

Overview

09 May 2020 17:45

Student Name: Simon Andebrhan

Student Number: 0450040

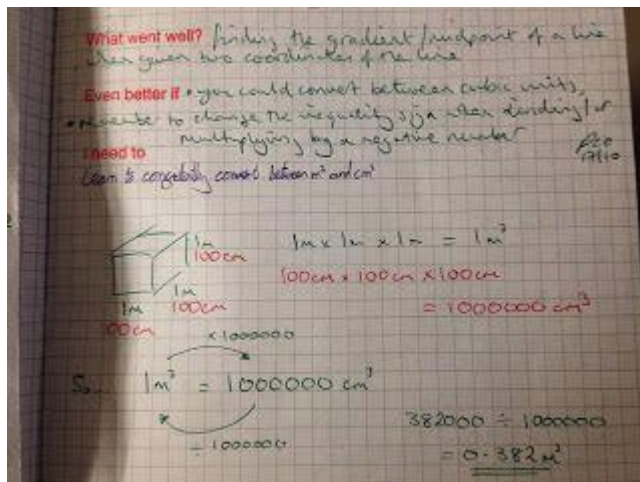
Assignment Title: A portfolio which illustrates a critical reflection of progress made on the planning and implementation of three pedagogical principles.

Pathway: Secondary PGCE

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Assessment for learning

09 May 2020 17:51



Example 1: Assessment for learning – feedback and response

Within my own practice, the use of prompt feedback works effectively; where learners are offered clarity on their progress they are more able to adapt and improve, sometimes with support, or to continue, challenge and extend their learning. More formal feedback is offered in learners' books and, though not as immediate as verbal feedback, offers valuable opportunities to engage in a productive narrative. Where it is argued that feedback is 'like bottles thrown into the sea' in that it may not reach or impact upon its intended recipient (Perrenoud, 1998), a reciprocal approach to feedback can go some way to remedying such concerns. My own practice allows opportunities for learners to respond to feedback interventions, addressing the notion that feedback can only be effective where there are efforts to close a gap in knowledge (Wiliam, 2011).

Starter

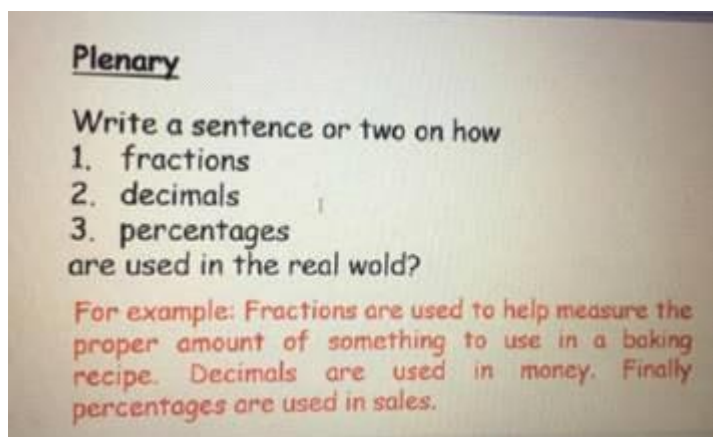
Complete this table without a calculator!

	10%	50%	25%	15%
£16	£1.60	£8	£4	£2.40
£22	£2.20	£11	£5.50	£3.30
£70	£7	£35	£17.50	£10.50
£5.40	£0.54	£2.70	£1.35	£0.81
£25.80	£2.58	£12.90	£6.45	£3.87
£80.40	£8.04	£40.20	£20.10	£12.06

Example 2: Assessment for Learning – Starter Activity

Starter activities of this nature offer opportunities for learners to recall and revisit prior learning, and for myself as the teacher to assess their initial understandings. However, when implemented in a considered way and where a dialogue is maintained about how the starter activity links to the learning objective, it has been possible to foster a deeper understanding of how concepts are interlinked in mathematics and how the foundations of learning feed into the constructivist view of knowledge acquisition.

Within my own personal practice, plenaries are used as a means of giving learners the opportunity to look back at what they have learnt and use this to create their own context for learning and development.



Example 3: Assessment for Learning – Plenary

Where a plenary should empower children to form connections in their own learning, reinforcing concepts by adding context and allowing for discussion and analysis (Bartlett, 2015), the plenaries implemented have resulted in relative success. The learners are able to use the plenary activity as a stimulus for discussion and often this discussion is revealing of misconceptions and misunderstandings, which can be addressed in a timely manner. It has allowed for more detailed, ongoing assessment of understanding; which is exactly what assessment for learning should strive to achieve. Using this method, learners can reflect and identify the gaps in their understanding and be encouraged to identify areas that require improvement or further challenge. Additionally, this example is one which could be applied to Bloom's Taxonomy which is a method of grouping reasoning skills in order to develop higher order thinking skills. Bloom's Taxonomy consists of six levels through which learners should progress in order to reach a transformative learning experience: knowledge, comprehension, application, analysis, synthesis and evaluation (Bloom, 1956). Upon reflection, it would seem that the plenary above goes beyond the knowledge and comprehension stage yet stalls at the application phase as it requires little comparative analysis which could help students in recognising patterns and applying learnt skills across contexts. Were I to repeat such an activity, instead of using closed questions I would endeavour to facilitate learners' path into the latter stages of the taxonomy by asking open questions which demand increased critical thought and discussion, such as 'why do we learn about fractions, decimals and percentages?'.

Cross-Curriculum Responsibilities, including literacy, numeracy and digital competence

09 May 2020 17:51



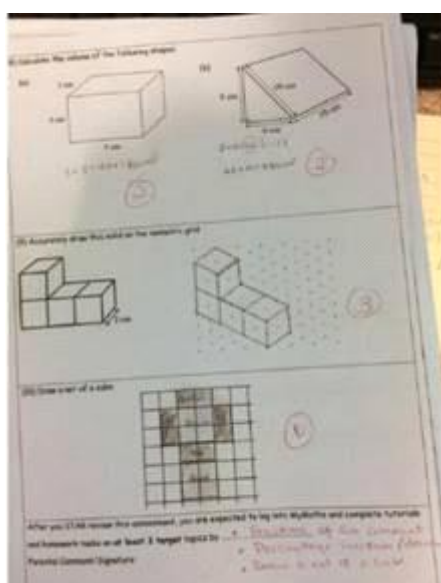
Example 4: Cross Curricular Learning – Literacy

This example demonstrates my own application of a cross-curricular approach to mathematics incorporating literacy. Though much literacy content takes the form of speaking and listening throughout the lesson, this example facilitated literacy development as learners were required to demonstrate reading comprehension of the multi-step worded problems in question. Additionally, they were required to use written English to articulate their reasoning and processes. The impact of cross curricular learning in this instance was significant; in order to effectively communicate their ideas, learners were required to mentally dissect their actions and ensure that each step of the process was documented. They understood that a strong comprehension of the initial question is invaluable and have gone on to apply learnt skills in subsequent lessons, often engaging with literary explanations autonomously.



Example 5: Cross Curricular Learning – Numeracy

Within my own experiences, the use of cross curricular approaches has achieved this outcome; using the example above it was possible for the class to investigate measurement in a scientific way, comparing and collating data on height versus age and examining human development as part of the process. Learners were able to discuss cultural and gender related variation and applied this to their own, personal contexts. In this way, though it remains a means of amalgamating subject matter into a coherent framework for learning, cross curricular approaches can offer further benefits to learners. In addition to linking together subjects, it should also seek to merge and facilitate connections between the experiences of learners in broader contexts (Barnes, 2018). Though a numeracy focus, this activity drew in elements of literacy and PSHE in the discussion element, digital competence in the recording of data and production of accompanying graphs, scientific knowledge of human development and investigative skills and much more.



Example 6: Cross Curricular Learning – Digital Competence

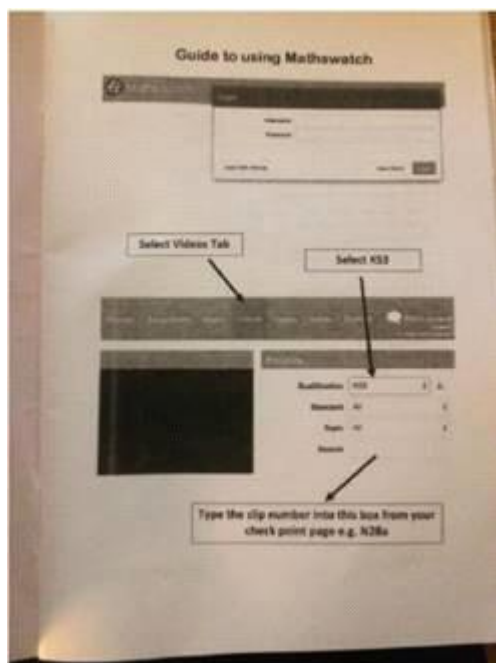
Having reflected upon the above example of an attempt at incorporating digital competence into a mathematics lesson, it seems that this was not sufficient.

Learners were asked to use a digital learning platform, MyMaths, to address three target topics.

What can be understood from this is that simply allowing learners to access pure mathematical content using digital means is not enough. Having experienced the success of the previously discussed sessions, I found that links made by the pupils were superficial by comparison. This served to reiterate the need for strong links to all subjects involved in cross curricular learning (Barnes, 2015) in order for improved outcomes to be realised.

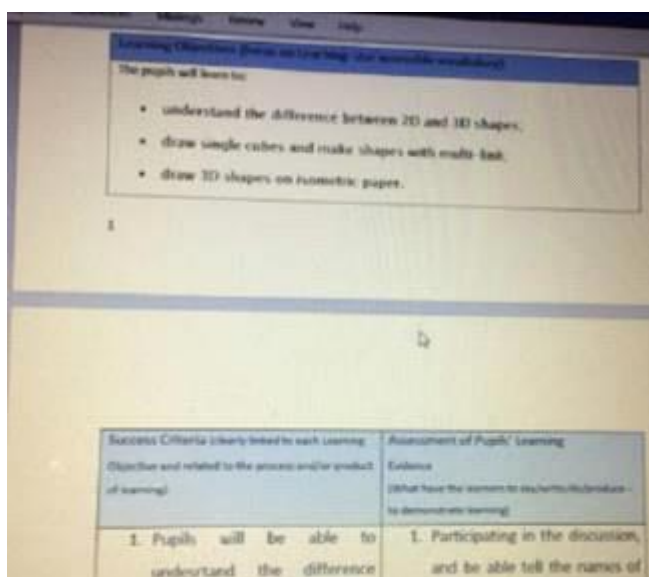
Employing a blend of approaches including direct teaching

09 May 2020 17:52



Example 7: Blended Learning - MathsWatch

MathsWatch is an online maths platform that makes learning accessible at any time using a digital learning platform. My own experiences have demonstrated that learners are both capable and motivated by the use of such platforms as they engage actively with their own learning both with support and autonomously. It was noted that learners who find difficulty with the structure of the formal learning environment were able to demonstrate learning in line with that of their peers, perhaps supporting the notion of blended learning being a means of improving learner flexibility and accessibility (Graham, 2006). Likewise, it allows teachers and learners to reflect and differentiate lessons from learners to learners across a different group of students (Garrison, 2004), something which has been made easier as learner preferences have become more clear. Though MathsWatch is an established platform and its implementation was well-considered, more research on my behalf is necessary in order to consistently improve attempts at coherent blended learning involving digital technologies.



	to demonstrate learning
1. Pupils will be able to understand the difference between the 2D and 3D shapes.	1. Participating in the discussion, and be able to tell the names of different 3D shapes. Also

Example 8: Blended Learning – Direct Teaching

powerpoint.

→ Discussion in pairs about shopping in tesco. Some nice discussions going on around the room.

→ Mason worked out the sum on the board but got confused about the layout.

→ Good point about sharing workings out rather than writing out the answer.

→ Whole class engaged with task just keep an eye on Mason being a distraction to others around him. Good movement around the room.

finished, George

Example 9: Blended Learning - Pair Discussion

The above examples (example 8 and 9) shows a section of planning and pair discussion from a direct teaching component of blended learning from my own practice. Within this traditionally taught session, many instructional techniques were employed as learners engaged in peer discussion, assessment, watched a relevant video in class and presented their findings to one another. Much of the value of direct teaching stems from its ability to explicitly reveal learner attitudes and, within such a model, my own experiences support this view as it was possible to establish students' level of engagement and attempt to address this.

Critical Reflection

09 May 2020 17:52

1. Introduction

Effectiveness of teaching and learning is a much contested and multifaceted concept, though there is relative consensus that it, at least in part, relies on teacher competency of the subject knowledge and the pedagogical principles laid out by experts in the education sector. In an effort to address the latter and enhance teaching and learning processes in Wales, Donaldson (2015) introduced four purposes; to produce healthy, ambitious, visionary and highly inspired citizens of Wales. It is argued that in order to successfully realise these four purposes, high quality and considered pedagogical ideologies are required and Donaldson (2015) suggests twelve such principles that are linked specifically to achieving success within the four purposes. This assignment will focus on three of the twelve pedagogical principles; assessment for learning, cross curricular responsibilities and blended learning. I will critically analyse and evaluate their efficacy with regard to key literature and, furthermore, I will reflect upon how effective the implementation of the three selected principles was in practice, scrutinising both advantages and limitations to their use and making subsequent recommendations.

2. Literature Review

The curriculum system in Wales is going through a major educational transformation to enable learners to grow as confident, motivated and healthy individuals. It is important to note that such reform does not occur within a vacuum and there are a multitude of competing macro and meso level influences which interact to create the policy rhetoric narrative (Donaldson, 2015). Though not the focus of this assignment, such influences can bear impact upon the micro level success of reform initiatives. Though the literature will be explored in detail, my own practice and experiences will be thoughtfully interweaved within the review in order to add specific context to the broader notion of pedagogical principles. As Alexander (2013) quite rightly asserts, the 'pursuit of social and political goals' through the implementation of a single ideology alone is insular at best. As such, complementing the literature with critically discussed, anecdotal examples from practice will serve to deliver the combination of professional knowledge and grounded, collective understanding that is noted to form the foundations of successful educational reform.

Pedagogical principles, where applied flexibly and in context (Donaldson, 2015) are acknowledged as fundamental to securing improved outcomes for pupils and much of the literature supports this view. However, similarly to any significant widespread reform, there is potential for tensions to arise in embedding principles into practice. The following review aims to untangle the literature surrounding the three focus pedagogical principles and will reflect upon the pragmatic considerations for teachers through examination of my own experiences teaching mathematics in Key Stage 3 at a state-funded secondary school in Swansea.

2.1. Assessment for Learning

In an era of high levels of accountability for teachers (Dixson and Worrell, 2016), assessment plays an essential part in the learning process as a means of capturing learners' understanding on concepts related to learning objectives. It is widely acknowledged that assessment can be defined by its process as either summative or formative; with summative assessment characterised by the acquisition and analysis of data to assess understanding (Dixson and Worrell, 2016) and formative assessment defined as ongoing activity by both teachers and students to ascertain understanding and adapt practice accordingly (Black and William, 2010). Though the

two approaches differ significantly in process, it is often the case that they are used in conjunction as formative assessment is applied as a precursor to summative testing at the end of a unit, for example. Given the informality and 'low stakes' of formative assessment, it is commonly viewed as the type of assessment less impacted upon by macro and meso level influences (Dixson and Worrell, 2016). The dominant strand emerging from the formative assessment ideology is that of assessment for learning.

Black and William (1998) define assessment for learning as one of the best methods within the teaching and learning process to establish important feedback and enhance learner achievement. It is argued that the employment of a variety of ongoing strategies to identify and address learner misconceptions and challenges in achieving planned outcomes is a fundamental element of effective teaching (William, 2011). Subsequently, teachers and learners predominately use formative assessment to identify and act upon learners' level of understanding in order to improve ability and outcomes (Bell and Cowie, 1999).

Feedback is one of the main parts of formative assessment, noted as having a positive impact on the teaching and learning process (Hattie and Timperley, 2007). Feedback helps pupils to identify and address misconceptions and difficulties in understanding, as well as allowing them to recognise their own achievements along the way. Though important, feedback is achieved through many strategies within the assessment for learning toolbox and formative assessment should maintain a 'broader focus than the feedback intervention itself' (William, 2011). There are many assessment methods that are useful to ascertain pupils' level of learning; homework, questioning lesson starters, plenaries and mini-plenaries are some of the techniques used in assessment for learning in the classroom (Chianese, 2012). These aim to help practitioners give feedback on their progress in relation to the learning objectives, though are assessment strategies in their own right. Many scholars have noted that pupils learn most effectively when they can reflect on their learning, advance what they learn, and formulate their progress pathways (Chianese, 2012).

Additionally, the use of lesson starters in my own practice allows for increased clarity on learners' existing knowledge, though the benefits of starters extend beyond simply establishing prior understanding. Harlen and Winter (2004) argue that opening lessons in this way can facilitate 'a higher degree of articulation of their knowledge' and, in practice, this has improved my own pupils' ability to discuss their understandings and forge connections between what they know and what they will learn. According Black and William (1998), assessment for learning should also expand pupils' capability to evaluate their work and learning progress. The use of plenaries has been documented as a successful strategy in furthering learners' ability to achieve this end (Bartlett, 2015).

Assessment for learning is a much discussed assessment tool that should enhance learners' ways of thinking (Zimmermann, 2000). It is argued that, furthermore, it is an especially useful technique for assisting students in measuring and reflecting upon their own progress and performance (Harrison, 2013). It is worth noting, however, that assessment for learning is not impervious to top-down pressures of performance. Though links are not as explicit as might be found with summative assessment techniques, learners are still measured against pre-determined, macro and meso level expectations. Within my own assessment for learning practice, learners progress against prescribed curriculum content and in preparation for high-stakes summative assessment is measured through assessment for learning strategies. Despite the dominance, at least in rhetoric, of the socio-cultural constructivist model of teaching and learning approaches, assessment still does not align well with assessment procedures (Gardner, 2012). If this is to be achieved, learning theory, curriculum content and assessment procedures must be triangulated effectively.

2.2. Cross-curriculum Responsibilities, including literacy, numeracy and digital competence.

Barnes (2015) describes cross-curricular as the world beyond the classroom. Most of the experiences and objects we see around us are not the result of one curriculum subject, and teaching and learning should reflect this. In education, cross-curricular teaching and learning is defined as a multidisciplinary approach that helps to capture the complexity of the world by bringing together features from different areas of the curriculum (Greenwood, 2013). Subsequently, there have been calls for the current education system in Wales to react and respond accordingly to the changing needs of society. The new Curriculum for Wales 2022 guidance promotes the cross curricular responsibility of literacy, numeracy and digital competence in its curriculum across all fields of study in order to help learners develop in relation to the four purposes laid out by Donaldson (Welsh Government, 2019). In order to thrive in the current and future education system, it is suggested that learners need to be competent in three essential skills: literacy, numeracy and digital competence (BIS, 2016), and that these should be embedded into other curricular areas with regularity due to their perceived high demand in society.

Though mathematics is often viewed as distinct from certain subjects, particularly literacy and the arts (Ward-Penny, 2010), it is possible to incorporate cross curricular learning into mathematics lessons successfully in order to achieve improved outcomes for learners. Mathematics can provide a valuable stimulus for much reasoning and discussion across a range of concepts. It is argued that, in order to become successful mathematicians, learners must demonstrate an ability to 'express themselves in written English as well as the language of mathematics' (Ward-Penny, 2010).

Greenwood (2013) further supports this notion, stating that incorporating a cross curricular approach into the learning process encourages learners' motivation as they can more readily understand the application of taught subject matter in contexts outside of formal education. Barnes (2015) suggests that engaging with cross curricular learning can increase learner ability to solve problems, improve creativity and foster innovation. It is, however, necessary to acknowledge that cross curricular learning should be based on strong, foundational links between concepts. I have noted that cross-curricular learning opportunities are mitigated where links between content are tenuous or one subject is merely crow barred into another. This could be the result of a mismatch between suggested approaches and curriculum content; that is to say that the new curriculum guidance strongly advocates a cross curricular approach yet the curriculum itself remains subject based and academic in its core structure. Instead of facilitating socially transformational experiences, there is a risk of learners being exposed only to socially reproductive ones (Morrison, 2017). Arguably, there are many explicit links between mathematics and digital-based activities. Young people's competence and interest in digital technology is ever growing and cross-curricular approaches should acknowledge the value of this as a learning tool. Additionally, activities which promote digital competence are often also rich in mathematical possibilities, and as such the two areas have the potential to complement and extend one another (Ward-Penny, 2010).

To achieve an effective cross-curricular approach to teaching and learning, educational systems should demonstrate a clear vision which is recognised and understood by all stakeholders of education (Savage, 2010). Implemented in a considered manner, it could create wonderful opportunities to be imaginative and innovative in curriculum planning (Savage, 2010). Despite the incongruence between suggested approach and curriculum structure, cross-curricular approaches can offer learners a well-rounded learning experience which holds relevance in their own context. As pedagogy reacts to the needs of the learner in this way, they are inspired to merge knowledge and skills within the subject, between the subject, from one subject to another and from person to person.

2.3. Blended learning approach including direct teaching

The blended approach to learning is known as a system of teaching and learning that involves a combination of different instructional methods, including traditional teaching and e-learning (Makhdoom, et al. 2013). It is not enough to simply describe blended learning as the amalgamation of a variety of instructional techniques, given that it would be difficult to find a system of learning which did not incorporate more than one style or approach to instruction (Graham, 2006). For this reason, a definition which acknowledges the use of both direct and online teaching is more reflective of the contemporary context of education (Rooney, 2003). The blend of direct teaching and the use of different methods, including e-learning, generates a more cohesive approach for both teachers and pupils. This has proven to be the case within my own practice, where the implementation of blended learning techniques have added cohesion and a further layer of support for learners. As Hancock and Wong (2012) suggest, e-learning offers learners a variety of teaching models and teachers and learners have immense flexibility and availability without giving up the traditional way of teaching. As advancements in technology have allowed for the development of innovative and progressive communication and learning resources (Graham, 2006), blended learning is suggested as a remedy for the evolution of technology within pedagogy (Hancock and Wong, 2012). The quality of outcomes when engaging with a blended learning approach positively correlates with the quality of resources, teaching and research into appropriate supportive digital technologies (Ellis, Pardo and Han, 2016). Additionally, Hong and Samimy (2010) point out that training and supporting learners to enhance their computer literacy skill is important in implementing the blended learning approach effectively.

Highlighting the importance of teacher competence in blended learning, Kaur (2013) describes the blended approach as the efficient consolidation of various means of presenting, modelling and styling of teaching and learning which are operated in an interactively meaningful surrounding. Though the approach provides learners a variety of teaching models and added flexibility and availability, it does not dismiss traditional teaching methods and direct teaching (Hancock and Wong, 2012), which are of significant importance in creating a true blended approach. According to Hong and Samimy (2010) blended teaching approach can only be effective if learners have positive mindsets and are eager to adapt with different teaching models including both direct learning and e-learning. I would also argue that in order to achieve success in the blended learning approach learners should be cognisant of how each component interlinks and reinforces the other.

3. Conclusions

There appears little doubt, both across literature and research and my own experiences, that the incorporation of the pedagogical principles in focus has the potential to enhance the experience of learners in a range of ways.

Assessment for learning is documented as being particularly useful in allowing students to develop autonomy and reflexivity through responding and reacting to feedback provided in a progressive manner. Literature suggests that efficacy is heavily reliant upon the quality and timeliness of the feedback and to what extent learners are given the opportunity to respond and my own experiences are reflective of this; where students are allowed time and space to consolidate their learning it has been possible for learning gaps to be closed.

In exploring the impact of starter activities as a component of assessment for learning, it was found that they can be a valuable tool in establishing prior understanding and addressing early misconceptions before continuing with a lesson. It is fundamental for teachers to articulate and discuss with learners the connection

between starter activities and the learning objective as, without this, its relevance and impact is somewhat diminished. In my own practice I have noted the improvement in learners understanding of expectations throughout the lesson as a result of the dialogue created by the starter activity. Equally, such benefits are significantly reduced where the starter is employed as a mere time filling exercise and links are superficial, highlighting the importance of a high-quality and considered approach to implementing starter activities.

Plenaries were also scrutinised under the assessment for learning bracket. The plenary was intended as a means of reviewing the learning objectives and success criteria of the entire lesson, though also to enable learners to deepen and extend their learning. Literature suggests that plenaries have the power to harness learners' understanding and enhance their learning experiences and, in practice, this was made possible to a degree by linking the concept with a relatable context. Though this is noted to be of benefit in the learning process, it is clear that in order to fully realise the potential benefits of plenaries they should be carefully planned in order to ensure that questioning used facilitates higher order thinking skills. Reflection upon my own practice highlights the need for a more considered approach and the progress of learners to the synthesis and evaluative stages of Bloom's Taxonomy (Bloom, 1956).

The second focus principle of pedagogy was cross curricular learning. It is suggested that it has high relevance in the socio-economic world of today as learners are required to adapt, multitask and develop cross-applicable skills for society. Cross curricular learning appears to be widely advocated; gaining significant traction in recent years amongst policy makers, school leaders, educators and students themselves. One of the key issues emerging from this exploration into the efficacy of cross-curricular learning in practice is subject specific; mathematics is often viewed as discrete from other subjects (excluding science) yet it has the potential to lend itself to so many more disciplines. My own practice has reflected this standpoint in that learners have demonstrated higher levels of motivation, engagement and enjoyment than in other, isolated mathematics lessons. Additionally, learners have begun to apply learnt skills independently in other lessons, adding value as they articulate their learning in new and transformative ways. It is noted, however, that links between subjects in cross-curricular learning must be strong in order to achieve transformation over reproduction of knowledge and this was evident in my own attempt to cross mathematics with digital competence. The link between the two subjects was shallow and this impacted profoundly upon the success of the approach. As such, there should be distinct and definite learning possibilities for each subject incorporated to promote positive outcomes.

This is echoed in the implementation of blended learning approaches; the third pedagogical principle explored within literature and practice. Success of the approach relies upon clarity of connections between the approaches and how they complement one another in order to enhance learning. It is fair to say that the popularity of blended learning has increased with the technological possibilities available within it. Broader advancements within the digital industry have led to higher quality and more accessible learning platforms being available. Teachers' own understanding of these, however, is integral as through my own practice I have noted that my own bank of resources for approaching learning using a blended model is narrow and, as such, I cannot implement it as regularly or as thoroughly as I would like. When it has been employed, however, results have fallen in line with the literature in that it has promoted inclusivity by breaking down barriers for those students who find formal learning in the classroom challenging. This has been the greatest success of blended learning in my own classroom.

Each element of the pedagogical principles discussed had many potential and real advantages for learners, as discussed. Though each comes with its own tensions in

application or caveats to success, none of these are unobtainable or unachievable and I would conclude that the progress made in implementing the principles has been both significant and positive.

4. Recommendations

There are a number of recommendations resulting from this critical reflection upon pedagogical principles in practice. The first, and perhaps the most prominent, recommendation emerging from this exploration is that learner voice and participation is critical in the application of many of the principles. Be it responding to feedback, discussing and articulating links between concepts or subjects clearly or developing discussion points for the development of higher order thinking skills, the vocal and active participation of learners within the process is fundamental for success and should be maximised upon.

I would also recommend that teachers and other educators be committed to their own professional development, as well as school leaders. Teachers should constantly cast a critical eye over their practice and reflect upon what they need in terms of continued professional development in order to ensure improved practice for themselves and outcomes for their students. They should actively research these principles in order to fully understand how they can help both teachers and learners.

The third and final recommendation I will make is that teachers should always strive for quality; high quality connections, questioning, resources and digital platforms can make a world of difference to the successful implementation of these pedagogical principles. If their potential is to be realised, teachers must be diligent in ensuring that what they are offering as part of the principles is worthy and adds value.

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09 May 2020 17:53

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