

An Exploration of the Concept of Wait Times as a Teaching Method and Solution to the Cognitive Challenges of Answering Questions, Focusing on a Case Study of an Observed Critical Incident

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Introduction

Critical incident theory, developed by David Tripp (2011), is a technique used by educational practitioners to reflect upon, analyse, and evaluate their work. The practitioner chooses an event or moment in the classroom which seems significant to them and attempts to understand the reasoning behind this event, using their own perceptions and any literature or research on the subject. According to Tripp (2011), critical incidents are not always obvious and can seem trivial at first glance. It is the choice of the practitioner reflecting upon the incident, and the further understanding gained by exploring the incident, which gives it significance. In this essay, I will outline the impact of educators on their learners and the importance of critical reflection. I will then explore the cognitive challenges of answering questions posed by the classroom teacher using Sweller's Cognitive Load Theory (1998), Piaget's theory of Assimilation and Accommodation (1952), and a critical incident observed by myself in a primary school classroom as a case study. I will explore the use of wait times, researched by Mary Budd Rowe (1969), as a solution to these challenges. Finally, I will evaluate my findings to suggest appropriate teaching methods in the classroom.

The Role of Critical Reflection

Critical reflection is important because it allows educators to constantly improve upon their practice. As educators, we have an immense impact on our learners. This is especially true in a primary school setting, where the learners are very young and spend a large portion of their time with the classroom teacher. The impact can be positive or negative and is often lasting (Jiang et al., 2019). It is therefore only fitting that we take seriously the effect we have on our learners and attempt to make our lasting impact as positive as possible. Critical reflection allows us to notice what actions we have taken in the classroom, and how they have impacted on our learners. It allows us to learn from mistakes and shape our practice, and to think about what we could do differently in the future. Regular critical reflection also gives us the opportunity to notice any patterns we might have unconsciously learned from parental figures or our own educators growing up.

The Five Ecological Systems model, developed by Urie Bronfenbrenner (2000), outlines how a child's environment impacts upon their growth and learning. Bronfenbrenner organised the child's environment into five systems: the microsystem, mesosystem, exosystem, macrosystem, and chronosystem, with the microsystem having the most impact upon the child, and the chronosystem having the least. However, each system is contained within the next and the systems can have influence over one other.

The microsystem represents the people who are directly connected to the child, and with whom the child will interact on a regular basis. A child's microsystem could include parents, teachers, siblings, friends, and school peers. The relationships within a microsystem are "bi-directional", meaning that the people within the microsystem influence the child's behaviour, but the child's behaviour, in turn, can have an effect on the behaviour of the people in the microsystem (Guy-Evans, 2023).

The mesosystem represents the interactions between people in a child's microsystem. For example, a teacher's relationship with the parents, or the parents' relationship with each other. These relationships have an impact upon the child. For example, whether the parents have a positive, communicative relationship with a child's teacher or not will have an impact on the child's growth and learning.

The exosystem represents the social structures that the child is not directly involved in, but which surround the people in the child's microsystem. This could be a parent's workplace, a sibling's friends, or a teacher's family. These systems do not directly affect the child, but they do have an influence on the behaviour of the people in the child's microsystem, which will, in turn, have its impact.

The macrosystem represents the wider cultural structures in which the child is raised. This could include the economic state of the country or area in which the child is raised, values and ideologies of the culture surrounding the child, values and ideologies of religions surrounding the child, and attitudes towards minorities in the area in which the child is raised.

The chronosystem represents all the environmental changes which happen throughout the life of the child. It takes into account that systems and environments will change throughout the course of the child's life. For example, the relationship between the child's parents may be affected by divorce, the people in the child's exosystem and even microsystem could change due to moving house, and the economic state or values and ideologies of the country in which the child was raised may change due to a new political system.

Using this model, it is clear to see that teachers and educators in a primary school setting are in a child's microsystem, therefore having a great deal of influence over the child's growth and learning. With this knowledge in mind, it is of vital importance that educators reflect critically on their work, in order to have a positive lasting effect on the learner. There are many different frameworks on critical reflection outlined by educational practitioners. In this essay, I will briefly outline the reflective theories of Kolb (1984), Gibbs (1988), Schön (1983), and Brookfield (1995).

The Learning Cycle, developed by David Kolb (1984), is a model for reflecting, analysing, and learning from experiences. There are four stages to the Learning Cycle: concrete experience, reflective observation, abstract conceptualisation, and active experimentation. Concrete experience refers to the experience itself. Reflective observation involves reflecting on that experience. Abstract conceptualisation involves learning from that experience. Active experimentation involves putting the learned knowledge into practice. This is a clear and useful theory. The four stages encourage the educator to acknowledge that reflection is a layered process, not a singular quick action.

In Graham Gibbs' Reflective Cycle (1998), there are six reflective stages rather than four. Description of the experience itself, description of thoughts and feelings about the experience, evaluation of your response to the experience (what went well, what could be improved upon?), analysis to make sense of the experience (using relevant literature and theories), conclusions about what you have learned, and action plan for the future. The Reflective Cycle serves as a development from Kolb's Theory. The structure remains clear but the model is more detailed and specific, making it easier to use in practice.

Donald Schön's theory of reflective practice (1983) is structured into two categories: reflection in action (reflecting at the time of the event) and reflection on action (thinking about the event after it has occurred). Reflection in action involves evaluating the situation in real time and deciding how to act at the time of the event. Reflection on action involves reflecting on what has happened, thinking about what went well and what you would do differently if faced with the same challenge in the future. Schön also outlines a process called "double-loop learning." This involves challenging the underpinning structures and restrictions on the situation rather than attempting to solve the problem within the confines of the situation. Challenging a school's ethos or even the wider curriculum and its effect on situations in the classroom can be thought of as an example of double-loop learning. While Schön's model is not as clearly structured as Gibbs', or Kolb's, it touches on some important points frequently glossed over by other theories: the power of being present and reflecting in the moment, and the importance of challenging wider structures in order to see a bigger picture.

The Four Lenses Model, developed by Stephen Brookfield (1995), encourages educators to see themselves and their practice through the perspectives of others, in order to be able to better understand themselves, their practice, their strengths and weaknesses, and their areas for improvement. The first lens, the autobiographical lens, encourages practitioners to reflect on their past and current experiences which might have an effect on their teaching. The second lens, the client lens, encourages practitioners to see themselves through the eyes of their students. This could include asking for feedback from students to better understand their experiences. The third lens, the co-worker lens, encourages practitioners to seek feedback and advice from colleagues. The fourth and final lens, the theoretical lens, encourages practitioners to engage with relevant literature to deepen their understanding and discover new methods. The Four Lenses is a helpful model which encourages educators to practice empathy, to broaden their horizons and gather information about their practice from more than one source.

The Critical Incident

The critical incident in question took place in a Welsh medium primary school located in the village of Llansamlet. As of the 2018 Estyn report, there are 482 pupils in the school, with ages ranging from 3 to 11 years old. There are 17 classes in the school, and this particular incident took place in a class of year 3 students. The teacher was giving a lesson about healthy eating, the eat-well plate, and how to create a healthy menu. She was stood in front of the class while the students were sat on the floor. The lesson was a mixture of explaining the information verbally to the students with the aid of a power point, asking questions to the students, and an activity in which the students would come up one by one and attempt to place a plastic item of food onto the correct section of the eat-well plate. When the teacher asked a question, students would raise their hands and wait to be called upon to answer. The teacher moved from pupil to pupil quickly, and a couple of times, called on the next pupil to answer before the first had finished speaking. Not long afterwards Child A called the teacher and started to ask a question before pausing and changing her mind, saying "never mind." The teacher then moved on and the question was not attempted again.

From this moment, it is clear to see the effect of not giving learners sufficient time to process information and form their own ideas and questions. By moving quickly from pupil to pupil, and not giving pupils time to finish speaking, the teacher had created an environment where the students were more likely to believe that they could not take too much time to speak without being interrupted. As a result, when Child A was unsure about the material and wanted to ask a question, she did not feel able to finish her question for fear of taking too long. This has an impact on Child A's learning, certainly for this lesson and perhaps even longer term, because she does not feel comfortable to ask questions, therefore limiting her ability to test her knowledge, deepen her understanding, and expand her learning. In terms of the Welsh Curriculum (2023), this affects her fulfilment of the four purposes, specifically to become an 'ambitious, capable learner,' and a 'healthy, confident individual,' by limiting her opportunities for expanding her learning, and not creating an environment where she feels that she can confidently contribute her ideas.

Literature Review

Cognitive Load Theory, formulated by John Sweller (1998), outlines the cognitive effort required to process and understand information. According to Sweller, there are three different forms of cognitive load. Intrinsic cognitive load refers to the difficulty of the information itself, the complexity and the barriers to understanding inherent in the information. Extraneous cognitive load refers to the additional difficulty in processing and understanding the information created by the way in which the material is presented. For example, if the information is presented on a whiteboard in a long, disorganised paragraph, using overly complex language, to be read in a loud classroom, this could add extraneous cognitive load to the material. The third and final form of cognitive load, germane cognitive

load, outlines anything that can be done to aid the processing and understanding of information. Germane cognitive load could include diagrams, visual aids, activities, clear and well-structured verbal explanations, answers to questions etc. Interestingly, extraneous and germane cognitive loads can vary greatly in learners, even when performing the very same task in the same classroom. This is due to the learners having different learning styles. While a noisy classroom might add extraneous cognitive load to one student, the same noise might enable another student to discuss the topic with their peers, therefore rendering the noise as germane cognitive load for them.

According to Jean Piaget (1952), a schema is a body of information which is collected and used to make sense of something in the world. Children are constantly developing schemas because they are constantly coming into contact with new information. When a child first starts building a schema, they experience disequilibrium, as they do not fully understand, and are in a state of uncertainty. For example, the first time a child sees a dog, they will experience disequilibrium as they have never seen a dog before and don't understand what it is. With the help of a parent explaining that this is a dog, the child will build a body of information surrounding dogs: a schema. A child's schema about dogs might include the information: has four legs, is furry, has a tail, barks. Once the child has processed this information, they return to a state of equilibrium, as they now understand what a dog is. Assimilation takes place when adjusting a pre-existing schema due to encountering additional information. For example, the second time a child sees a dog, the dog might jump up on the child, lick them, and wag its tail. The child's schema about dogs did not previously include jumping up, licking, or tail wagging. The child again enters a state of disequilibrium as they assimilate this new information. They might seek reassurance from the parent that this is a dog. If the parents affirms that this is the case, the child builds their schema to include: jumps up, licks, wags its tail. The child returns to a state of equilibrium. Accommodation takes place when a child builds a new schema based on a pre-existing schema. For example, the first time a child sees a cat, they may initially mistake it for a dog as it possesses some of the same traits. However, the cat does not bark. It does not jump up or wag its tail. Instead, it meows. Again, the child enters a state of disequilibrium, as this does not match their pre-existing schema of dogs. The child may seek reassurance from the parent that this is a dog. The parent explains that this is not a dog. It is a cat. The child builds a new schema about cats which includes meowing and returns to a state of equilibrium.

Through an understanding of Sweller's Cognitive Load Theory and Piaget's theory of Assimilation and Accommodation, it is clear to see that the process of learning, particularly for a young child, is complex and challenging. In the case of this specific critical incident, the process of answering a question posed by the teacher is multi-layered and should not be underestimated. Firstly, the learner must receive the information. This could be through verbal explanation, visual aids, written information etc. Note that the form of receiving this information could present either extraneous or germane cognitive load for the learner, depending on their learning style. If extraneous cognitive load is presented at the level of receiving the information, the learner will have more difficulty in processing and understanding the information. Secondly, the learner must process and understand the information. This may involve the building of new schemas, assimilation to adapt pre-

existing schemas, or accommodation to form new schemas from pre-existing ones. Next, in order to answer a question posed by the teacher, the learner must re-form their understanding of the material into their own words, and into coherent sentences. In the case of some questions, this reformation of information even demands the learner to think critically and to form their own opinions about the material. Lastly, the learner must build the courage to speak about their understanding and opinions in front of the class. For some learners, building this courage presents an immense amount of extraneous cognitive load, as any time and effort spent on dealing with the anxiety of being judged by the teacher or their peers leaves less time and effort for processing and understanding the material.

The findings of Mary Budd Rowe (1969) pose a solution to this challenge: wait time. Rowe researched the benefits of intentional pausing for three to five seconds at two distinct points in the questioning process. First, after the question has been posed but before a student has been called upon to answer (wait time 1), and again, after the student has given their answer but before giving feedback (wait time 2). Both wait times have been proven to significantly benefit both teacher and students. Students give longer, more in-depth answers which show greater understanding when given time to think. Wait times have also been linked to the number of students who will volunteer to answer a question. If given time to think, students who take longer to cognitively process will be more likely to answer, rather than run out of time or give up before they have begun to form an answer. Moreover, all students are reported to answer with more confidence, engage with each other's comments, and ask more questions when given time to think. Teachers also benefit from wait times. Pausing after asking a question and before answering gives the teacher time to think themselves. They will therefore be able to give more well-thought-out responses, and ask more meaningful follow-up questions, which in turn, will improve the students' learning (Rowe, 1986; Tobin, 1987, cited in Walsh and Sattes, 2015).

Reflection and Evaluation of Teaching and Learning Methods

Having learned that a student's process for answering questions is complex and challenging, and that wait times significantly benefit the learning of the students, it would seem that the way forward is clear. However, there are challenges. Although they have been proven to significantly benefit students' learning, many teachers do not regularly practice wait times. According to Walsh and Sattes (2015), teachers struggle to use wait times for three main reasons: they feel that they don't have time to wait due to the pressures of the curriculum; they fear that by waiting they risk giving up control of the classroom by students becoming disengaged; the normalisation of fast-paced work in today's society makes silence seem uncomfortable.

Luckily, the first challenge has been made a little easier by introducing a new Curriculum for Wales (2023), which focusses on the progress of each individual learner, rather than racing to cover content. However, a different challenge is then posed in the form of differentiation. Even if teachers take the time to wait for students to answer, some students in the class are eager and capable, and want to move on to the next activity, while some do not yet

understand the topic. In these situations, the teacher can take advantage of this and encourage the more capable students to help the students who are struggling. However, this must be done with tact and sensitivity. The weaker students may find it very easy to put themselves down or may be embarrassed or frustrated. Conversely, the more capable students may be tempted to feel superior and may even belittle the weaker students. Both these reactions are often learned behaviour from parental figures, family, friends, or wider society. It is important to firmly establish that both students hold equal value, and to encourage students to help each other without judgement.

To solve the second and third challenge, the practices, expectations, and atmosphere of the classroom as a whole must be taken into account. One cannot start implementing wait times in a classroom unaccustomed to silences, with learned behaviours of only wanting to answer 'correctly' and making fun of students who answer 'incorrectly.' To transform this classroom into a classroom which can benefit from wait times, firstly, clear expectations must be set out by the teacher about the aim of classroom discussion. The teacher must make it clear that they are not necessarily looking for 'right' answers. They are looking for each student to be engaged, curious, inquisitive, and open to learning. They are also looking for students to learn from each other without judgement. The teacher must be clear that they will hold all students accountable for answering (not only the ones who volunteer) and explain that the wait times are to be used by all students to think about the question that has been posed, the answers the other students have given, and the student's own thoughts about the matter. Secondly, the teacher must stay true to the expectations and principles they have set out. They must call on any and all students to answer. They must welcome 'incorrect' answers without judgement and use them as opportunities for further learning by giving the answering student time to reflect upon their answer, asking meaningful follow-up questions which encourage the student to think critically about their answer, or revisiting the material in cases where the teacher evaluates that the class has not understood the topic. They must encourage peer learning by asking other students to respond to an initial student's answer and allowing students to engage in free discussion. All these things they must do consistently, to build an atmosphere of acceptance, curiosity, and togetherness.

Conclusion

From exploring the concept of wait times as a teaching method and solution to the cognitive challenges of answering questions posed by the classroom teacher, it has become clear to me that implementing the teaching method alone is not enough. The implementation of a new teaching method calls into question the practices and atmosphere of the classroom as a whole. Implementing wait times in a classroom where previous learned behaviours do not support such a teaching method will not be nearly as effective as implementing wait times in a classroom where they do. It is therefore prudent to reflect upon and evaluate the atmosphere of the classroom as a whole, as well as any unconsciously learned behaviours or patterns that the teacher or students may have. This may also include evaluating the larger structures of the whole school, the curriculum, and any wider societal views. This approach clearly draws upon the theories of Schön (1983) and Bronfenbrenner (2000) as outlined in

the section on the role of critical reflection. In future practice, I will aim to remain present and receptive in the classroom as well as in wider school life, in order to receive as clear a picture as possible of the expectations and learned behaviours, the positives and drawbacks of the current classroom practices. I will regularly note these observations and attempt to evaluate the reasoning behind them. I will aim to consistently engage with feedback from students, colleagues and mentors, as well as deepen my understanding through the study of literature and regular self-reflection. Through all of these methods, I will attempt to form an understanding of how to create a classroom with a positive and supportive environment for learning. As well as this, I will continue to consistently evaluate my own practice and engage with feedback.

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Appendices

Appendix A

Location: Welsh medium primary school located in the village of Llansamlet.

Number of Pupils: 482 pupils in the school.

Age Range: 3 to 11 years old.

Number of Classes: 17 classes in the school

Latest Available Information on the School: 2018 Estyn report.

Class: Year 3

What Happened?

The teacher was giving a lesson about healthy eating, the eat-well plate, and how to create a healthy menu. She was stood in front of the class while the students were sat on the floor. The lesson was a mixture of explaining the information verbally to the students with the aid of a power point, asking questions to the students, and an activity in which the students would come up one by one and attempt to place a plastic item of food onto the correct section of the eat-well plate.

When the teacher asked a question, students would raise their hands and wait to be called upon to answer. The teacher moved from pupil to pupil quickly, and a couple of times, called on the next pupil to answer before the first had finished speaking. Not long afterwards Child A called the teacher and started to ask a question before pausing and changing her mind, saying “never mind.” The teacher then moved on and the question was not attempted again.