

Design, conduct and critically evaluate a close-to-practice research project (lesson study) focusing on the model of the transformative teacher in developing practice that has a positive impact on the learner

Targets

1 – I attempted to improve how I link my theory to practice in my report through researching and reading more, seeing how they link the theory to practice, I also prepared notes with links I had already made before starting the report.

2 – Need to watch for my use of apostrophes with duplicate words which I have attempted through reading over my work.

Introduction

This report will outline how seating arrangements in the classroom can affect the ability of the pupil to learn and produce in day to day lessons as classrooms in schools now seat pupils differently depending on ability, age and social behaviour.

The main focus of this research project is to discover '*What effect does grouping students have on their pedagogical development?*'. In order to complete a fair research with accurate results the same lesson was carried out in three different schools, [REDACTED], while the seating arrangements for all three lessons was the only factor that had been altered.

Seating arrangements are important classroom setting events because they have the potential to help prevent problem behaviours that decrease student attention and diminish available instructional time. (Hornby, 2011)

One of the classes was re-arranged, sitting in similar age groups while one class was seated based on ability and the final class sitting amongst social peers. During this research project the objective was to see how these seating arrangements would affect the quantity and quality of work the pupils produced as well as their emotional state and health and well-being.

When diving into a widely researched topic such as grouping children in the classroom and how they are seated four reasons are commonly spoken about:

1. Collaboration in learning within groups of children.
2. Ability grouping or setting within a class.
3. Small group teaching
4. Access to resources which, when placed in the centre of a group table, can be reached by all. (Hastings and Wood, 2002)

This project was carried out by myself and two other student teachers, taking it in turns to teach and observe in our PTE1 schools.

Context

It is important to give an explanation on the three schools that were involved in this research project, each school will be labelled school 1, 2 and 3.

School A is a very small school in a deprived rural town where the total number of students who attend is roughly 40 where roughly 20 students were in KS2. In this school KS2 were taught as one class and therefore the ability of the pupils varied massively, this made it very easy to choose seating the pupils by age as our factor.

School 2 is another small school in a rural town but had three times the number of pupils found in school 1, this meant that during our research project and observation of the lesson we observed a class of year 4 and 5 combined, with one of the pupils suffering from severe ALN's. This class was seated based on ability,

School 3 is a much larger school than the previous two as it's located in a largely populated town just outside of a city and has approximately 500 students. In this school the classroom under observation was a combination of Year 3 and 4, with the overachieving year 3 students producing the same work as the less able year 4 students. In this class pupils were able to sit amongst peers.

Three pupils were chosen from each class as the main focus of the observation with each pupil having the right to withdraw at any point during the lesson. The same numeracy lesson was taught in each school to ensure that this was a fair experiment although we must consider certain factors are out of our control.

All pupils who took part in this research project gave their own consent and had consent from parents and/or guardians.

Methodology

"By observing children while they are involved in activities, practitioners will find out how the children's skills are developing and what they are able to do. Practitioners will also be able to gather information on what the children know and understand, as well as their personal preferences." (Welsh Assembly Government, 2008)

Before conducting this research it was important to establish with the other practitioners the ability and characteristics of the children whom were being observed in the lesson, this

allowed them and myself to accurately assess the work they were producing as well as their general attitude and behaviour in the lesson.

It is important to remember that during the observation we're able to analyse and assess what is going on in this environment and control the factors we have chosen to adjust and observe, but we must remember and consider that some factors in the investigation will be out of our control and that this can sometimes alter the results of the research slightly. This is perfectly described by (Sharman et al, 2007) who said "Observation is like a camera shot, and although it is said that the camera does not lie, it may distort". People and practitioners can be quick to jump to conclusions with the results that are in front of them as they believe it is merely 'black and white' but by doing this we sometimes fail to see the bigger picture or the finer details.

It is also paramount that we understand why we are conducting research and what information we gather from research, (Kumar, 2014) explains how research is carried out in five steps:

1. Question what you observe
2. Further explore
3. Understand and explain
4. Draw conclusions
5. Enhance practice

People often associate research as a set of skills while it is also a way of thinking. All research is carried out so that we can enhance our practice skills and improving their knowledge base.

In this research project we decided on four key observation methods:

Running Records – Running records is an observation method/strategy where the practitioner notes down what they see and what the child says or does as it is happening. These notes are usually written in past tense and are detailed.

Jottings – This method is as simple as noting bullet points and brief sentences of important events, conversations and behaviours.

Work Samples – Images of the work the child produced is an accurate way of understanding whether the learner has underachieved, maintained their average standard or exceeded their expectations during this lesson. Making notes on the child's actions, behaviour and anything verbal they may have said during the task may add further insight into how they produced during the lesson.

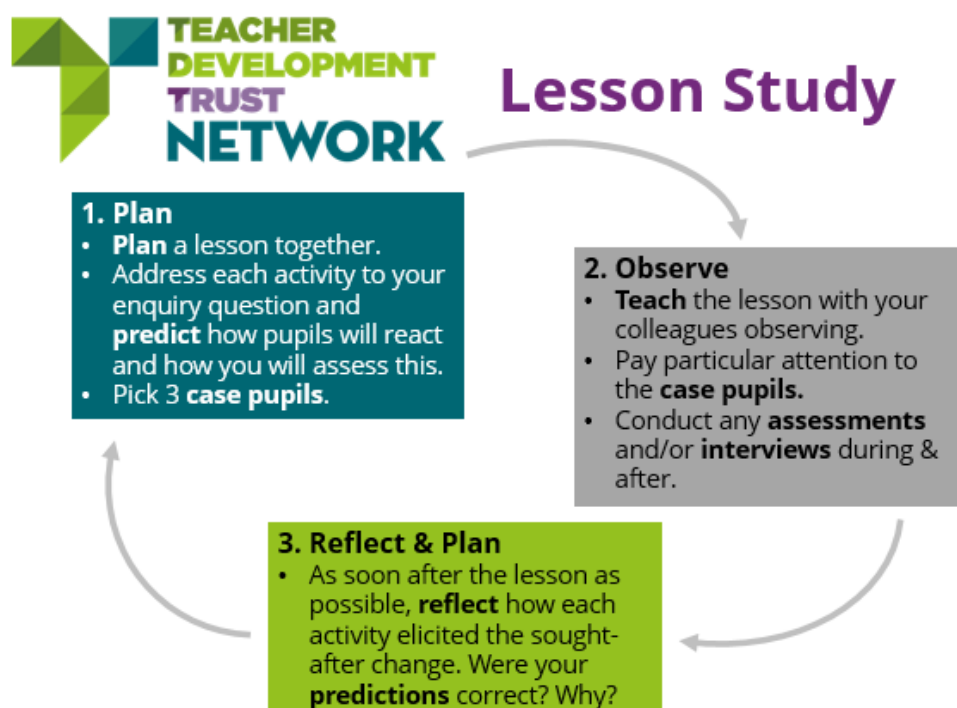
Group Interviews – Folch Lyon and Trost (1981) indicate that focus group interviews can assist in explaining how and why people behave as they do. Focus groups also provide the means to probe people's emotional reactions to issues (Vaughn 1996).

Interviewing the children in groups allows them to feel more relaxed during the process as they are amongst fellow peers but at such a young age one problem that may occur through group interviewing is some pupils will give the same answers as their peers instead of voicing their own feelings and opinions.

To gain accurate results from research project it was important to plan and discuss as a group to prepare ahead of the lessons, this meant deciding on what questions we thought were important to get the answers we wanted, ones where answers would be affected through varying seating arrangements. Refer to appendix 4 to see the type of questions each pupil was asked, it is noticeable that many of the questions not only question the quality and quantity of work the children have produced in comparison to their average lesson, but also the children feeling and emotions, concerning for their health and well-being which Donaldson highlights is vital within 'Successful Futures' (2015).

The most important factor which allowed this project to take place was the consent of the pupils and their parents/guardians. As a group of three we wrote a letter of consent explaining all details of how the children would be observed, how and what notes would be made, and if there would be use of any recording devices such as a voice recorder or video evidence. Refer to appendix 3 for all consent forms.

Using these methods to gather information is called a lesson study, a lesson study is a specific method, a Japanese model of teacher-led research. This method has been introduced to the United Kingdom for some time now and is integrated through the National College for Teaching and Leadership. In pairs or in small groups, practitioners, teachers and experts plan, teach and observe many lessons with one factor of each lesson changing. After collecting the relevant data they will compare this with any pre-existing research. (TDT.org, 2015)



As we can see from the appendix above there are three main stages to this study model, it is important to plan and structure everything as a team to ensure that everyone is working off

the same page and that all factors of the lessons but one remained the same. Researches will take it in turn to rotate between teaching and observing.

As I am on Placement in school 3 for my PTE 1 I shall be teaching that year 3 and 4 class while the other two practitioners observe, I shall then observe in schools 1 and 2 as the practitioners each teach in their allocated PTE1 schools.

Thanks to previous research projects and preparation for critical incident research as practitioners we were aware of how to observe and what to look for in the lessons we were observing and teaching.

This also gave us a better understanding on the importance of reflective practice. To enable teachers to critically question their assumptions and deepen awareness reflection is key. This allows teachers and practitioners to maintain an open mindset and understanding that all teaching is an opportunity learn.

MARSHALL and ROSSMAN (1989) define observation as "the systematic description of events, behaviors, and artifacts in the social setting chosen for study" (p.79). Observations enable the researcher to describe existing situations using the five senses, providing a "written photograph" of the situation under study (ERLANDSON, HARRIS, SKIPPER, & ALLEN, 1993).

DeMUNCK and SOBO (1998) describe participant observation as the primary method used by anthropologists doing fieldwork. Fieldwork involves "active looking, improving memory, informal interviewing, writing detailed field notes, and perhaps most importantly, patience" (DeWALT & DeWALT, 2002, p.vii). Participant observation is the process enabling researchers to learn about the activities of the people under study in the natural setting through observing and participating in those activities. It provides the context for development of sampling guidelines and interview guides (DeWALT & DeWALT, 2002). (Kawulich, 2005)

All lessons taught in this research project were numeracy lessons focusing on problem solving, using the Wales Vs Italy Six Nations game as the topic to keep the kids interest and inspire them to produce some work. Examples of this work can be found in appendices...

Ethical Consideration

Ethics are closely associated with morals and involve embracing moral issues in the context of working with humans (Gregory, 2003). It is illegal to conduct any research without due regards to ethical issues and consent from any involved parties and this must always be prioritised when researching, you can find any relevant information or understanding of ethics within democracy and human rights documents.

It was important as researchers to be critically aware of any ethical risks that could potentially occur during our study, this is why a ethics form was created and completed before sending these letters off to the schools in partnership with the University. (L B. Shawa, 2017; Ethical Guidelines for Educational Research, 2018; British Education Research Association (BERA), 2020).

Burgess (1989) believed there were four major dilemmas linked to ethics when recording data:

1. Research sponsorship
2. Research relations
3. Informed consent
4. Data dissemination

Fortunately for this research we did not have to deal with any of the dilemmas listed above. Sponsorship was not a problem as we were carrying out this investigation as a University project, this also meant there were issues in-regards to relations due to the university and school partnerships.

Refer to appendices ... to see the informed consent provided by guardians and participants of the investigation, these consent forms and the ethics form also discuss the dissemination of data, this was also explained to the participants at the start of every lesson and before the group interviews, ensuring they had an understanding of what and how this data was being recorded and how it would be used, as well as confidentiality and sensitive information. BERA recommend that researchers bring these guidelines to the attention of those they work with such as, participants, stakeholders, sponsors and commissioners of research, schools and other organisations. (BERA, 2018)

Students spend a large amount of time in a classroom, where desks are arranged in a specific way and individual seats are determined by the teacher. At the beginning of the school year, as part of classroom management, teachers face the question of how and where to seat their students. This is an important decision, as classroom seating arrangements influence classroom climate and students' relationships with each other (van den Berg et al. 2012; Gest and Rodkin 2011; McKeown et al. 2015).

This allows us to understand that the children are comfortable with the arrangements in class currently as this is normal for them, therefore any changes may upset some pupils and is why we also decided not to carry out any seating changes on pupils who will find it difficult due to any reason they may have such as ALN's (Schoon, 2003).

Lesson Study 1 – School 1

As mentioned in the context of our report School 1 is a small school with all of KS2 (Key Stage 2) being taught in one class and meaning the ability of the pupils varied massively and allowed the practitioner to very easily move the pupils from their current tables and seating years 3,4,5 and 6 on separate tables. This means these pupils were now sat according to age, they were not familiar with this seating arrangement as they are always sat based on their ability.

Katz, Evangelou and Hartman (1990, p.10) said "Although humans are not usually born in litters, we seem to insist that they be educated in them." – This reference is one which speaks negatively on grouping-by-age, with certain schools persistent on using conventional grouping methods such as this it was important to see other views first. (R LI. Greenfield, 2011)

When we look at how the lesson went it was a success, the pupils understood the task and aims of the lesson after clear instruction and explanation from the teacher. The pupils carried out their work as they would have in their usual sitting arrangements, but there were noticeable differences from the observation and the group interviews which allowed us to

make comparisons as to how much this seating arrangement affected the pupils academically and emotionally.

Reading over appendices ... there are noticeable similarities and connections between the summarised notes of each child, it describes how Pupil A, B and C all listened the instructions and agreed how they understood what they had been told. All three pupils were in year 4 but all at different abilities so once they began the task it was clear immediately who was leading the task, it was supposed to be an independent task to complete but due to lack of mathematical resources they worked in pairs.

Pupil B was allowing pupils A and C to complete the work for him/her, after a series of questions Pupil A decided to complete the remaining questions on her own, not needing the resources and forcing pupil B to work with Pupil C. Pupil C showed a great understanding of the task and how to correctly use the resources and also attempted to help and teach pupil B, however when pupil B attempted to complete a question she was unable to do so.

This was the reoccurring theme throughout the lesson even when the teacher went over examples with the class pupil B struggled, however he/she did gain some understanding once given some further instructions by the teacher and practitioners.

If we then compare the observation notes with the answers the students provided in appendix ... and ... we begin to make the connections between what the pupil is saying and what they produced and felt.

First thing to reflect upon was how the new seating arrangements made the pupils feel and why, the answers were no surprise as pupil B was happy as she was able to sit next to her friends, I believe that pupil A and C completing majority of the work plays a big part in this but this isn't something pupil B would willingly admit.

We can also link why pupil A would rather be seated in the classes usual arrangements as she did not find the work challenging enough and found herself constantly doing the work for pupils B and C. This was evident during the lesson from reading the observation notes.

Pupil C was much happier with the seating arrangements as she was able to sit and work with a friend, it did not seem to bother her that she was constantly helping her friend with the work. Although they did seem to get distracted often which led to conversations irrelevant to the task at hand.

Armstrong, 1966 and Goodman, Gledhill and Ford, 2003 evidently suggest how grouping by age can affect certain pupils in a negative way whilst others thrive, not providing a good educational experience. This argument is supported by Meghir, Crawford and Dearden, 2007 who describe the age-grouping process as a mean to allow children to fit the system and not moulding the system to fit the pupils' needs. By forcing them into homogenous age groups we are ignoring all factors such as social, emotional and intellectual maturity, this over a period of time is detrimental to pupils who's birthdays are towards the end of the year as they haven't had time to develop as much as the elder pupils of the same age and year. (R LI. Greenfield, 2011)

Lesson Study 2 – School 2

We arrived at school 2 half an hour ahead of time, this gave us a chance to reflect, adapt and prepare for the next observation as well as allowing us time to provide more resources and ensure we gather all necessary information. In this school the aim was to group the

children differently in the class, having them seated randomly (mixture of abilities) meaning there was no set structure just that there was a mixture of children of different abilities on all tables.

(Hallam and Toutounji, 1996) and Ireson et al, 2005 both explain in their extensive research how ability grouping pupils' in schools can impact their behavioural and academic outcomes, this research is also supported by (Kutnick et al, 2005; Slavin, 1996; Smith and Sutherland, 2006). (Support for Learning, 2011)

Pupils who attend school in the UK are assessed and then banded or placed in streams dependant on their abilities in literacy and numeracy, this is not the case for all schools but is for a majority. On average there are 3 ability groups but this can vary depending on the number of pupils in a class, the three groups separate:

1. High ability
2. Average ability
3. Low ability and ALN's

In a report from 2011 five headmasters of five schools expressed their opinions on ability grouping, whilst two of the headmasters saw no disadvantages to it many other concerns were raised by the remaining headmasters. They believed that ability grouping:

- Lowered teachers' expectations of pupils' achievement (this is more relative to lower ability and ALN's).
 - Highlighted the ability differences between the pupils, children were aware of the grouping and this can affect their confidence and behaviour).
 - Created trouble trying to find teachers or staff to work with the lower ability and ALN groups.
 - Allowed lower ability pupils to label high achieving pupils as 'geeks'.
 - Children who were in between-class ability grouping rather than mixed were unable to 'feed-off' (learn from) the pupils with better ability and understanding.
- (Support for Learning, 2011)

When we reflect on the observation and group interviews and compare this with researched literature we can see similarities.

One of the first things pupil C mentioned when asked how she felt with the change in seating arrangements was 'happy', when questioned as to why pupil C explained how everyone on her table would talk and not do any work. Pupil C is in the lower ability group for mathematics but felt that she had produced more work this lesson and it was because she could concentrate on the task at hand.

This is supported by the observation notes written during the lesson which outlined how originally pupil C had began to copy pupil A's work, but after working with pupil A on a couple of questions she gained an understanding and was able to then continue with the problem solving throughout the lesson, suggesting she was able to 'feed off' pupil A who is in a higher ability group.

Pupil A's answer to the question also supported the existing research which looks at within ability groupings negative effects. We knew before starting the lesson about Pupil A's difficulty with numeracy in comparison to literacy, this wasn't evident during the first half of the lesson but was much clearer as the difficulty of each problem increased. Fortunately pupil C was able to learn from A at the start and continue the work assisting pupil A to

understand the remaining questions. This was confirmed as a positive when Pupil A mentioned how she had enjoyed being able to work with someone in a pair and how she would prefer this seating arrangement to status quo.

This confirms the concerns of the schools mentioned in the Support For Learning article.

Pupil B had a slightly different experience to pupils' A and C as he did not enjoy the re-arrangement, when referring to appendix ... we can see he did not enjoy sitting on a table full of girls, but also felt as if he wasn't able to present as much work because of where he was sitting, with the view of the whiteboard restricted. It was obvious from observing that this was the case as he had asked the teacher for reassurance on his work as he couldn't see the examples on the white board and on numerous occasions was annoyed by the questions the girls continuously asked.

After discussion with the teacher it was understood that pupil B enjoyed sitting in under usual arrangements as his friend would often complete majority of the work, no one is asking him for help and is able to talk to his friends about things other than the work. But you can see how this seating arrangement allowed him to teach and explain to the pupils' who were struggling and thus supporting one of the concerns above of children feeding off the higher ability.

Lesson Study 3 – School 3

Just as we did with schools 1 and 2 all practitioners arrived ahead of time to allow appropriate preparation. In this school the aim was to seat the children based on their academic abilities. This is how the children are used to sitting in this school meaning there was a set structure. The children under observation remained in the same ability groups but did move to sit at other sections of their table so that some aspect of their usual seating plan had been altered.

Slavin (1988) reported no consistent effects of ability grouping on attainment from two research syntheses of studies relating to elementary and secondary schools. This suggested that high achievers in a number of studies saw positive effects from ability grouping at the expense of low achievers but overall, the effects clustered around zero for students at all levels. (Kutnick et al; 2005).

In this study I was the teacher and therefore had my own observations while teaching the class but as my concentration was focused on teaching the pupils' I had missed finer details the other practitioners observed throughout the lesson.

In an educational article there is mention of perceived advantages to mixed ability grouping, explaining how four headmasters of schools felt about this seating plan and what advantages they saw:

- Targets pupils' needs better.
- Allows the matching of teachers' strengths with pupils' needs.
- Created homogeneous groups, allowing teachers to teach pupils of the same level.
- Enabled improvement with the more able students whilst challenging teachers also.
- Encourages sound teaching practice in providing diversity of learning needs.
- Benefits the lower ability pupils, encouraging them to do their best.

- Reduced 'tall poppy syndrome' (pupils not wanting to stand out so under achieve intentionally).
(Support for Learning, 2011)

One thing I did notice when reading appendix 5 School 3 is how pupil A's feedback on the lesson did not correlate with the practitioners observation, with pupil A claiming to have enjoyed the lesson as he enjoyed the rugby theme and had an interest in mathematics, however one of the practitioners recalls hearing pupil A mention his dislike towards rugby and how he did not enjoy the work. Fortunately this is not a result of changing seating arrangements or sitting in ability grouping and purely down to the task, however the pupils on the same table who are in the same ability group were able to explain the work after difficulties pupil A had early on, which is a positive outcome.

Pupil A still produced work of high quality by the end as his mathematic ability is high, and his understanding improved thanks to his peers, this disagreeing with the claim that within ability groups don't allow for 'feeding-off' each other. Pupil A was unhappy with the seating arrangements and did not enjoy being sat next to one of the girls in the class but would rather sit by his previous peer. (Appendix 4)

Pupil B's answers when answering the same questions were rather different as she did not understand the purpose of the task and was unhappy about sitting in her usual arrangement (low ability group), this supports the comments made by the practitioners on appendix ... as it explains how she was constantly being questioned by her peers and attempting to help them, this distracted her from her own work as she focused more on what everyone else was doing, this did not help her peers or herself as she didn't completely understand the directions and purpose of the task.

In this instance it allowed me and the classroom assistant to target her needs during the lesson and explain the work to her so that she could understand. As all the low ability students were grouped together it allowed me to teach them directly while the other groups continued completing the worksheet, supporting one of the advantages of ability grouping. Through this I understood what my pupils were failing to understand and therefore enabling me to adapt my teaching and resourced for specific ability groups.

Pupil B went on to explain how she felt she would have performed better if she was on a table with someone from a higher ability group, there are a number of factors this could be the case as she would likely have less disruption from her peers and concentrate more on the task at hand. However when asked where she would like to sit it was by one of her closest friends and this could also draw her away from the task at hand discussing things such as plans outside of school, this was evident in both school A and B.

I do believe that pupil B would benefit from being moved to sit with someone of a higher ability as it would allow her to learn from the more able pupils, but also focus more on her own work. Although pupil B did not understand the task, she did try her very best.

Unlike pupils A and B it was obvious Pupil C had a strong interest in rugby as he was prepared to answer all questions asked during my introduction, he was very happy with the theme of the work but once everyone began he became distracted by the pupil sitting next to him who had less of an interest in rugby. He was constantly being questioned about the task

and had not produced anything for several minutes. When asked if he had produced more work pupil C answered no as he produced what he usually does, pupil C is in the average ability group and was sat by his best friend which meant they did not focus on the task. Further into the lesson pupil C and his friend both helped each other to note down the scores in the table, using pupil C's knowledge of rugby and his friends understanding of how to fill the sheet out they attempted the work again, allowing both to work well as a team and 'feed-off' each other. It is important to seat the right peers next to one another as research demonstrates how a single student's verbal or nonverbal behaviour can cause other group members to become inattentive, explaining how the number of students' affected varied, from one to possibly five, this is an example of ripple effect explained by Kounin (1970). (Felmlee et. Al 1985). I believe pupil C could benefit from sitting next to someone in the same ability group if they weren't really close friends.

After discussion with the other practitioners it became aware to all of us that the usual outcome of this test was not unusual or irregular to normal day to day practice, with the high ability understanding and producing work, the average ability producing enough and the low ability under achieving. But there were smaller irregularities such as enjoyment and understanding that were also affected by the theme and the work rather than their seating arrangements.

Conclusion

I believe this research was successful in discovering what effect grouping pupils had on their pedagogical development, thorough observation and analysis were carried out to gather the relevant information.

When analysing the outcomes of all three studies it was clear that in all schools some of the high and average ability pupils were happier with their original seating plans, as school 3 only had minor changes this was expected, but with School 1 the seating arrangement had changed to age, with pupil A finding the work rather easy, this results in the lesson not pushing or challenging the pupil enough and therefore not excelling with the pupils' pedagogical development. Pupil B school 2 and pupil A school 3 would also rather sit in their usual seats.

There were other comparisons to be made with lower ability pupils in all three schools copying off someone they were working next to, regardless of their age, ability or any seating arrangement. But there were positives for learning off one another with many of the lower ability pupils learning from the higher ability and vice versa, with pupils C and A in school 2 explaining to each other how to complete the work, with Pupil C who is in the lower ability group was able to thrive and teach pupil A when she got stuck.

Before classroom management was seen as the teachers control over the learners but over a long period of time has developed, with Hue Ming-Tak and Li Wai-Shing (2008: pg- 47) defining it as "teachers steering and coordinating a complex environment for the purpose of effective learning and teaching". They also believe that seating arrangement is a very important within education and go on to say "a good seating arrangement is one which facilitates specific learning tasks and activities and communicates a teacher's beliefs about learning and teaching". (S. Zerin 2009)

The Plowden Report (1967) supports this as it recommended and made assumptions that the classroom pedagogy would have a much larger pupil-centred orientation, improving their pedagogical development. In these years pupils would have been sat on individual desks

with no collaboration, but as years went by schools began to introduce tables of all different shapes which serve different purposes where children could sit as groups. Plowden described grouping as a mean to occupy or control the pupils in a class while the focusing on specific pupils and differentiate pupils by attainment. (Kutnick, 2005)

Despite its widespread practice in schools, the bulk of research evidence suggests that between-class ability grouping is not an effective strategy for facilitating the optimum academic achievement of pupils, with a headmaster of one school explaining that high ability pupils need other high ability pupils to bounce ideas off one another allowing them to work at their own level. The positives of this allows me as a teacher to focus more on the lower ability students as the other ability groups can continue their work. (Support for Learning, 2011)

From all appendices we can see that there have been negative and positive experiences for all pupils during the research, with some pupils thriving in one form of seating arrangement and others underachieving, this goes to show that there is no grouping or seating which will benefit every pupil in the class. Pupils' learn differently and can process information differently to one another, what works for one won't necessarily work for the other. (Support for Learning, 2011)

I believe that out of all three seating arrangements that grouping by ability is the most appropriate way when considering tracking progress, allowing teachers to create lesson plans that are suited to the pupils' and trying to meet the needs' of all students. There are positive and negative effects for pupil's pedagogical development. More detailed and thorough research would need to be carried out to gather a greater understanding with some of the aspects of research making it difficult to gather information to make any strong statements or conclude there is a superior grouping style.

Recommendations

To improve the quality of the results and the overall investigation I believe all classes would have to try all three seating arrangements, sitting based on age, ability and mixed. It is not possible to conduct a fair evaluation if one small school in a rural area who try one seating strategy while a larger school near a city attempts another. We could use one class and test all 3 seating arrangements while collecting data and then repeat this process with the other schools, this would allow us to assess how all three classes reacted to the different seating arrangements.

More structure, preparation and research will be carried out before a second investigation to ensure all controlled variables are considered and maintained throughout the study. Things such as theme, subject, ALN's (Additional Learning Needs) and teacher can affect a pupils' pedagogical development.

Other devices such as voice and video recorders would be beneficial during these types of experiments as we can listen back or re-watch the events, giving a more accurate and detailed perception of what is happening during the lesson.

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