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A critical analysis of the relationship between teacher subject knowledge and effective learning and teaching in the primary school

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Teacher subject knowledge can be described as having substantial knowledge and understanding of a given subject in order to be able to teach that subject to others (Poulson, 2001). Effective teaching and learning has been defined by Coe et al (2014, p.2) “as that which leads to improved student achievement using outcomes that matter to their future success”. The general belief of the relationship between these two things in the past has been that the better a teacher’s subject knowledge the more effective the learning and teaching in the classroom (Creemers and Kyriakides, 2010). This essay aims to examine the relationship between subject knowledge and effective teaching and learning firstly by reviewing the current literature and secondly by analysis and evaluation of my own subject knowledge for teaching by drawing on my own teaching experiences in the primary setting. My placement experience took place in large primary school in the Bridgend, South Wales area. I was placed in a year 3 class of thirty children. One of the children had an autistic spectrum disorder and three had general learning difficulties. In compliance with the British Educational Research Association (BERA) guidelines the names of the school, teacher and children have been excluded to establish anonymity.

A teacher is the person who knows something which is not known by pupils and is able to present these skills and attitudes through pedagogical representations so that the pupils can understand them (Shulman, 1987). For teachers to effectively and efficiently deliver learning to the unskilled students then they need to have appropriate subject knowledge. Subject knowledge is not only the teacher’s knowledge of the subject matter but encapsulates many different aspects which compounds in an intricate knowledge base. Shulman (1987) drew attention to seven aspects of the knowledge base for teaching (Table 1). Murphy (2011) has further categorized Shulman’s (1987) seven aspects into two sub-categories:

- Generic Knowledge Base.
- Content-specific Knowledge Base.

GPK, Knowledge of learners and their characteristics, Knowledge of educational contexts and Knowledge of educational ends fall into the sub-category of the Generic Knowledge Base (Murphy, 2011). Whereas CK, Curriculum knowledge and PCK fall into the sub-category of Content-specific Knowledge Base (Murphy, 2011). Shulman’s (1987) work on the knowledge base for teaching was

Seven Categories of the Knowledge Base for Teaching	
Content Knowledge (CK)	The teacher's knowledge and understanding of the subject matter
General Pedagogical Knowledge (GPK)	Surpasses subject matter and includes the teacher's knowledge of strategies which include classroom composition and control, engaging students in the learning process, establishing student-teacher relationships and an awareness of what is going on in all parts of the classroom (OECD, 2017)
Curriculum Knowledge	A teacher's knowledge of their basic instruments for teaching in the form of syllabi and resources
Pedagogical Content Knowledge (PCK)	The amalgamation of CK and GPK, it is a teacher's own distinctive model of professional understanding. PCK is the method by which a teacher develops subject-specific knowledge in their students through appropriate selection, adaptation and representation of different aspects of the subject according to the varied abilities and interests of the learners (Shulman, 1987; Poulson, 2001)
Knowledge of learners and their characteristics	The teacher's secure understanding of how their learners' physical, intellectual, social, cultural and emotional development can affect their learning
Knowledge of Educational Contexts	Teacher's knowledge of the local community and culture, the school governance and funding and the inner

	workings of the school and of their own classroom
Knowledge of Educational Ends	The teacher's knowledge of the purposes and values of education in their locality and the grounds behind them.

Table 1: Developed from Shulman (1987)

seminal and has been developed further by Rowland et al (2003) who introduced 'The Knowledge Quartet' framework which is a tool for thinking about primary teachers' mathematics knowledge and its effect on teaching. The knowledge quartet consists of four areas of knowledge:

- Foundation:
- Transformation:
- Connection:
- Contingency:

Shulman's (1987) 'Knowledge Base' and Rowland et al's (2003) 'Knowledge Quartet' both describe how more than just subject-matter knowledge is required for effective teaching and that teacher subject knowledge is more complex than at first it seems. However there has been some debate since Shulman's (1987) work as to which part of the teacher's subject knowledge is most important with regards to effective teaching and student achievement.

A report by the Organisation for Economic Co-operation and Development (OECD) (1994) listed a key factor for effective teaching and learning as the teacher's subject-matter knowledge. This is acknowledged in other literature (Martin, 2008; Murphy, 2011; Campbell et al, 2014; Cordingley et al, 2015; Kyriacou, 2009; Poulson, 2001) but they also recognise that good subject-matter knowledge or CK can not stand alone as the most influential quality for effective teaching in the primary school. There have been some who have expressed the opinion that if a person has a strong knowledge of the subject matter then that person will be able to teach (Kyriacou, 2009). At its base level teaching can be described as an exchange of ideas and therefore it seems obvious that a teacher's understanding of these ideas would influence the

presentation of them in the classroom (Murphy, 2011). However, this has been found to be less true. A study by Lloyd et al (1998) on subject knowledge for teaching science in the primary school worked on the assumption that the studying of a subject in higher education would enhance the teaching and learning in the school setting. They found that the teachers with science and mathematics degrees performed better than arts graduates and planned better lessons in some aspects but were less inclined to teach inquiry-based lessons and more readily taught in a didactic fashion (Lloyd et al, 1998). Similarly Coe et al (2014) reported a correlation between student learning in mathematics and science and their teacher having a higher class of qualification or degree in mathematics or a science, though this association was not observed in other school subjects. Broadly speaking the affiliation between the effectiveness of teaching and certification is trivial and a difficult relationship to interpret (Ball and Hill, 2009; Poulson, 2001). Although a teacher may be able to work out the answers to questions which have been set for their pupils this does not equip them with the tools, the confidence or the other aspects of the 'Knowledge Base' (Shulman, 1987) or 'Knowledge Quartet' (Rowland et al, 2003) to then explain this to students. Poulson (2001) expressed that teachers cannot teach what they do not know and so this makes it obvious that teacher CK is an important aspect for effective teaching but it cannot stand alone. Shulman (1987) knew this with the development of his 'Knowledge Base' and this has been confirmed in a literature review by Cordingley et al (2015) which recognised that both CK and pedagogy were equally important for effective teaching and learning.

Although GPK is a key factor for the enrichment of effective teaching it is insufficient to only include this alongside CK. What Shulman (1987) termed a teacher's PCK, the way in which pedagogy and CK interrelate (Martin, 2008), may be more influential on the teaching and learning process than simply a strong CK. A teacher needs to be able to organize their subject matter knowledge from a pedagogical perspective, that way they can transform what they know to better help their students to understand concepts in a more meaningful way (Rowland et al, 2003). Hill et al (2005) expressed the view that it was not the knowledge of the subject-matter which was most significant in teaching effectiveness but a knowledge of how to teach that CK. This study indicated that students made greater progress in their learning when their teacher had a greater knowledge of how to teach concepts. This was echoed in

a study by Murphy (2011) which identified that teachers who had a better knowledge of how the students understand concepts were more effective. However, the study by Murphy was a small study and therefore has low external validity on its own. Poulson (2001) made a point which supports this stating that if a teacher is able to deliver content to the class whilst making connections between its different concepts then it is less important if they are teaching something they do not know. Even if CK is situated pedagogically teachers are still able to teach effectively (Poulson, 2001).

Shulman (1986) said that the knowledge, for the purposes of teaching, of the subject-matter or PCK needs to include a sound awareness by the teacher of the variety of instructional strategies needed to teach concepts and a strong knowledge of students' common misconceptions. It is also therefore a necessity for the teacher to appreciate the background knowledge that each student brings to each different subject (Hill, Ball and Schilling, 2008). To be able improve quality of instruction and therefore teacher effectiveness Baumert et al (2010) identified that both CK and PCK make their own distinctive influence. However, Baumert et al (2010) also identified that PCK had a greater effect on instructional quality in the classroom. This notion is supported by Hill, Ball and Schilling (2008) who identified that the development of the teacher's PCK has resulted in greater effectiveness of instruction and consequently student achievement. This finding has, however, been limited narrow content areas in only a handful of small-scale studies (Hill, Ball and Schilling, 2008). The development of the PCK is therefore crucial for the advancement of effective teaching. Lloyd et al (1998) identified that for the primary teacher there is a need to obtain an understanding of the critical content of a subject to then be able to transform that content for the teaching of students. This must not be confused with the notion that the greater the CK the greater the PCK. CK has been identified as being a necessary prerequisite to the development of PCK and that PCK can only be obtained after mastering a significant volume of CK (Depaepe et al, 2015; Kleickmann et al, 2013; Baumert et al, 2010).

Although Shulman's (1987) work on the knowledge base has influenced many research studies since, the implications of his research in the primary school setting should be drawn with caution. The idea of CK and its application pedagogically is considerably more complex in the primary setting as there are greater demands in prepping for one subject in the secondary setting in comparison to over six in the

primary setting (Poulson, 2001). The complexity and depth of the knowledge required to teach primary school children may not be at a level similar to that needed to teach the same subject area in a secondary setting or higher (Poulson, 2001). This does not take away from the importance of CK in the primary setting but readers should be aware of the differing levels required for the different school settings.

Another important consideration of teacher subject knowledge which should be addressed when discussing effective teaching and learning is the teacher's beliefs about a subject. Beliefs differ from knowledge in that they are usually implicit and evaluative and therefore hard to articulate (Campbell et al, 2014; Martin, 2008) however, they do form a part of the PCK. The teacher's beliefs about a subject include how the teacher feels about the way the subject operates to inform the understanding of the students about the world around them (Martin, 2008). Coe et al (2014) identified that highly effective teachers of numeracy held beliefs about what it means to be numerate, how children learn and the role of the teacher in promoting learning. These beliefs inform a teacher's pedagogical practice in-the moment and allow them to select appropriate teaching approaches to consequently be more effective.

In the next part of the essay I will draw on my own experience of teaching from my first school placement to reflect on my own subject knowledge. I will use the different categories of the knowledge base suggested by Shulman (1987) to structure the discussion.

Content Knowledge

When examining my own CK my mind is immediately drawn to the time I had to deliver a lesson on Hajj, or the holy Islamic pilgrimage to Mecca, one of the five pillars of Islam. Being atheist myself and brought up in a society dominated by Christianity I had no prior knowledge regarding Hajj and so my CK was extremely poor. I researched the subject heavily as I felt this would give me better insight into how to deliver the lesson as I felt my PCK was poor as a result of poor CK. As discussed previously greater CK does not necessarily result in greater PCK but it is necessary to master a certain amount of CK prior to obtaining a good level of PCK (Depaepe et al, 2015; Kleickmann et al, 2013). After researching I also drew on my own beliefs, as identified by Campbell et al (2014) and Coe et al (2014), about learning religious education and

how as a child it is difficult due to the lack of reference points with which to relate the material to. I therefore planned a lesson taking the children on a pilgrimage around the yard linking stops made on the Hajj to specific places in the school yard. Overall the lesson was successful and the children really engaged in it. One child commented “how do you know all of this stuff?” which exhibited to me that having a basic CK is often sufficient as long as you can deliver it in a meaningful way. Next time I would include a short video about the subject at the beginning of the lesson as both a hook and as a way to transfer background knowledge to the children without direct instruction from the teacher.

General Pedagogical Knowledge

When planning a series of English lessons whilst on placement to develop the students’ story writing by varying their sentence starters I used Iceland’s (2018) banned Christmas ‘Rang-tan’ advert as a central theme. The video was shown at the start of each lesson and helped to engage the students every time. I found whilst on placement that engaging the students was half the battle for effective learning. If the students are disinterested then they are less likely to learn (OECD, 2017). I also tried to engage the students in the learning process by setting out learning objectives at the beginning of the lessons and informing them that the end goal would be to write their own version of the Rang-tan story in small groups and producing a slideshow using the ‘Puppet Edu’ app on the iPads. This gave the students focus and motivation. I did find it difficult to conceptualise the order of the lessons so that the students were progressing and building on their prior knowledge each time as I had no previous experience of doing this. For this I had to use the wisdom of my class mentor and adapt her ideas, something mentioned by Shulman (1987) and supported by Poulson (2001) to expand the knowledge base. Another aspect of GPK which I believe I exhibit well is having an awareness of what is going on around the class I was frequently given good oral feedback from my class mentor about this and my tutor wrote that “He exhibits a wider awareness of all children even when working with an individual or a group” (Appendix A). My GPK currently stands at a good but basic level by all accounts but there is still significant room for improvement which I believe will come with

experience of teaching and thoughtful reflection which was identified by Kleickmann et al (2013).

Curriculum Knowledge

The current curriculum in Wales is changing following a report by Donaldson (2015) who has made several recommendations regarding the future structure of the school curriculum in Wales. Knowledge of the curriculum will give the teacher the tools they need to guide the teaching of certain subjects as it is their key reference point (Shulman, 1986). Whilst I was on placement, the school I was teaching in were committed to working towards the new structured curriculum for Wales. Donaldson (2015) identified three cross-curricular responsibilities for all teachers as literacy, numeracy and digital competence as they are paramount to the way we think, the way we learn and to modern life in general. These three responsibilities need to permeate through all other areas of learning and experience. I personally found it difficult to work out how to do this independently whilst on placement. However, with guidance from my class mentor I was able to work both literacy and numeracy into a science lesson. Following an experiment, I was able to teach time connectives to the students whilst getting them to write step-by-step instructions in a method for the experiment. Also, I included numeracy in the science lesson by teaching the students to draw bar charts from the results of the experiment. I see the new structure of the curriculum in Wales to be a positive change, but I feel that I do not yet understand it well enough to effectively implement all parts of it. This is partly because the new curriculum for Wales has not yet been finalised but a handful of schools such as the one I was on placement in are trying to adopt a similar structure to that recommended by Donaldson (2015). To improve my knowledge of the curriculum I feel I need to familiarise myself with the current curriculum for Wales and also the recommendations made by Donaldson to try and adapt my delivery of topics in preparation for the new curriculum.

Pedagogical Content Knowledge

When teaching a mathematics lesson whilst on placement I had to deliver a lesson on fractions. The class had not previously done very much work on fractions so it was still

a new concept for them to grasp. My CK of fractions was quite strong but finding ways to deliver this information to young children in a way that they would understand was much more challenging. I used lots of pictorial resources to deliver the information including number lines, commercially printed and hand-drawn diagrams. However, there were a handful of children who were unable to “get” the concept. It was only on reflection after the lesson that I realised I should have begun with more concrete examples of fractions (e.g. pizza, cake) to introduce the concept and then move on to pictorial examples to help consolidate it by providing a different visual model (PDST, 2014). By improving my knowledge on how students learn specific topics or content it will allow me to be more effective when teaching as well as gaining a greater social sensitivity to better understand student’s misconceptions and varied perspectives on the same subject. Consequently, improving this will improve my instructional quality according to Baumert et al (2010) and Hill, Ball and Schilling (2008).

Knowledge of the Learners and their Characteristics

Having a knowledge of the learners and their characteristics will allow the teacher to be more effective in their teaching as all students are different and there is no fixed method for teaching and learning. By strictly keeping to one approach this will limit the effectiveness of teacher delivery and teachers need to take into consideration any specific learner behaviours such as learning difficulties and experiences (Depaepe et al, 2015). During my time on placement I had several children in my class with general learning difficulties, one child with an autistic spectrum disorder (ASD) with traits of attention deficit hyperactive disorder (ADHD), a more able child and one child on an individualised education program (IEP) because of her behaviour. Child A, the child on the IEP, was very difficult to engage in any type of written work. I noticed however that child A relished any opportunity to share work that she had done with the rest of the class. To be more effective I used to set child A mini targets to engage her in learning offering her lots of encouragement throughout the process and giving her praise when she completed the work. During one lesson on Islamic artefacts I used the game of Pictionary on the whiteboard to finish the session. I picked Child A to do the first drawing and she was visibly happy with being given the opportunity. She was able to draw an Islamic prayer rug well and then when questioned was able to state 2

facts about it. This approach to engaging child A paid dividends as she was able to learn information about artefacts and answer questions about one. This is just one example of how knowing the learners in your class can effect the effectiveness of the teachers delivery. This is supported by Depaepe et al (2015) and Wang, Haertl and Walberg (1993).

Knowledge of Educational Contexts

Educational contexts encapsulate the workings of the classroom or of the school, the local community, the funding of the school and the local culture. Having a knowledge of educational contexts will allow the teacher to be more effective (Shulman, 1987; Depaepe, 2015). In Wales it is important to link lessons to the local area by referencing specific Welsh historical, environmental, cultural, economic and linguistic features as it aids their application and understanding of knowledge (ACCAC, 2003). I was able to acknowledge the local community and culture when teaching a science lesson about waterproof materials. The class had previously been learning about flood-prone areas in Bangladesh and discussing which materials would be best to build a house out of in these areas. I then decided to bring the discussion closer to home and showed the students photographs of the floods of Bridgend town centre in the 1960's. This gave the discussion and application of the knowledge more context for the young minds of the students who do not have any experience of far off countries like Bangladesh and worked as a good hook to reignite their interest in the subject. The school my placement took place in was large, well-financed and situated in a more affluent area of Bridgend. Knowing this and I was able to plan lessons which utilised modern technology such as interactive whiteboards and iPads to help develop the pupils' digital competence in a variety of lessons. Digital competence being another of the cross-curricular responsibilities alongside literacy and numeracy (Donaldson, 2015). Knowledge of educational contexts can help to inform a teacher of ways to structure lessons and manage the classroom as well as how to adapt their instructions to be more effective in the delivery of teaching and learning.

Knowledge of Educational Ends

A teacher's knowledge of educational ends includes having an understanding of the purposes and values of education as well as their philosophical and historical grounds (Shulman, 1987). Donaldson (2015) has made numerous recommendations for the new school curriculum in Wales and has stated that there should be four main purposes to education:

- Ambitious, capable learners, ready to learn throughout their lives
 - Enterprising, creative contributors, ready to play a full part in life and work
 - Ethical, informed citizens of Wales and the world
 - Healthy, confident individuals ready to lead fulfilling lives as valued members of society
- (Donaldson, 2015).

It is the responsibility of all teachers to direct all teaching and learning towards the achievement of these four purposes. My placement school tried to embrace these purposes throughout their teaching. However, in reflection of my own experience I realise that although the four purposes were something I was very aware of in the new curriculum for Wales, they were not something which I used to inform the direction of my teaching. In future I will endeavour to acknowledge the four purposes in teaching and think of strategies which will cultivate them in each area of learning. This could be achieved by researching established methods for nurturing the desired characteristics in the students and also by discussing these with experienced teachers.

This essay has discussed the relationship between teacher subject knowledge and its relationship with effectiveness of teaching and learning. Shulman (1987) proposed seven categories for what he termed a teacher's 'knowledge base'. After reviewing some of the literature it has been identified that although the different elements of Shulman's (1987) knowledge base have a certain effect on the effectiveness of teaching and learning, some have a greater effect than others. PCK, for example has a greater impact on effective teaching than CK (Baumert et al, 2010; Kleickmann et al, 2013; Coe et al, 2014; Hill et al, 2005; Lloyd et al, 1998). This does not mean that specific CK is not held in as much esteem as PCK as CK is still a key factor in teacher effectiveness (Martin, 2008) and is seen by many as a requirement prior to the development of PCK (Kleickmann et al, 2013; Lloyd et al, 1998; Poulson,

2001). Not only are CK and PCK important as well as the other categories of the knowledge base but a review of the literature by Cordingley et al (2015) emphasised that it is also important for teachers to have clarity about learners' starting points and their next steps. Effective teaching also necessitates the teacher to make strong in-the-moment decisions whilst simultaneously managing a multitude of differing agendas related to the school culture, parents' expectations, the curriculum as well as the students themselves (Depaepe et al, 2015; Campbell et al, 2014). In conclusion, there has been a statistically significant relationship between teacher knowledge base and student achievement (Campbell et al, 2014). Consequently, the recommendation following this essay is that an enhancement of all aspects of the knowledge base paying special attention to PCK will result in more effective teaching and learning.

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Appendix A

Lesson Observation Form

Date 09 / 12 / 2018

Class Mentor [REDACTED]

Observer/s [REDACTED]

No. of Pupils 30

Class Year 3

Additional Adults [REDACTED]

Part 1 Lesson Observation (Areas of strength/Areas for development)

S1: Professional Values and Practice

Good

- Comments and Evidence
- Targets for improvement and suggested ways forward

From discussion with his class mentor, the headteacher and his file, it is clear to see that [REDACTED] has achieved a good level of independence in all aspects of teaching and monitoring. From the lesson it can be seen that he has sound engagement with pupils' learning. He had clearly had through professionally articulated dialogue with both adult helpers before the session. His file shows a good ability to reflect on his own practice and its impact on learners. The mentor and the headteacher spoke of [REDACTED] willingness to accept advice and act upon it. He has shown a commitment to involvement in the general life of the school, including engagement with extra-curricular activities. Next steps: to extend his role as the teacher by seeking opportunities to communicate with parents

S2: Knowledge and Understanding

Adequate

- Comments and Evidence
- Targets for improvement and suggested ways forward

[REDACTED] showed a good level of subject knowledge on Islam and had prepared conscientiously for this. According to the class mentor, this is typical of [REDACTED] approach to the learning in the classroom. The reason that some parts of the session fell flat was that all adults concerned had expected that the children would have an understanding of what faith means to a religious person and would know what the term 'Christianity' meant. It became clear that this was not so. No-one could have predicted that but it will form the basis of [REDACTED] next session on RE. Sometimes we have to go back one step to make the other steps clear!

S3.1: Teaching: Planning, Expectations and Targets

Adequate

- Comments and Evidence
- Targets for improvement and suggested ways forward

We discussed the ways of writing Success criteria so that they can be shared effectively with the learners. He began with recapping a practical lesson and moving them from that into a deeper understanding of Islam. There were a number of misconceptions that he addressed as they occurred but it became clear that there is a fundamental lack of understanding of faith in religion, and of Christianity, in the class which made making connections and deepening understanding problematic. We discussed how using the artefacts to engage, excite and enthuse the children would have been a way back into the lesson and how virtual tours of mosques or the use of BBC class clips/ i-Wonder where children speak about their own faiths could have enhanced this lesson. Next steps: improve the 'hook' of a lesson by using artefacts and video as appropriate

S3.2: Teaching: Monitoring and Assessment

Good

- Comments and Evidence
 - Targets for improvement and suggested ways forward
- ██████ was clearly aware of the social, emotional and intellectual needs of the class through his differentiation by task and by support. He used questioning to draw out information. It is clear from his file that he has kept track of the children's work. Although he was able to discuss his focus children I was unable to see the file today but this will be part of the review meeting. The lesson today linked to the display that ██████ had created and formed part of the introduction to the lesson. I particularly liked your awareness of the child with specific needs who seemed disengaged throughout the lesson who lit up at the opportunity to show her knowledge at the end of the lesson. You chose her to start the Pictionary plenary and she demonstrated that she had taken in the session content and had learned - well done. Next steps: Remember to bring your focus children's file to the review meeting

S3.3: Teaching: Teaching and Class Management

Good

- Comments and Evidence
 - Targets for improvement and suggested ways forward
- ██████ classroom management is good showing a calm and confident manner. He exhibits a wider awareness of all children even when working with an individual or a group. He created a positive classroom environment where the children listened respectfully to each other's answers and ideas. He made good use of the additional adults and had clearly shared the lesson content and expectations before hand. Take care with transitions and be more firm in your expectations. Next steps: To motivate, stimulate and challenge the learners - the group that had the artefacts to work from were buzzing with interest.

S4: Welsh Language Standard

Adequate

- Comments and Evidence
 - Targets for improvement and suggested ways forward
- ██████ had a list of phrases to use at appropriate time which it did achieve. He used correct pronunciation and repeated the instruction or phrase in English to link the understanding. The next step would be to encourage the children to respond in Welsh.

Part 2: Progress Review

a) Comment on progress in relation to previously set targets (including lesson evaluations and end of week reviews)

Good - [REDACTED] has listened to all advice and responded accordingly. He has made good progress and this is evident in his weekly reviews and observation reports.

b) Comment on quality of trainee's reflection for ensuring progress

Good - [REDACTED] file shows good use of ARCs and weekly reviews to think about his own practice and progress.

Overall quality of PTE file Good

Please comment on:

planning, evaluation, evidence of pupil assessment and tracking, personal literacy, organisation, presentation

All elements are in place and are being used well. I would like to have seen the focus pupils file but [REDACTED] was able to discuss the children and I will look through it at the review meeting.

Number of half day sessions absent from this placement to date 0.0

Quality of trainee's oral and written English language as appropriate. Please comment

[REDACTED]' oral and written English is excellent and he is able to extend the children's vocabulary through using a wide range of vocabulary.

Are there any specific areas that need intervention to ensure further progress?

No

Is this a cause for concern over progress?

No

Are there aspects of this session that should be filmed as examples of good practice?

No

Any additional comment

Thank you for the visit. Could you look at your personal target statements as it is not clear how the sentence links to the target number. My apologies again for the lateness of the observation report due to the technical difficulties I experienced with my computer.

Oral Feedback 06 / 12 / 2018

Written Feedback 09 / 12 / 2018

Joint Observation No