

ECAD 6007

A critical evaluation and identification of next teaching and learning steps focusing on a case study of an individual learner or a group of learners, based on an observed critical incident

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Introduction

What are Critical Incidents?

Critical incidents can be defined as everyday occurrences in a classroom that are made critical by the meaning an individual interprets from the event and the analysis that ensues thereafter (Tripp, 1993). Critical incidents can be small in nature and it is important to note that they can be positive events. To create a critical incident, an event or incident must first be observed, described, and then explained in context as to why it occurred. To transform the incident into a critical one, the incident must then be analysed and reflected upon as to the meaning, within the context of the literature (Tripp, 2012).

Analysis of critical incidents in the classroom enable teachers and educational practitioners to reflect and apply their expertise in teaching practice to allow them to become diagnostic experts. This allows teachers to conduct their own research and use their professional judgement and improving their own educational methods in the classroom (Tripp, 2012).

This critical evaluation aims to analyse an incident that occurred in the classroom of an experienced teacher. The criticality of the incident is explored by a silent observer in the classroom, a student teacher. The meaning behind the incident will be analysed and the factors that may have impacted the decision making in the classroom at said observed incident will be discussed.

The essay will first seek to understand the importance of reflection in the role of the teacher, and how this has changed with the curriculum. The critical incident will then be discussed in detail alongside details of the location of the observed incident. The underpinnings of the incident will then be discussed in a literature review. This will then be followed by a reflection and evaluation of the critical incident.

The Role of Critical Reflection

Having fallen short in PISA (Programme for International Student Assessment) testing compared to other UK countries, the Welsh government called for a radical reform of the education system mediated through a change to the curriculum (Power *et al.*, 2020). Curriculum reform has started to take place since the publication of "Successful Futures" by Donaldson in 2015, who detailed suggested proposals for the reform. Successful Futures aimed to give more autonomy to schools and teachers, allowing pioneer schools to develop the new curriculum, alongside a paradigm shift in learning, teaching, and the purpose of the school environment (Donaldson, 2015). As part of the new curriculum, professional learning and development is expected to be undertaken by teachers, of which, reflective practice plays an important role (Power *et al.*, 2020).

Reflective practice can be described as a critical analysis of teaching methods that allow teachers to improve and gain insight into their own professional practice, whilst being able to relate situations back to educational theory (Farrell *et al.*, 2018; Finlay, 2008). Dewey, a well-known scholar in the educational field, set out the scaffolding for the importance of reflection as a systematic method to broaden understanding and learning (Rodgers, 2002). Since Dewey, various reflective models such as Kolb, Gibbs and Brookfield, have been developed to achieve deeper understanding of teaching and learning practices (Finlay, 2008).

Alongside curriculum reform, the Initial Teacher Education (ITE) training for trainee teachers in Wales has also been under reform following a review by Tabberer (2013). Tabberer described the Welsh

teacher education provision as “adequate and no better” (Tabberer, 2013 p14). In a report for the Welsh government, Furlong (2015) states that one of the issues surrounding Teacher training in Wales was that there was no emphasis on the importance of reflective practice, and therefore newly qualified teachers were not equipped to achieve the best for themselves or the pupils. As reflective practice was to be an integral part of the new curriculum for Wales, teacher education as it stood would not be able to provide the foundations for new teachers to be able to deliver the new curriculum (Furlong, 2015). Taking the review into account, the Welsh government set out a new set of professional standards that ensured reflective practice played a prominent role in the development of newly trained teachers (Evans, 2022).

Teachers have been leaving the profession in increasing numbers since 2012, with most having been in the role less than five years (Evans, 2022). Due to the added pressure of the curriculum changes, Evans (2022) claims that a culture shift is needed to allow teachers to be supported and aided by government policy, such as the Government's publication of the “National Approach to Professional Learning”. With a heavy emphasis on the importance of reflection in teaching, professional development should be seen to develop alongside the curriculum (Evans, 2022; Power *et al.*, 2020).

The role of a teacher in society is fundamental and ever changing. A teacher is expected to fulfil a wide-ranging role within the school, including offering behaviour management, safeguarding and pastoral support, all whilst maintaining their primary role of subject teacher. With these roles alongside curriculum and ITE reforms, the importance of self-reflection and analysis has never been more important.

Observation

School and Class Context

The observations of critical incidents used within this study conform to the British Educational Research Association (BERA) guidelines around ethical research within an educational setting. In accordance with guideline 40, the school, staff and pupils shall remain anonymous throughout to protect their right to privacy (BERA, 2018).

Observations for the critical incidents were held in an English medium Secondary School in Pembrokeshire, West Wales. The school falls under the Pembrokeshire local authority and is one of six English-medium state secondary schools within the local authority. The school is mixed gender and caters for 11-18 year olds. As of 2018, there were 1,167 registered pupils, of which the sixth form accounted for 101 pupils (Estyn, 2019).

Students are from a predominantly white British background. English is the first language for most pupils with only a small cohort of students speaking Welsh as a first language (Estyn, 2019). 6% of pupils identify as being from an ethnic minority which is almost half the national average, but slightly above the average for schools in the local authority (My Local School, 2021).

Approximately 26% of pupils are eligible for free school meals which is much higher than the national average in Wales of around 16% (My Local School, 2021). It must also be noted that 25% of pupils on roll at the school are or were living within one of the top 20% most deprived locations in Wales (Estyn, 2018).

The school has a high number of students with additional learning needs, at 44% in 2018, this was almost twice the national average. Over three percent of pupils have been issued a statement of special educational needs. Again, this is over the national average of approximately 2.2% (Estyn, 2019).

It is important to note that these number may have changed due to the impact of the Covid pandemic. The school has a Learning Resource Centre, one of only two in Pembrokeshire that caters for children with ASC and complex needs (Estyn, 2019; Pembrokeshire County Council, 2022). The school encourages learners to access mainstream education whilst ensuring individual needs are met (Pembrokeshire County Council, 2022).

The subjects of the critical incident were in an undifferentiated Year 7 Science class. Observations occurred on Monday 03/10/22 in the final lesson of the day, in the early weeks of the autumn term. It may be important to note that students in this year group are following the new Curriculum for Wales.

Critical Incident

“The students had just completed their first full practical session which involved heating water with a Bunsen burner and measuring the time it took to reach boiling point. The class were excitable and becoming higher in energy, which could become dangerous with boiling water and hot equipment on the desks. Responding to this, the class teacher advised the students that they were going to answer questions about the practical using a new name generator app, whereby they could score ‘Class chart’ points. The students became focused on the questions about to be asked and were all anticipating their names being called. All the students whose names came up answered or attempted to answer the question and peers were encouraged to help if needed. Students were awarded points for participation. The students actively wanted to be chosen and were visibly disappointed when they weren’t.”

The escalating excitement of the students meant that the teacher had to intervene to calm the students down to ensure that no accidents occurred. Sensible behaviour is important in a science lab for the safety of the students and staff. By grabbing the student’s attention with a new app, all focus was directed at the teacher, ensuring the pupils were listening and acting safely within the lab. By using the random name generator, the students had to be engaged in case they were chosen to answer the question. The students therefore had to think about what answers they may give and be sure that another student hadn’t already given that answer. The assessment for learning (AFL) method allowed students to recall what they had learnt from the practical session and be able to explain and apply it to the context of the questioning. It allowed the students to interpret data that they had gathered, an important skill to have in science! The fact that the students wanted to be chosen and involved in answering the questions highlighted their engagement with the lesson as well as their desire to do well and show how much they have learnt.

I have chosen to talk about this critical incident as I feel that it is reflective of Donaldson’s Four purposes. The willingness of the students to answer questions on what they have been learning about, enjoying challenges and being able to understand and communicate their findings means that they are meeting the aim of becoming ‘ambitious, capable learners’. The use of AFL at the end of the practical ensured students remained focused as well knowledgeable on why they conducted the experiment. The AFL allowed the students to think deeper about their understanding. The use of technology to pique the students interests and direct their attention to the teacher highlights how engagement can be achieved from students when digital technologies are implemented in the classroom.

Literature review

The use of Assessment for Learning to Deepen Understanding in Science

Formative assessment is an important tool in education that allows for understanding and improvement, resulting in increases in student achievement (Black & Wiliam, 1998). Assessment for learning (AFL) is a formative assessment technique that involves evaluation of pupil progress and understanding throughout the learning process rather than at the end, allowing feedback and adjustment, to target the learning for the learners (Kippers *et al.*, 2018; Wiliam, 2011). AFL is important in educational practice as it enables teachers to gain insight into the students position in the classroom and can allow the teacher to aid the student to unlock their potential as per Vygotsky's Zone of Proximal Development (Kippers *et al.*, 2018; Gredler, 2012). Strong correlations in pupil achievement have been seen in students where formative assessment was implemented by class teachers (Andersson & Palm, 2017; Black & Wiliam, 1998).

Historical focus of summative testing in the discipline of science has resulted in students' ability to pass exams yet be incapable of deeper critical engagement and understanding (Chetcuti & Cutajar, 2014). AFL is an important tool in developing deeper understanding of a topic and studies suggest it should be regularly implemented in the science classroom to check for understanding and misconceptions (Donaldson, 2015; Kippers *et al.*, 2018). Implementation of AFL in the classroom can include regular questioning techniques, feedback, self, and peer assessments (Black & Wiliam, 1998).

Harlen (2007) suggests that self-assessment allows students to formulate their own learning and to deepen their critical thinking skills. To be active participants of their own learning, pupils should use meta-cognitive skills, allowing them to set goals so they can understand where they are in their own learning and where they need to be (Black & Harrison, 2001). Zepeda *et al.* (2015) investigated the use of using self-assessment through developing meta-cognitive thinking skills in a secondary science class. The study concluded that students who had been introduced to self-assessment methods had achieved better performance on testing and self-guided study tasks compared to students that had instead been provided with more practice time for learning the theory. Kirby and Downs (2007) however conversely found that the cohort of students studying Earth Science, tested using self-assessment, and were not able to accurately self-assess, when compared to teacher assessment. In this instance, self-assessment therefore had no significant effect on their ability in assessed essays.

Peer assessment is another form of AFL and relies upon students assessing and making corrections or suggestions to their peer's work (Harlen, 2007). Peer assessment works on the assumption that students will be fair markers, whilst deepening their own understanding of the topic and marking criteria, allowing them to learn in a co-constructivist way (Harrison & Harlen, 2008; Hovardas *et al.*, 2014). When examining the use of peer assessment to teach Earth Sciences using virtual reality programmes, Chang *et al.* (2020) concluded that using peer assessment resulted in better learning achievements as well as critical thinking abilities than using teacher assessment alone. Wang *et al.* (2020) also found the usefulness of implementing peer assessment when teaching scientific concepts to students. However, they noted that the role played in the peer assessment procedure may have a negative impact on the student's confidence, dependent on their ability in the subject. This is an important consideration when thinking about the application of peer assessment in classes, particularly those with mixed ability students.

Questioning to check for understanding would seem to be a natural process of learning in science, as per the described critical incident whereby questioning was used to assess pupil understanding of the experiment. Questioning by teachers has been shown to promote deeper understanding and pupil engagement using a constructivist approach (Darong & Niman, 2021). Harrison (2006) suggests that

to allow deeper thinking around scientific topics, questions should be open ended, allowing for exploration and ideas, and can come from both teacher and pupil dialogue. Chin (2006) suggests that implemented correctly, teacher questioning can aid in building conceptual knowledge and understanding of complex topics in science. van Zee *et al.* (2001) analysed the effects of questioning on a pupil's understanding of science, and found that asking questions to allow discourse, in a safe environment, could further students understanding of the topic as well as allow teachers to check pupil progress and understanding. They also noted that effective questioning led to peer feedback and discussion. Open questions may therefore be appropriate to enable pupils to deepen their understanding of scientific concepts.

When implemented appropriately, AFL could effectively encourage students to build upon prior knowledge, address misconceptions and guide the teacher to the next areas of teaching and learning, whilst also captivating and maintaining students' interest in the subject. Further research could guide teachers on how to improve pupil self confidence in topics through the use of AFL methods.

Effects of Technology Use on Student Engagement/ Motivation

Engagement and motivation are somewhat critical in ensuring pupil achievement in schools (Ainley, 2012). Student engagement has typically been defined under three categories: behavioural, emotional and cognitive, but despite the rich academic material around the concept of student engagement, a conclusive definition is yet to be agreed upon (de Rocha Seixas *et al.*, 2016; Fredricks *et al.*, 2004; Parsons & Taylor, 2011). Russell *et al.* (2005) as cited in Ainley (2012) suggests engagement is "a connection between person and activity", contrasting it to motivation which they describe as "the reason for a behaviour". Whilst it is important to distinguish between motivation and engagement within the classroom, the two are somewhat dependent on each other, as a student must be motivated to be engaged yet may not be engaged whilst being motivated (Appleton *et al.*, 2006).

Technology in a classroom setting is being used increasingly and is used for many reasons including research, allowing students to find and present information, and AFL tools, such as the random name generator, and games that help consolidate learning (Macleod *et al.*, 2018). Smart classroom learning environments (SCLE's), whereby digital technologies are integrated into lessons are becoming mandatory in some countries, including Thailand, Australia and Poland (Wang *et al.*, 2022). With the increase in access to technology in the classroom, using it to engage pupils with learning is a must, and is encouraged by Donaldson and the educational reform in Wales (Donaldson, 2015).

Gamification is the concept of adding gaming elements into the classroom to encourage pupil engagement, for example, leader boards, feedback methods and 'Class chart' points (Khan *et al.*, 2017; Legaki *et al.*, 2020; de Rocha Seixas *et al.*, 2016). Various studies have shown the use of gamification in lessons have been effective in increasing student engagement and motivation overall (Hursen and Bas, 2019; Legaki *et al.*, 2020; de Rocha Seixas *et al.*, 2016). de Rocha Seixas *et al.* (2016) used Class Dojo to measure engagement of pupils aged approximately 13-14. The authors tested the engagement of pupils by observation and analysis of badge achievements rewarded to them by the class teacher upon demonstration of engagement within the class. The study concluded that most badges were received by students who went on to have significantly better class performance. It must be noted, however, that the study was conducted using a small cohort of students (<65) within the same school. The class teacher had also remained the same, potentially introducing bias into the experimental method. Using the same gamification platform, Class Dojo, Hursen and Bas (2019) recorded similar results, concluding that student motivation was increased using gamification in science lessons. The researchers also noted that the students spoke positively about the use of the platform, with the majority giving a high satisfaction score in the survey. The study also used very low participant numbers (16) and would therefore benefit from being scaled up to allow for more conclusive results.

Interestingly, Attali and Ariela-Attali (2015) concluded that, when using an online mathematical test, whereby students were rewarded points for both accuracy and speed, test subjects opted for speed over accuracy. This was true for both school pupils and adults. In consideration of this, gamification may result in engagement for competitive purposes rather than learning. Further analysis is therefore required on how to implement gamification effectively in school to ensure the purpose of the task can be met.

Digital game-based learning (DGBL) is another method of using technology to increase pupil engagement, whereby students play games to further their learning (Khan *et al.*, 2017). Legaki *et al.* (2020) measured engagement using a test taken by students following a lecture, after using a game used to consolidate learning. The authors found that students did better overall when using the gaming method which highlighted engagement with the game. However, the study found that when students had to use the traditional learning method of reading up on the subject coupled with gaming, they performed significantly better overall. Whilst it is important to note that the students in this study were university students, and therefore a higher level of engagement is expected, the use of a large sample size (365) shows promising results. Using a sample of 13-15 year old students however, Khan *et al.* (2017) found that whilst student engagement increased overall, when using a DGBL approach in a science lesson, to further consolidate knowledge on the topic that had just been taught, students did not achieve the learning outcomes of the lesson and did comparatively worse than those taught using traditional rote methods. This suggests that whilst DGBL can be used to effectively engage students, the impact on the student learning must be well thought out in the design of the game.

To conclude, despite the increased use of technology in the learning environment, there is not yet a conclusive agreement on the positive effects. From the literature research, technology seems to engage students, but more studies are needed to define how to effectively implement technology in lessons to achieve the desired learning outcomes.

Reflection, Evaluation, and the Next Steps

The critical incident I have discussed in this essay has highlighted the importance of student engagement in secondary science lessons. To fulfil the aims of the Four Purposes set out by Donaldson (2015), I have seen how nuanced teacher behaviour can influence that of pupils, ensuring classroom control whilst encouraging and furthering learning and understanding through AFL techniques.

The critical incident demonstrated dual use of questioning and technology to pique the interest of the students after a practical science lesson. The incident was chosen to be critically analysed by the change in behaviour witnessed after the students were aware of the next task. Instead of remaining in an excited state that the practical had created in them, the students were immediately engaged with the teacher. At the time of the incident, I was surprised by the behaviour shift observed in the students, and as it was one of my first times in a science lesson, I had presumed this was typical behaviour for the class and students in general.

After spending more time at the school and in the class, I have had the chance to reflect upon my initial, somewhat naive assumptions about the behaviour in class. Whilst they are generally an engaged class who are excited about science, their attention is not always drawn straight away and with such enthusiasm. After witnessing the same teacher using similar techniques with other classes, and witnessing the same class with other teachers, I came to understand and realise that the teacher's knowledge and skills had ensured the class were focussed and safe. I was also able to understand the importance of being able to keep control of a class when using equipment that could be potentially hazardous.

After reflecting upon the incident, I was able to narrow down the turning point of the lesson and what I thought had captured the student's interest at that time. When analysing the incident, I came to realise the importance of the use of technology that was novel to the children, with the prospect of scoring 'Class Chart' points. Due to the impact the technology and prospect of points had on the children, I examined how technology can influence pupil engagement within the classroom. Although there was no clear consensus on the effectiveness of technology in the classroom, research on the topic is still relatively in its infancy, and currently most research seems to view it favourably. Another important point to note is that students are wholly in favour of technology usage in the classroom, and student enjoyment should generally promote engagement. Being in the fortunate position of seeing the focus and excitement about the questioning that the pupils exhibited, prompted me to research how AFL can be used to deepen understanding in science. I discovered that the use of AFL in the science classroom can have a profound effect on student learning, particularly when peer assessment and questioning techniques are used.

When considering my own practice in the classroom, I feel more confident in being able to deliver effective methods of AFL. Based on the research behind AFL usage and the different ways of delivering it for student benefit in science lessons, I have evolved a deeper understanding of the importance of AFL in furthering student learning. Going forward, I will ensure that methods of AFL are integrated appropriately and usefully into every lesson, making considerations for what methods I am using and why. I would like to create a safe learning environment for students so they feel confident in their abilities to engage with AFL. I will also ensure that I set firm goals of what I, as a trainee teacher, want the outcome of the AFL to be.

The critical incident has made me consider the way that I could use technology in the classroom to the benefit of the pupil. Seeing how effective gamification methods can be in engaging pupils with learning, when used appropriately in the classroom, has given me more confidence in implementing them in my lessons. However, the research has also made me consider how to use technology methods appropriately, without detracting from the learning objectives or indeed utilising technology for the sake of it. I will ensure that whenever I make use of gamification or DGBL methods, that I use it effectively and with clear aims of what I want the students to get out of this. I also feel that technology is a suitable method to garner attention when I undertake practical sessions in the classroom, having seen this method used effectively as well as understanding the research behind the use within the field of student engagement.

Overall, following deep reflection, I can see the benefit of implementing both AFL and technology to my lessons, being mindful of 'why' and 'when' I am using them.

Conclusion:

The role of the teacher is dynamic and ever changing. Reflective practice encourages teachers to become diagnostic practitioners, allowing deeper understanding of the reasons behind the everyday events that occur in the classroom. Curriculum reform in Wales has provided a new challenge for teachers, yet with the skills of reflective practice, teacher development can occur alongside the curriculum.

This essay has identified a classroom incident and critically analysed the meaning behind it. Looking deeper into the reasons why an experienced classroom teacher utilised methods of AFL and technology when they did has led to extensive research of the theory behind the practice. Understanding the implications for using AFL in science lessons has highlighted when and how to implement these appropriately into lessons. The use of gamification and DGBL in lessons has shown

that embracing the new technological era in the classroom can have far reaching consequences on student engagement.

Deep reflection of the incident has allowed new goals to be set and taken forward into the classroom. The skills learnt will be utilised and applied to other situations within the school environment. Overall, a new reflective mindset has been developed, and is one that will remain throughout my ITE training and future career as a classroom teacher.

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