its results in three ways, what new knowledge they have acquired, what knowledge did not meet their hypothesis and by the use of subtle wording allow the student to identify what part of the lesson they understood the least.

Time	Activities/Methodology/Key Concepts (Teacher's Role – including key teaching points and key questions)	Pupil Tasks (Pupils' role -including differentiation strategies, engagement in formative assessment and homework)	Resources (Including Health and Safety requirement)
5 mins (5 mins)	Welcome (Cymru) Starter Recap of previous lesson	APK, fill in the blanks for names of the phase changes	Slide 1
20 mins (25 mins)	Ensure correct completion of workbook exercises.	Correctly complete p8-10. To ensure assimilation of knowledge from previous lessons.	Slide 2-3
25 min (50 mins)	Supervise practical experiment to establish the volume and mass change for salt dissolved in water.	Correctly carry out the experiment in accordance with p11 .	Slide 4
5 (55 mins)	Ensure pupils have recorded results of experiment and challenge them to link the experiment results to the particle model	Record that a salt and water solution gains mass without gaining volume cold water, correctly link this to the particle theory and energy states	Slide 5 Experiment equipment
5 mins (60 mins)	Plenary Confirm understanding And issue exit passes	Complete exit pass: 1 Learned, 1 interesting, 1 further investigation.	Exit Pass Exercise Book p8

Figure 1 Lesson plan for 111 AfL

The result of the collected exit passes can be collated to assess the student's perception of the effectiveness of the lesson. In the case shown in Fig 2 it can be seen that the student appeared to appreciate the main points of the lesson, however the lesson plan predicted only five minutes to complete the exercise. It was found by the student teacher that the exercise took far longer than predicted and that despite the small quantity of text that the students produced, it did initiate conversations within the class around the topic of the lesson. However, it would seem obvious that the collation of a large quantity of exit slips could soon become a burden on a teacher's time.

1 Thing I Learnt	Salt fits between water
1 Thing I Found Interesting	Things get heavier Not always bigger
1 Thing I Need Explaining Again	How salt dissolves

Figure 2 Example of completed 111 AfL

Dixson and Worrell (2016, p. 1) found similar issues and suggest the use of a digital system of exit passes such as a Padlet or google form that could allow quicker and easier collation of data.

Making use of digital resources would seem an obvious way of lessening the workload on teaching staff, further, making use of technology that is familiar to students could engender engagement.

A further Yr. 7 class was studying air pressure and effects as part of a module on solids liquids and gases, as part of this lesson demonstration videos were used showing a train car being crushed by air pressure and hot air balloon launch.

Time	Activities/Methodology/Key Concepts (Teacher's Role – including key teaching points and key questions)	Pupil Tasks (Pupils' role -including differentiation strategies, engagement in formative assessment and homework)	Resources (Including Health and Safety requirement)
10 mins (10 mins)	Welcome (Cymru) Starter Where would you go to find the answer to: Why do your ears pop?	List resources by type and name as to where you would find information to answer any given question.	Slide 1
15 mins (25 mins)	What caused this to happen? Play air pressure videos and enquire as to possible causes.	Discuss and propose possible causes for the shown events.	Slide 2-5
25 min (50 mins)	Describe task of researching air pressure and thereby explain possible causes of events in videos.	Carry out research into air pressure to discover 3 sources, 3 facts from each and rate the sources reliability.	Slide 6 iPads Research resources
10 mins (60 mins)	Plenary: Thumbs up if you found out something new. Check progress and any new information discovered?	Thumbs up if discovered new information; Explain new information in tweet	Tweet an Exit Pass Exercise Book p8

Figure 3 Partial lesson plan for Tweet AfL

The lesson plan shown in Figure 3 allowed ten minutes for the completion of the exercise, also due to the hardware restrictions on IT equipment within the school environment, it was not possible to connect students to carry out a live tweet, it also became apparent during the AfL session that despite the student teachers assumption that secondary students would all be familiar with Twitter, it became clear that approximately 25% of the class were not familiar with the medium nor its character limitations.

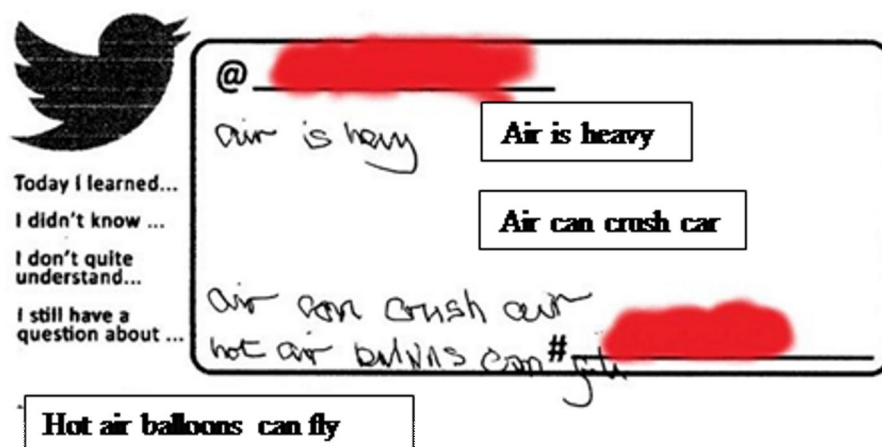


Figure 4 Example of completed Tweet AfL

Figure 4 shows a student response and illustrates the lower end of the received replies, this example demonstrates that due to a low capability some students that may struggle to vocalise their understanding of a lessons aims, they may be more comfortable in writing this down, it also provides a hard copy for the teacher to create a history for pupils of concern.

Given the advantages of digital methods of AfL the student teacher resolved to continue the vein and use an online system that would assist in collating the information. Kahoot! is an online quiz program that allowed the student teacher to create a bespoke quiz for any subject matter.

Time	Activities/Methodology/Key Concepts (Teacher's Role – including key teaching points and key questions)	Pupil Tasks (Pupils' role –including differentiation strategies, engagement in formative assessment and homework)	Resources (Including Health and Safety requirement)
5 mins (5 mins)	Welcome (Cymru) Starter: Welsh words on subject	Attempt to link scientific words in Welsh and English.	Slide 1 - 2
5 mins (10 mins)	What is runny? What is thick? The meaning of viscosity.	Describe attributes of popular fluids/sauces and describe their consistency.	Slide 3
5 mins (15 mins)	Video Viscosity variation in engine oil	Suggest possible variations to the viscosity of engine oil that may occur during engine running.	Slide 4
5 mins (20 mins)	Definition of Viscosity Aims of the experiment Brief practical safety and procedure	Note definition of viscosity in exercise book. Observe safety requirements and practical instructions.	Slide 5
30 mins (50 Mins)	Supervise practical for safety and learning.	Carry out practical to measure the rate a ball of plasticine falls through glycerol of varying temperatures. Test each temperature 3 times.	Plasticine Glycerol Stopwatch ~~Waterbaths~~ Test tubes Clamp stands
10 mins (60 mins)	Plenary : Kahoot 10 Question Kahoot exercise	Join Kahoot quiz; discuss learning and compete with classmates.	Kahoot iPads

Figure 5 Partial lesson plan for Kahoot! AfL

The lesson plan allowed for a 10 minute plenary/AfL section, one advantage of the Kahoot! AfL is that the length of the quiz can be amended

The lesson plan allowed for a 10 minute plenary/AfL section, one advantage of the Kahoot! AfL is that the length of the quiz can be amended to suit time available although this must be done prior to the start of the session.

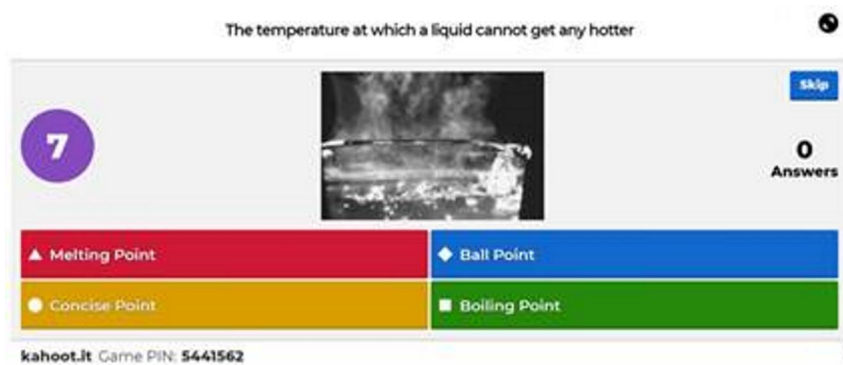


Figure 6 Example Kahoot! AfL question

Figure 6 shows an example question from the AfL quiz given to another Yr. 7 class. The system analysis of the quiz presents the student teacher with the opportunity to evaluate statistics per pupil, Figure 7, that can highlight a particular pupils' weaknesses

Rank	Nickname	Accuracy	Final score
1	[Redacted]	70%	6590
2	[Redacted]	60%	5764
3	[Redacted]	60%	5609
4	[Redacted]	60%	5501
5	[Redacted]	50%	5106

Figure 7 Kahoot! AfL student data analysis

Further it allows for the demonstration of data per question, Figure 8, that could be used to highlight gaps in delivery.

	A	B	C	D	E	F	G	H
1	Solid Liquids Gas							
2	Played on		4 Dec 2019					
3	Hosted by		Mr. Lockhart, Physics					
4	Played with		25 players					
5	Played time		10 of 10					
6								
7	Overall Performance							
8	Total correct answers (%)		33.20%					
9	Total incorrect answers (%)		66.80%					
10	Average score (points)		3021.48 points					
11								
12	Feedback							
13	Number of responses		5					
14	How fun was it? (out of 5)		0.00 out of 5					
15	Did you learn something?		0.00% Yes		0.00% No			
16	Do you recommend it?		0.00% Yes		0.00% No			
17	How do you feel?		0.00% Positive		0.00% Neutral		0.00% Negative	
18								
19	Switch tabs/pages to view other result breakdown							
20								

Figure 8 Kahoot! AfL class data analysis

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Cross curriculum responsibilities

29 December 2019 15:08

Cross Curriculum Responsibilities

Donaldson (2015, p. 39) cites that the cross-curriculum responsibilities of literacy numeracy and Digital competence are the fundamental building blocks of learning and life. They should therefore be developed across all areas of learning, the application of these responsibilities across areas of learning aid their development as they can be given subject and context.

Literacy

Across this PTE the cross curriculum responsibilities of Literacy, Numeracy and Digital Competence can be naturally fitted into almost all lessons. Figure 9 shows a section of the lesson plan that tasks the student to create their own explanation for the observed diffusion and dissolution.

Time	Activities/Methodology/Key Concepts (Teacher's Role – including key teaching points and key questions)	Pupil Tasks (Pupils' role -including differentiation strategies, engagement in formative assessment and homework)	Resources (Including Health and Safety requirement)
5 mins (5 mins)	Welcome (Cymru) Starter Recap of previous lesson	APK, fill in the blanks for names of the phase changes	Slide 1
10 mins (15 mins)	Demonstrate the process of solid to gas sublimation and corresponding deposition.	Correctly identify where sublimation/ deposition would fit in phase change triangle.	Slide 2-3
10 min (25 mins)	Solution terminology Solvent Solute Solution	Correctly identify that solute added to solvent gives a solution.	Slide 4
15 mins (40 mins)	What happens in cup of tea Video on diffusion and dissolving	Observe video on diffusion and dissolving Write personal definition of diffusion on P10 of workbook	You Tube Video CSpMigXBgk
10 (50 mins)	Demonstrate Potassium permanganate dissolution in hot water vs cold water	Identify that hot water dissolves potassium permanganate quicker than cold water, correctly link this to the particle theory and energy states	Slide 5 Potassium permanganate Demo
10mins (60 mins)	Plenary Clear down and return lab equipment Discuss results with learners and clarify understanding	Clear down experiment equipment. Complete conclusion on p11 and justify observations as per particle model	Exercise Book p8

Figure 9 Partial lesson plan cross curricular literacy

Figure 10 shows the efforts of a student to the task, the student has correctly identified the science that was delivered during the lesson and despite handwriting issues has demonstrated a single erroneous misspelling of a particular word, this is the only correction required for this student.

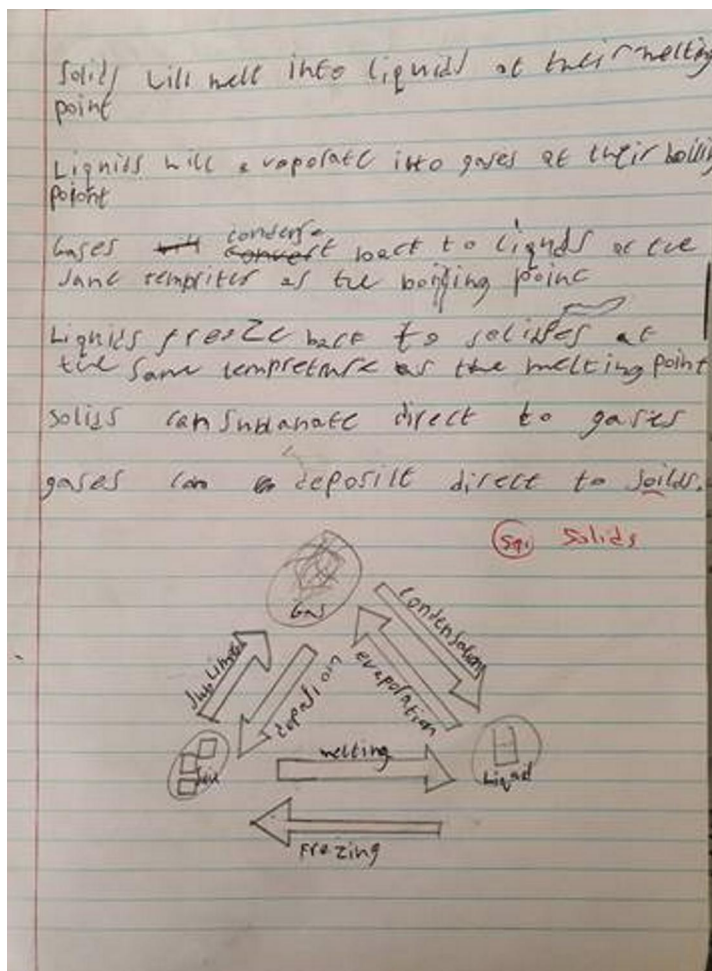


Figure 10 Students cross curricular literacy

Numeracy

Figure 11 shows a partial lesson plan for a Yr. 7 class that was tasked with carrying out a timing task through a variety of exercises.

Time	Activities/Methodology/Key Concepts (Teacher's Role – including key teaching points and key questions)	Pupil Tasks (Pupils' role -including differentiation strategies, engagement in formative assessment and homework)	Resources (Including Health and Safety requirement)
10 mins (10 mins)	Welcome (Cymru) Starter Numeracy Puzzle: Time	Calculate the time from the 3 clues	Slide 1
10 mins (20 mins)	Timing and its punctuation 00:00:00.000 (hh:mm:ss.000)	Demonstrate understanding of hh:mm:ss.000 by writing given times in longhand.	LNF books p8 Stopwatch
10 mins (30 mins)	Fractions of a second and rounding	Rounding timed events to a simple fraction, halves, quarters fifths.	Stopwatch Whiteboard
15 mins (45 mins)	Time an exercise and extrapolate a prediction for a longer exercise.	Time writing name 5 times. Convert to approximate fraction. Estimate time required to write name 20 times. Repeat exercise for crossing classroom 1 - 3 times	LNF Book p8 Stopwatch x 15
15 mins (45 mins)	Plenary : Pair Share What did your neighbour learn during this exercise?	Discuss exercise with partner discover their learning and then share with class.	Exercise book Stopwatch

Figure 11 Partial lesson plan cross curricular numeracy

The students were required to record times for the activity before rounding the time to an approximate fraction and using this to create an estimate for time taken for a longer task.

Estimating, measuring, practical skills activity lesson

A. Use a stopwatch to measure accurately how long it takes you to do the following tasks. Work with a partner to complete the activities.

Measuring time




When recording time it is important to record it correctly. Remember that if you are recording in minutes and seconds there is NO decimal point between them as there are 60 not 100 seconds in a minute. 3 minutes 30.34 seconds could be recorded as:

1. 3:30.34 (mins and secs)
2. 210.34 seconds (converting mins to secs – we tend to do this in science)
3. 3.534 min (converting secs to mins)

Activity	How long in seconds/minutes	Convert your result into approximate fractions of seconds (1.34 would be approximately $1\frac{1}{3}$ s)	Estimate how long it would take...
To write your full name five times.	no minutes 2.22 sec	$6\frac{2}{10}$ sec	To write my name 20 times it would take $24\frac{8}{40}$ sec
To walk from one end of the classroom to the other	no minutes 4.15 sec	$4\frac{1}{10}$ sec	To do this 3 times it would take me $12\frac{3}{10}$ sec
To write down the x6 tables.	no minutes 55.50 sec	$57\frac{1}{10}$ sec	To write my tables 10 times would take $570\frac{70}{1000}$ sec
To do 10 star jumps.	no minutes 24.11 sec	$24\frac{1}{10}$ sec	To do 30 star jumps would take $22\frac{3}{30}$ sec

Figure 12 Students cross curricular numeracy

This allows the students to practice multiple arithmetic skills around a single context. Figure 12 shows the result of one pair of students, it can be seen the student recording times was initially reversing some digits, although this was addressed by the student teacher and the student appeared able to correct this with concentration, it was noted and discussed with the supervising teacher and the students maths teacher, further the students have taken a literal interpretation of the simplest example of simplifying to a fraction that was given in demonstration and applied it across the exercise showing little understanding of translating times to other simple fraction denominators.

Digital Competency

Although Donaldson (2015, p. 41) makes the point of the growth of the

digital era and the amount of digital media that students need to be familiar with in the modern world he also makes the point not to focus on technologies that rapidly become obsolete but focus on “understanding and transferability”, this could also mean understanding the relative fallibility of the digital sources.

Shown in Fig 13 is a lesson plan developed to require Yr. 8 students to investigate digital sources of information for a project on the digestive system.

Time	Activities/Methodology/Key Concepts (Teacher's Role – including key teaching points and key questions)	Pupil Tasks (Pupils' role -including differentiation strategies, engagement in formative assessment and homework)	Resources (Including Health and Safety requirement)
10 mins (10 mins)	Welcome (Cymru) Starter Organs of the Digestive system	Reflect on previous lessons and find organs of the digestive systems in word search.	Slide 1
45 min (55 mins)	Research lesson Demonstrate methods of research and inquiry into the digestive system. Internet/biology books/digestive system handout.	Carry out individual research into an organ of the digestive system in accordance with LNF P2, choose a subject for homework project.	Slide 2-3 Biology books Chromebooks LNF Workbook p2 Summary sheets NHS digestion factsheets
5 (60 mins)	Clear up and plenary, Heres the answer. Whats the question	Plenary Whats the question?	Notepad and pen

Figure 13 Partial lesson plan cross curricular digital competency

The lesson required the students to find three sources of information and during the process evaluate the sources for how reliable they perceived them to be.

The structure of the digestive system

Activity: Research one organ of the digestive system in order to make a life-size model of the organ. Make notes on your research in the spaces below. In the *triangles* write the name of the source and why you believe it to be reliable.

Source of information#1 (website/book):	BBC Bitesize
Circle one face to judge how reliable and trustworthy you think your source of information is;	
Information:	Enzymes break down food passes food to intestine
Source of information#2 (website/book):	Sutton grammar school
Circle one face to judge how reliable and trustworthy you think your source of information is;	
Information:	Stomach acid kills germs
Source of information#3 (website/book):	Wikipedia
Circle one face to judge how reliable and trustworthy you think your source of information is;	
Information:	J shaped organ between esophagus and the Duodenum

Figure 14 Students cross curricular digital competency

The shown response that despite the availability of reference books on the subject the student, and all other students within the class, opted for three websites to source their data, further this student's judgment is indicative of the reliability the students attributed to the sources they chose for the exercise.

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Blend of approaches

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Blend of approaches

Donaldson (2015, p. 65) advocates that a blend of approaches should be used and that these should include direct teaching. During this PTE the student teacher has employed a number of different approaches to suit the lesson being delivered and the class receiving the lesson.

Due to the student teachers previous experience it is a natural delivery mode that the student teacher has a comfortable habit of dropping into, this can lead to lesson delivery that is too teacher led. Figure 15 shows the partial lesson plan for the discussion lesson on food and nutrition.

Time	Activities/Methodology/Key Concepts (Teacher's Role – including key teaching points and key questions)	Pupil Tasks (Pupils' role -including differentiation strategies, engagement in formative assessment and homework)	Resources (Including Health and Safety requirement)
10 mins (10 mins)	Welcome (Cymru) Starter: Healthy Foods quiz Link to previous lesson (Starch Sugar Protein Tests) Content of typical fast food meal.	Complete as groups in food group quiz Recall food groups and which meals contain them as majority	Slide 1-8 White boards pens
20 min (30 mins)	Lead discussion on make up of balanced diet Fruit and Veg 5 Portions per day Fresh v Frozen Vitamins, minerals, antioxidants	Partake in discussion session Create list of advantages of each food group and consequences of deficit / excess consumption.	Slide 9 - 15 Workbooks 'Diet Plate' NHS data sheet
20 (50 mins)	Demonstrate 3 example 24hr diets Discuss decisions made in the analysis of 3 diets	Tabulate and compare 3 diets and justify labelling diets as healthy / unhealthy	Slide 16-18 Workbooks 'Diet Plate' NHS data sheet
10 (60 mins)	Plenary Discuss realistic balanced diet	Complete an example healthy diet	Workbooks 'Diet Plate' NHS data sheet

Figure 15 Partial lesson plan discussion / direct teaching

The planned discussion was based on the subject of Food and Digestion to make the content relatable to the students a series of prompting quiz questions were used to seed the discussion, an example of this is shown in Figure 16.

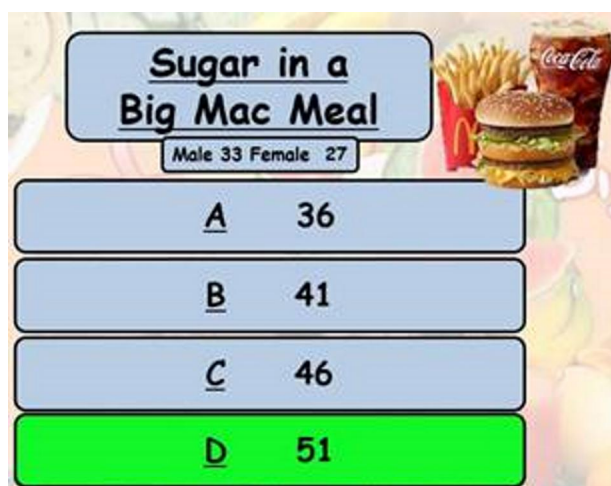


Figure 16 Discussion / direct teaching seed question

The planned discussion did not fully develop as intended, after initial interest from each question the discussion quickly died out and the

lesson became very teacher led with little fresh input from the students. Figure 17 shows the student teachers reflection on the lesson.

Reflective Analysis of Teaching and Strategies for Development – including justification/rationale for pedagogical choices	
Evidence of my Effective Practice	Starter quiz elicited good interaction and engagement. The desired discussion to be driven by the students never fully developed and despite guidance from the student teacher pupils did not initiate different topics of discussion round the balanced diet theme. This led to the student teacher leading the lesson. In retrospect, the use of a discussion session and aiming for the student to drive the discussion was over ambitious for this year 8 class and a research activity could have produced a less teacher focused lesson
Areas for my Development	Student centred learning: Allow the students to develop own learning with less direct teaching from myself.
Personal Targets for Progress	Names: Remembering students names aids building a rapport, I have struggled with this and found that those few names I have managed to retain have been for negative reasons, using students names would seem the best way of learning them therefore it may be a case of "biting the bullet" and accepting that I will get them wrong.

Figure 17 Discussion / direct teaching reflection

The failure to engage the students in an interactive discussion was also commented on by the supervising teacher. The lesson observation notes are shown in Figure 18.

YR8	Food + Digestion.	14 Nov.
starter - Encouraging pupil discussion with food facts // - Interesting facts - surprising pupils. - Pupils excitable - but well managed - insisting on 'Golden Rule' // - Reiterating need for discussion / listening ↳ linked to healthy diets		
Main phase - 'Eatwell plate' handout - Class discussion - all keen to participate - Difficult to maintain focus of all for extended activities like this. * Maybe break up lesson into smaller chunks with pupil led exercises - only 10 mins left to complete task - analysing diets.		
Teacher led lesson - no time at end to discuss meals in great detail. Let the pupils do the work!		

Figure 18 Discussion / direct teaching observation notes

An improvement over the discussion lesson plan and in line with the teacher observation and Donaldson's (2015, p. 50) recommendations to allow discovery and constructivist approach. Figure 19 shows a lesson plan for an experiment lesson where students were required to carry out tests on a sample of organic matter to determine the presence food groups.

Time	Activities/Methodology/Key Concepts (Teacher's Role - including key teaching points and key questions)	Pupil Tasks (Pupils' role - including differentiation strategies, engagement in formative assessment and homework)	Resources (including Health and Safety requirement)
2 mins (2 mins)	Welcome (Cymru) Starter Link to previous lesson (Food Groups) Assess which of the food groups is the main constituent of shown products?	Complete list of shown food products and their major food group constituents.	Slide 1 Student pen and paper
Book Prep 5 min (7 mins)	Explain upcoming practical and its recording method in table form. Printed table available for students with ALN to stick into workbook. Practical explanation	Create table in workbook to annotate practical results.	Slide 2 Workbooks Differentiated table handout
5 min (12 min)	What equipment to use / Group size / Equipment setup / Practical Lesson / Safety / Method. Check understanding	Clear worktops. Stools/Bags stored safely. Collect equipment. Safety Goggles always worn. Confirm understanding.	Slide 3-8 Water bath, SPLOSH, Iodine, Benedicts & Biuret solutions (Per pupil) Goggles (Per group) Test tube stand, Test tubes, Pipette.
30 min (42 mins)	Practical Experiment. Circulate and supervise experiment. Ensure safety procedures followed.	Complete 3 tests on SPLOSH solution, record results in workbook. Extension: Write short paragraph explaining 1. The test 2. The results. 3. The meaning of the results.	Water bath, SPLOSH, Iodine, Benedicts & Biuret solutions (Per pupil) Goggles (Per group) Test tube stand, Test tubes, Pipette.
5 min (47 mins)	Tidy up Direct equipment washup and replacement.	Equipment rinsed and returned to trolley.	
10 mins (57 mins)	Plenary (State, Describe, Write)	In workbooks State 3 things learned. Describe 2 skills. Write 1 question.	Slide 9 Pen workbook
3 mins (60 mins)	Link to next lesson: Test food supplied by pupils	Think: of foods they can bring to next lesson for testing	

Figure 19 Partial lesson plan Experiment lesson

The lesson was briefed using powerpoint to ensure full understanding of

the lesson requirements and to ensure full understanding of the aims of the lesson and a reminder of the indicator changes, an example of the briefing powerpoint is shown in Figure 20.

Food Tests

If iodine turns from a red/brown to black, then it is a positive test for starch.

FOOD TESTS

STARCH
2cm³ SPLOSH
3 drops of iodine
Observations: red-brown

SUGAR
2cm³ SPLOSH
2 cm³ Benedict's solution. Put boiling tubes into a hot water bath.
Observations: blue

PROTEIN
2cm³ SPLOSH
1 cm³ Biuret solution
Observations: blue

If Benedict's solution turns from blue to green then brick red, then it is a positive test for sugar.

If Biuret solution turns from blue to purple, then it is a positive test for protein.

Complete the observations on page 4 of your booklet.

Figure 20 Experiment lesson guidance slide

The experiment shown requires minimal equipment to complete, however for more complex experiments or those with a higher degree of risk then a demonstration can be more appropriate. Figure 21 shows the lesson plan for a demonstration lesson.

Time	Activities/Methodology/Key Concepts (Teacher's Role – including key teaching points and key questions)	Pupil Tasks (Pupils' role -including differentiation strategies, engagement in formative assessment and homework)	Resources (including Health and Safety requirement)
10 mins (10 mins)	Welcome (Cymru) Starter Organs of the Digestive system	Reflect on previous lessons and find organs of the digestive systems in word search.	Slide 1
45 min (55 mins)	Gums to Bums Demonstration. Simulate the processing of food from ingestion via mouth through mastication, saliva and enzyme production, swallowing oesophageal passage, Stomach acid, enzymes small intestine, bile, faeces, rectum, anus.	Participate and interact during demonstration, correctly answering questions on purpose of each organ and fluid.	Slide 2-3 Workbooks p9,p14
5 (60 mins)	Clear up and plenary, List 3 things your neighbour has learned today	Assist in clear down , Think pair share 3 things your neighbour has learned.	Notepad and pen

Figure 21 Partial lesson plan demonstration lesson

The demonstration was for a 'Gums to Bums' explanation of the digestive system of the human body. The lesson was new to the placement school and was proposed by the student teacher after observing a similar lesson delivery during the microteach section of the PGCE course. The lesson was proposed to the department head and approved. Figure 22 shows some student notes compiled during the demonstration.

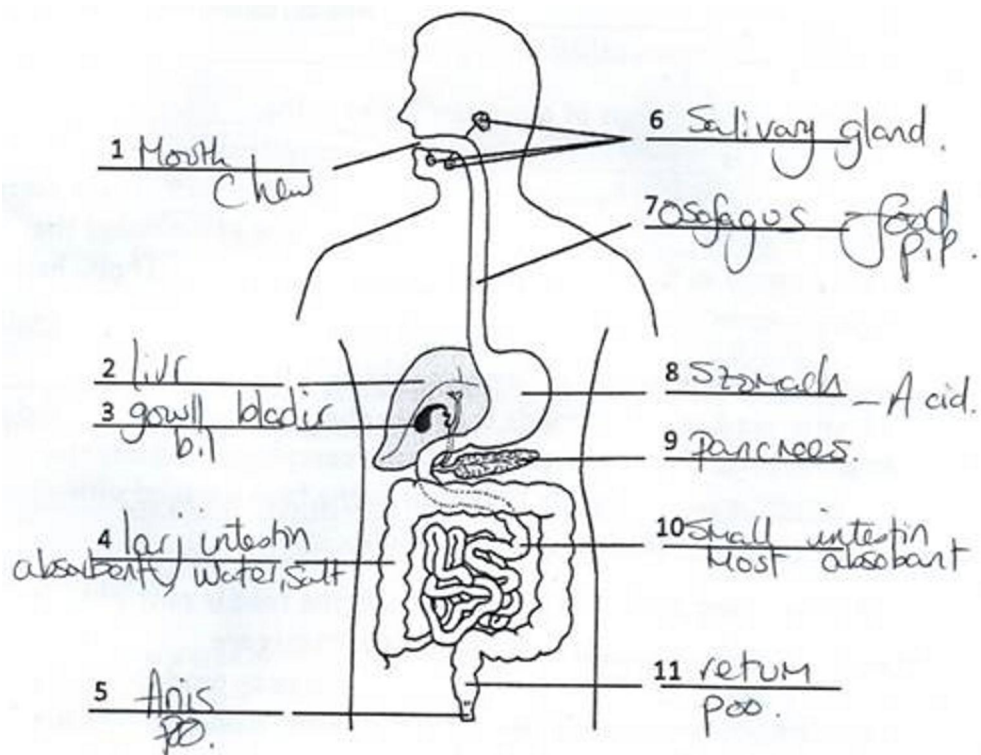


Figure 22 Demonstration lesson student notes

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Critical Reflection

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Critical Reflection

This paper is focused on the application of three pedagogical principles recommended by Donaldson to promote good teaching and learning. These will be used to critically reflect upon the student teachers' evidence of their application within PTE 1 Block 1.

The pedagogical principles that this paper shows the student teacher is applying in their practice are aimed at encouraging good teaching and learning. However good teaching and learning would seem a difficult concept for literature to agree on, Devlin and [Samarawickrema](#), define effective teaching as that which is "focused on students and their learning"(2010, p. 112). Good *et al* find that the definition of good teaching and learning is that which can be shown by research to have a positive impact on student outcome. Coe *et al* further describe good teaching and learning as that which improves student achievement that is relevant to further success(2014, p. 9). Coe *et al* further make the point that any definition on the effective teaching and learning must be measured by the metric of student progress. Therefore, this paper shall use this as the metric by which the student teacher shall gauge their progress and make recommendations for further progress.

Assessment for Learning

Donaldson makes recommendations to follow twelve pedagogical principles aimed at defining the means to good teaching and learning, Among them Assessment for Learning (AfL). William discusses several definitions of AfL from various sources and would seem to find that AfL is where the prime aim of the assessment is to promote a students' learning. Figures 1 & 2 show the AfL strategy of using Exit Passes to allow students to reflect on the lesson and provide assessment and feedback. Leigh (2012, p. 189) finds that reflection that takes place as soon as possible after a lesson is critical for students to achieve maximum retention of new information from the lesson, further she discusses that the exit slip can further make the student feel that they are being listened to, even if they have not had the opportunity to speak directly to a teacher during a single lesson. Despite the advantages of exit slips it could become an onerous task in that if used for every lesson which could generate over five hundred exit slips for the average teacher per week. The 111 exit slip used was aimed to give the students a medium to both positively demonstrate what they had learned inconspicuously highlight to the

student teacher an area where they are struggling, this exit card as designed is analogous to the two stars and wish format (Black and Jones, 2006, p. 8)

Figures 3 & 4 show a further development of the exit pass AfL strategy where a twitter simulation was used as an engage to students into the plenary with a familiar mode of communication. This is an attempt to provide a mode of communication

Black and Wiliam state that assessment for learning must be an interactive process(1998, p. 2), therefore the student teacher must react to the data garnered from whichever AfL strategy is in use. Figure 4 shows a student's answers with the student's class and name have been removed to ensure anonymity and indicate a student with a poor understanding of the delivered lesson which is indicative of this student's ability. Black and Wiliam, further state that Assessment for Learning is particularly important for weaker students(1998, p. 6). Especially for weaker students it seems obvious that the assessment strategy in use must be a clear and simple to undertake to ensure weaker students can complete them fully. In this case it would seem to have been beyond the capabilities of the student to fully complete the exit slip clearly. The student teacher to take some time to work out the meaning of the script and it would seem a differentiated strategy that allows students with weaker communication skills to clearly communicate their understanding of the lesson would have been more applicable in his case.

Figures 5 - 8 show a digital means of completing an AfL plenary. The Kahoot! Website allows the student teacher to compile a bespoke quiz for pupils to complete. This has several advantages Rust(2002, p. 147) finds that any strategy that piques a student's interest will invariably provide more engagement and better results, in the modern digital age it would seem obvious that secondary students would engage better with a digital medium. This strategy also offers an avenue to exploit a secondary student's competitive nature, Verhoeff (1997) finds that a healthy competition for students will improve results provided that the students are exposed to any negative repercussions from the completion. Figure 7 shows the top 5 scores across the class, though all scores are available to the teacher to evaluate, using the Kahoot! system only the top 3 scores are publicly available to the students and a personal score is issued to them by the device, this prevents a poor score becoming a source of beratement from peers. This system also allows the teacher to observe the results across the questions set and could be used to highlight gaps in whole class knowledge that could indicate a failure in teacher delivery. Overall this system can provide an engaging medium for students as opposed to rather more staid methods that the students might perceive to be uninteresting and therefore pointless to complete. Rust's (2002, p. 150) further comments would

seem to confirm this and further notes that by its simplest definition students can perceive purely academic exercises as pointless and therefore the need to make strategies interesting and relevant is all the more important.

Cross-Curriculum Responsibilities

Thomson, Hall and Jones (2012, p. 6) define cross-curriculum learning as part of a distinct move away from pure subject focused learning and an emphasis placed instead on the application of the fundamental skills required to succeed in the modern world within those subjects. Cross-curriculum responsibilities are defined in LNF and DCF, The Literacy and Numeracy Framework (LNF) was introduced to the curriculum in Wales in 2013 and has been further included as a core part of the new 2022 curriculum(Welsh Government, 2019b) along with the Digital Competency Framework (DCF)(Welsh Government, 2019a).

Munise and Gozutok found that a majority teachers suggested that their was a range of significant problems encountered with delivering cross-curriculum learning beyond the extra time and preparation required, significantly they found that the skills required were not covered in the subject content and that the skills were not naturally covered in science(2010, p. 1322). This is a polar opposite of that found by Spodniakova et al who found there was a positive correlation between the introduction of cross-curriculum learning and the students outcomes in science and further that there was no major addition to the course content to meet the additional responsibilities(2017, p. 37). This correlates well with the experiences that the student teacher has found during placement, where the student teacher found that Literacy, Numeracy and Digital Competency responsibilities fall very naturally into the delivery of science and the student teacher found not issue in delivering the cross curriculum responsibilities without grossly straying from the core subject matter.

Figures 9 and 10 relate to the delivery of the Literacy aspect of the LNF and cross-curriculum responsibilities, the lesson was focused on the state changes of water, the majority of the state changes were familiar to the students with the exception of sublimation and deposition, the students were required to create a written explanation of their understanding of the subject. The students work shown in Figure 10 shows a student that has achieved a good grasp of the subject content and the work was only corrected for the single spelling error of a previously correctly spelled word that was missed in during their own review of the work, this was in line with the schools marking policy. The lesson aims to investigate the state changes of matter were aided by the inclusion of a Literacy aspect by allowing the students to revise their own understanding of the subject matter.

Figures 11 and 12 relate to a numeracy lesson that explored timing during a science lesson. The timing of activities were used to practice the skills required for future science experiments; this also includes developing the skills to predict a scientific outcome based on previously established data. To allow this skill to develop and as per the lesson plan, timing information that could be rounded to an approximate fraction and then multiplied to predict the outcome of a longer experiment. This therefore includes multiple numeracy skills within the context of a science lesson. It can be seen that the students work shown in Figure 12 shows reversal errors in the students writing of digits, this was addressed by the student teacher and the student started to correct the error in the following columns. As a follow up the case was discussed with the supervising teacher and the student's maths teacher who was aware of the issue and would continue to monitor. Further research into this by the student teacher after the lesson found that digit reversal is more commonly found in students under the age of 7 (Fischer, 2013, p. 357) and that in secondary age pupils it should be monitored for additional indicators of Additional Learning Needs (ALN). This would seem to be a prime justification for the application of cross-curriculum responsibilities where issues with the fundamental skill sets required for a student's future can be observed and addressed in another subject.

Figures 13 and 14 refer to a science lesson that involved the investigation into the functions of the human digestive system. The students were offered a range of resources to carry research into an organ of the digestive system. Although there was both hard copy literature and internet access available, it was envisaged that students would have a bias toward internet sources for the exercise. As part of the exercise to the students were required to indicate how reliable and trustworthy, they envisaged the source to be. The ability to reliably discern the trustworthiness of internet sources is a fundamental skill for future learning in this digital era. In this case the student has correctly attributed the reliability of the sources used, it may be arguable as to where on the Likert scale (Likert, 1932) that each resource is placed, however the student has correctly placed them relative to each other. Donaldson stipulates that the development of transferable digital skills and the application of these competencies should be a focus of the DCF (2015, p. 41). It is assessed that this lesson has followed the intent of the DCF and pedagogical principle of cross-curriculum responsibilities and provided an opportunity for the students to practice them.

Blend of Approaches

A blend of approaches involves the use of varying teaching methods used to deliver lessons. Donaldson specifically advocates the inclusion of direct teaching as part of a range of approaches (2015, p. 65). This would appear surprising as direct teaching would otherwise

seem to be the least popular teaching method (Heru, M and Jamil, 2018, p. 63). Since each approach has its own advantages, disadvantages and applicability to different subject matter, and given the direct teaching methods supposed unpopularity among educators it may be fair to conjecture that to counteract this, is the very reason the direct teaching method is specifically mentioned as an appropriate pedagogical principle in the new curriculum.

Figure 15 – 18 demonstrate a lesson that was delivered to a Yr. 8 class, the lesson plan in Figure 15 shows that the aim of the lesson was to create a class discussion around the topic of a healthy diet as part of a module on Food and Digestion. Figure 16 shows an example of quiz questions that were used to seed the discussion. During the lesson it quickly became apparent that the students were not engaging in the discussion and were not offering new trains to the discussion, the lesson descended into a teacher led, direct teaching lesson on the subject. The student teacher found this as a failure of the lesson and was commented on by the supervising teacher that it was too teacher led (Figure 18). Although the students all appear to meet the lesson objectives during the plenary by the creation of a healthy diet example, the student teacher reflected that the discussion session may have been an ambitious reach for the class and the student teacher (Figure 17). That the student teacher still managed to meet the lesson aims by resorting to a direct teaching method may in part be due to previous experience as a technical instructor in industry that was, to the greater extent, a purely direct teaching role. This was therefore a 'comfort zone' method of teaching that the student teacher has been deliberately trying to avoid.

Figures 19 – 20 relate to a more student led experiment lesson. Seery (2010) quotes Michael Faraday as saying he "was never able to make a fact his own without seeing it". Further evidence supports that students that discover information for themselves take ownership of that information and this aids retention and understanding (Ball, 2018). The experiment was designed for the students to test the workings of a model gut against different food groups. The students engaged well with the lesson, even from the student teachers limited experience, this was predictable, as the class can occasionally become overzealous in their excitement to start a practical lesson and must be managed in accordance with CLEAPSS guidelines (2019) in such a way as to begin the lesson in a safe way. A guidance PowerPoint slide was also left on display during the lesson to ensure the students understood the significance of test indicators. The lesson was successful in such that the students achieved the lesson aims however the class atmosphere, despite the student teachers' best efforts the class behaviour would often push the limits of the definition of 'under control' and the student teacher would have to stop the lesson to regain control. Given the student teachers lack of experience and familiarity with practical lessons the student teacher finds these classes daunting and rarely feels fully in control.

Figures 21 and 22 refer to a demonstration lesson that was carried out with a Yr. 8 class covering the module on Food and Digestion. The lesson was designed as an interactive demonstration on the workings of the full digestion system and was colloquially referred to as Gums to Bums. The lesson was a replacement to the schools scheduled lesson of a general introduction to the digestive system, the student teacher found the lesson to be dry and non-engaging and proposed a replacement to the supervising teacher. The lesson was a messy demonstration using foodstuffs and simulated the working of each organ of the digestive system and the effects it had on the matter as it passed. The lesson required the students to make notes as the lesson progressed and carry out some of the segments in turn. The lesson was largely a success, the students were fully engaged and were heard discussing the information on the lesson when passed in the corridor later in the day, however as can be seen from the notes in Figure 22 which are indicative of those created during the lesson, the students made minimal notes beyond the bare headlines of each organ. The student teacher did not leave sufficient time during the lesson for the students to make more comprehensive notes and this became an issue in latter lessons in the module when it was found that all students in the class were devoid of specific information points despite the student teacher having delivered them.

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Recommendations

Good teaching and learning means employing assessment for learning principles means that the teacher must obtain regular feedback to adapt their pedagogies to meet the changing needs of the student. The student teacher does not demonstrate this well with either the 111 or the Tweet methods of AfL. If the need to differentiate a lesson is required to meet the needs of a student then so also must be the AfL strategy, these simple methods of collecting data are not differentiated sufficiently for low ability students to clearly indicate their learning and their deficiencies further these AfL methods are not collated to show a trend indicating if a change in delivery is meeting the changing needs of the student. This is partly corrected by the use of the Kahoot! AfL strategy though the use of 'nicknames' in the system limit the ability of the student teacher to correlate the responses of the student to their actual identity. To make further

progress with their AfL strategies the student teacher needs to find a method of collating the AfL returns to demonstrate the effectiveness of changes to pedagogies.

Good teaching and learning regularly reinforces Cross-curriculum Responsibilities, including literacy, numeracy and digital competence, and provides opportunities to practise. This pedagogical principle means that the cross curricular responsibilities should be an integral part of all subjects. The student teacher feels that they have demonstrated this well, with literacy and numeracy being particularly well suited for ease of inclusion in science. However, there is scope for improvement, for the student teachers' application of digital skills within their pedagogy. A prime example of this would be the use of digital skills and spreadsheets to collate and present numerical information showing trends and anomalies that are worthy of scientific mention which presents further opportunity for literacy inclusion.

Good teaching and learning means employing a blend of approaches including direct teaching. This pedagogical principle means that teachers should use a range of approaches as best suited to the subject matter and the students, without unjustifiably avoiding direct teaching. The student teacher feels that they have demonstrated this with room for improvement. The student teacher fell into a direct teaching mode that the planning did not prepare for, this led to a less than perfect lesson. The student teacher needs to better prepare backup methodologies to allow them to adjust a lesson that does not go as planned, this could be provided for in the planning stage and allow a flexibility not yet demonstrated by the student teacher.

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