

LEVEL 7 ASSESSMENT SPECIFICATION

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Academic honesty / referencing:	Academic honesty is required. In the main body of your submission you must give credit to authors on whose research and ideas your work is based. Append to your submission a reference list that indicates the books, articles, etc. that you have used, cited or quoted in order to complete this assessment.		

An Investigation into the Impact of Seating Plans on Pupil Achievement**Contents**

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Introduction

The following investigation was undertaken in a local authority-maintained school in Wales with a roll of just under 500 pupils. The full range of abilities is represented at the school with pupils being divided into four sets, set A being the most able and set D catering for pupils with various educational and behavioural needs. For the purposes of teaching geography, sets B and C are, broadly speaking, mixed ability classes. The focus group for this investigation was a Year 9, set C class of 20 average ability pupils. The cohort tend to display behaviour perhaps typical of any group of teenagers in secondary school, such as chatting and being off task.

During the placement at the school, it became apparent from observations that seating arrangements that focused on individual learning were used in the vast majority of classes in order to minimise distraction, for example, forward facing rows. However, this might be limiting pupils' involvement in the learning process and, an intervention allowing pupils to sit in pairs and be more actively involved, might enable them to acquire complex skills without relying on teacher instruction. To sum up, the purpose of this particular investigation, was to look at the impact of adopting a group participation seating plan on the achievements of a mixed ability geography class.

Literature Review

Linked to classroom design is the idea of pedagogy, and feeding that, are the ideals of an influential, higher organization. In this case, the Welsh Government vision relies heavily on the ideas of Donaldson (2015). His report, 'Successful Futures' encourages collaborative classroom learning. In this context, the idea of arranging seats to accommodate co-operation is significant. Even the most anecdotal evidence suggests that making and adhering to a seating plan is one of the most basic prerequisites of successful classroom management and one of the main ways of securing pupil progress.

For example, Bennett (2013) believes that in the initial stages of teaching, seating plans cannot be overlooked as class relationships are influenced by this and pupils who are free to choose their own seats in a classroom tend to be guided by social rather than educational motives. This is further supported by the work of Smith & Laslett, (1993) who argue that part of the responsibility of a teacher is to decide on where children sit. Therefore, to promote co-operation, pupils may sit with friends, but the decision should be quickly determined by the teacher to assert control and consistency. For Lemlech, (1991) the arrangement of the classroom physical environment has a bearing on the intellectual and social climate. Therefore, depending on what skills a teacher wishes to develop, the classroom may be arranged to encourage those skills. For example, a classroom designed to suppress interaction may result in less class management

issues, however, students in these classes may not be as involved in the lesson. McCorskey & McVetta, (1978) have shown that seating arrangements can impact on how the instructor communicates with pupils, how the pupils interact with one another and frequency of interaction. In the realm of software, and in promoting their behaviour management application, the company 'ClassCharts' points out that their seating plans are very useful for identifying pupils who need, supporting, stretching or challenging and can prove useful to teachers who are being observed (ClassCharts, 2018).

However, dictating pupils' seating arrangements is not without its detractors, Scholastic News, (2017) reported that a school in Iowa did not assign specific seats in lessons and this helped pupils to learn how to make good choices. Moreover, pupils were more likely to contribute when sitting with peers who made them feel most comfortable. Similarly, Roberts (2013) points out that friendship groups may enable more confident discussion of ideas and opinions.

On balance, it seems the most widely held opinion is that a seating plan is a necessity. It is, therefore, the teacher's responsibility to choose between a number of different alternatives. These fall into six groups as shown in *appendix 1*. Traditional, round table, horseshoe, double horseshoe, group pods and pair pods. The two arrangements of greatest interest for the purposes of this

investigation are the 'traditional' and the 'pair pods' as it is these set-ups that the research aims to compare in terms of their impact on pupils' achievements.

In favour of having pupils sit in traditional rows, Bennett & Blundell, (1983) carried out an investigation that included several curriculum subjects. They found that seating pupils in rows rather than in groups tended to increase the quantity of work that was produced but had no discernible effect on quality. Conversely, Marx et al.(1999) found that traditional seating arrangements generally seemed to dampen pupils' enthusiasm in that they were less likely to ask questions during lessons. However, there appeared to be an 'action-zone' where the reverse was true. Basically, arranging pupils in rows brought about a polarisation of engagement, meaning those closest to the teacher were comparatively more involved and those furthest away, increasingly disengaged.

The extent to which classroom layout influences the amount of time spent on task was explored by Rosenfield et al. (1985). They found that pupils seated in 'clusters' or 'pods' exhibited more on-task behaviour than those arranged in circles and that those organised in rows were the least engaged of all. This was supported by Anderson (2007 cited in Haghighi & Jusan, 2011) who found that pupils were on task 97% of the time when seated in clusters, 96% of the time when seated in a horseshoe arrangement but only 91% of the time when they were seated in rows. However, Hastings (1995) finds the opposite to be true, claiming that the time some pupils spend

on tasks rises considerably if they are taught in rows. These results do not provide any meaningful conclusions, so the findings of Wasnock (2010) should not come as a surprise. He found that the relationship between seat location and pupil performance was of little, if any, significance, accounting for less than 7% of the variation seen in pupil attainment.

Gummerum et al (2014) took a different approach and explored the question of whether learners are making any progress with their understanding of the topic in hand. They found that collaboration on a task improved pupils' performance when it came to low level tasks such as remembering and, to a lesser extent, understanding. However, when it came to application and analysis, which are higher order tasks in the cognitive process, gender came into play: only female pupils developed these skills to a significant degree through collaboration. (Classification of task understanding according to Bloom cited by Heick, 2018.) See also *appendix 2*.

Nuthall (2005) asserts that, in order to manage a class of 20-30 students simultaneously, routines need to be ritualised. However this also means that the learning experience for the individual remains unnoticed. He suggests that, because everyone has at least ten years' experience of being taught before they, themselves, get to teach, a number of traditions and myths are perpetuated both by everyone's common experience of schooling and by the ways in which classroom performance is evaluated.

When pupils are asked to work in 'pair pods' as a form of intervention, as opposed to working through tasks independently, teachers are encouraging collaboration. This can take many forms. As long ago as 1938, John Dewey believed that collaboration could lead to improved learning. Subramanyam, (1982) describes collaboration as sustained participation and offering of opinions in a pooling of intellectual resources. Clearly, in asking pupils to work in pairs, teachers are hoping for successful teamwork as they perceive benefits of such co-operation. For instance, Terenzini et al. (2001) found that active or collaborative methods produced substantial gains in pupil learning when compared with more traditional methods. For Lemlech (1991) an important aim of group-work is socialisation and the learning of social participation skills such as listening and negotiating. Typically, such an intervention, changes interaction patterns as responsibility shifts from the teacher to the students. Some educators may let students choose groupings to enhance social competencies, nevertheless teacher judgement may be better when evaluating for capability and personality compatibility. In fact, it is this quality of managing student interactions that dictates group task success. However, Knoster (2014) challenges the notion of management altogether as it implies control as an inhuman, mechanical process.

Also relevant is the work of Thalluri et al (2014) who worked with pupil nurses and midwives to investigate the impact of a 'Study Buddy' Support (SBS) scheme in which pupils at risk of failing the course were 'paired up' with high achievers. In this study, 72% of 'at risk' pupils

who participated in SBS subsequently passed compared to 49% of those who did not take part.

The respondents put the success of the scheme down to a number of factors. For those 'at risk'

these included reassurance and a non-intimidating learning environment while, for the high

achievers termed 'buddy leaders', benefits included the consolidation of learning, the

development of networks and improved teamwork and leadership skills. This example, however,

could be seen as mentoring. For Eby et al (2010) this is where one participant has mastered a

particular topic and explains it to another and where the goal is the growth and development of the

mentee. In a classroom education setting this would involve the academically strong student

guiding the weaker one which this study does not aim to achieve.

Eisenkopf, (2010) looked at whether pupils of the same age could motivate one another and

found that, even before the actual cooperation took place, the mere fact that a pupil had a peer

with whom to share the work had a motivational effect. However, while he found that more talented

pupils were able to help their less able partners to improve their performance, the levels of

motivation among the less able partners fell as they were inclined simply to sit back and watch the

brighter pupils do the lion's share of the work. The findings of Carman and Zhang (2012) also

showed that having pupils work in pairs had both benefits and disadvantages, often depending

upon the pupils' level of ability. They found that pupils in the middle of the ability range benefitted

the most from linking up with more able peers, particularly when the task in hand had a strong

mathematical or scientific element to it. Heymari et al (2012) found that it was not academic subject ability that affected positioning. They found seating arrangements were determined by students according to their personality traits. Therefore, students with different types of personality would tend to gravitate towards particular areas in a large lecture theatre. Diem & Olsen (1997) on the other hand, have found that paired work, such as that envisaged by this study, has been shown to give rise to conflict and becomes time-consuming.

Many researchers believe that collaboration is a prerequisite for genuine learning. Piaget (quoted in Garton 2005) believed that interaction between peers gave rise to improved intellectual performance because it forced individuals to spend time co-ordinating their conflicting perspectives. Two pupils arriving at different answers to the same problem are unlikely to sit back and accept the situation, after all, one if not both of them must be wrong. However, a pupil working alone remains ignorant of any errors until a teacher intervenes. Working on a task with a peer as opposed to under the guidance of a teacher has also been shown to develop pupils' critical thinking skills. This is because a pupil is more likely to challenge a solution that is offered by a peer than one put forward by a teacher, whose credibility is not usually questioned by pupils.

Smith & Laslett (1996) argue that group work can be empowering for the modest or shy student. Whereas in a traditional class setting these pupils are unlikely to speak up, a group setting tends to be less embarrassing. Kewley (1998) argues that regular intervention from the

teacher makes pupils less likely to make the effort to clarify their own ideas. In addition, the pupil who enquires whether the teacher intends to 'go through the answers at the end' is actually, asking whether they have to do any thinking for themselves. Bizar & Daniels (2005) argue that discussion beats individual learning as the constant talk and clarification not only aids learning but echoes the kind of teamwork that is required and used every day in the workplace. Some differences between peer collaboration and teacher-directed learning are neatly summarised in the *appendix 3*.

A class seating arrangement is naturally related to learning style. The constructivist method advocated by the likes of Vygotsky and Piaget advocates minimal teacher instruction. Hattie (2012) acknowledges the benefits and powerful impact of co-operation however abandoning pupils to 'fight things out among themselves' is not a recommendation. Lin et al. (2015) found that, although teachers do not have to say a great deal in order to guide the deliberations of pupils, the influence of what they do say can be very significant. Indeed, Wood (1998) found that if teachers did not organise activities, children may be overwhelmed by indecision. Backing up the claim that without clear direction, pupils will tend to flounder, Kirschner et al. (2006) are quite dismissive of the whole approach of discovery-based learning. They claim that although these approaches are quite popular, pupils need a high degree of skill to provide what they call "internal guidance" before they can take on responsibility for directing their own learning. Furthermore, when a person faces

a problem that they have not encountered before, they are wired to look for someone to offer them guidance rather than make the effort to 'muddle through' themselves. This explains, in part, why pupils from stable home backgrounds with supportive parents will tend to fare better in school because that reliable or 'go-to' person is there to model an appropriate response to any problems that they face. Those who do not have the benefit of such support are more likely to struggle.

Bruner, (1976) guided by the ideas of Vygotsky, looked at instruction taking the form of scaffolding. This is when the teacher first engages the pupil in a problem that is beyond their immediate grasp, they then provide the assistance that is necessary to progress to the next level. Gradually the teacher will withdraw as the pupil develops the skills to tackle the problem alone. Pupils whose levels of ability are quite similar are unlikely to be able to help one another in this way for a number of reasons. First, they are likely to be suspicious of any claim made by a fellow pupil that they can show them "how it's done". Second, the pupil making such a claim is unlikely to be clear enough in their own thinking to be able to communicate it to others, or to rescue the situation when the 'stabilisers' are removed. The ability of pupils to direct their own learning and to persevere in the face of obstacles is crucial in this context. Grotberg (1995) looks at characteristics related to resilience, such as the ability to overcome in the face of adversity and the capacity to turn the tables. Brooks (2006) argues that this can be achieved by developing pupils' social competence, developing better relationships between them and caring adults, communicating high

expectations for pupils' academic and social performance and creating as many opportunities as possible for them to influence and be influenced by the school environment. Khan & Watson, 2018 studied an approach to learning, in which the teacher 'guides from the side'. Their research showed that in this kind of "flipped classroom", student's performance and understanding improved in mathematics as did pupil engagement. Unsurprisingly, students preferred the flipped classroom setting. The idea of pupil relationships strengthening learning might be seen as an effective learning strategy, but as Sutherland (1992) has pointed out, learning will not occur if lessons have no meaning for the pupils.

School Policy and Practice

The policy of School B, at which the study was conducted, does not dictate to teachers how they should arrange the seating in their classrooms. Nevertheless, lesson observations and glances through most classroom doors reveals that the unspoken policy was to encourage independent learning, albeit around desks that would allow for some, perhaps unintended, discussion to take place. Learning by experimentation and, by inference, from mistakes was not promoted to any great extent, possibly because, with the new content-driven GCSEs being embedded in schools, there is so much material for pupils to assimilate that there simply is not the time available for taking an experimental or creative approach to learning. Indeed, Hammer (1997) found that teachers interested in promoting student inquiry often feel a tension between that

agenda and the more traditional agenda of covering content. This tension is further exacerbated when students discover things other than what the teacher planned for them to discover.

The school policy is often quite prescriptive in nature, asserting that “students learn, develop and progress in a structured and stimulating environment.” This lends itself to the intervention strategy as a stimulating environment is a subjective notion. As with all local authority schools, there is an expectation that teaching standards are met. Relevant aspects for this study can be found in the Welsh Government ‘Becoming a Qualified Teacher’ handbook (2009) such as; clear rules and routines in the classroom, strategies to encourage high expectations of behaviour, and effective class management that involves pupils. At a departmental level, the guidance contained in the Department Improvement Plan, makes it clear that the development of the kinds of skills that were being taught in both the intervention lesson and the traditional scenario is a priority for the department. The school geography department plans to “(i) provide opportunities for pupils to extend their writing, provide support through reading behaviours strategies, writing frames & connectives; (ii) begin to filter down some skills from the new GCSE specification into KS3 teaching, e.g. opinion questions, choose the right graph to present data and (iii) continue to deliver numeracy strands throughout KS3 geography to support the skills of all pupils & to help prepare them for their NNR tests” (School B, 2018).

School B remains open, at least in theory, to innovative ideas and is keen to encourage new entrants to the profession to find their own teaching style by experimenting with different ways of doing things in the classroom, however this is under the supervision of a mentor. Professional judgment is the key to strategic decisions in the classroom. Teaching standards are displayed in staff areas and alluded to in policy documents, but classroom management is an area of teaching that is decided by the individual teacher. Rearrangement of classroom furniture, for example by a trainee, is generally met with resistance and moving pupils is not encouraged. Therefore what makes a stimulating classroom environment does not seem to be based on theory but dictated by the senior teachers and school mentors.

Methodology & Ethics

In order to develop professionally, teachers may carry out action research. By understanding their practices, learning can be improved. For Stenhouse (1975) this type of research is essential for curriculum improvement. Action research relies on data collection and analysis and Somekh (2006) points out that, in a process of triangulation, various data can be considered along with several viewpoints. For example, Noffke & Somekh (2012 cited in Somekh & Lewin) indicate that quantitative data may focus on knowledge to inform policy, whereas, qualitative data may be used to get a deeper understanding of practice and idiosyncrasy.

Qualitative educational researchers can make use of research diaries in order to record findings. In 1980, Armstrong analysed intellectual growth and by using this method it enabled him to describe and analyse in meticulous detail. Somekh & Lewin (2012) note that diaries may often be seen as introspective personal literature, but as research tools they can offer reflection and insight. As part of action research, a research diary can provide contextual information, reflections and ideas. Data entries that are rich can give the researcher more to work with. Critical to any data collection in a teaching environment is the process of observation. That is, the use of the self in order to witness, keep records and form impressions. An open observation method for data collection means anything seen as relevant could be recorded in a diary. However, Hopkins (2008) remarks on the problem of unfocused and judgemental reporting. Jones & Somekh (2012 cited in Somekh & Lewin) remark that sensory data is interpreted and given meaning, making it a subjective process, perhaps at odds with research aims. Flanders (1970) attempts to give observations more structure with schedules to remove bias by including categories and simple coding procedures for the observer. However, Jones & Somekh (2012) point out that bias is evident within the categories. In some cases unstructured observations may be preferable as the researcher seeks to use experience and knowledge to decide what to record, the risk being subjectivity and obscured meaning. Another disadvantage is that note taking may have to be done after the experiment especially in a classroom setting.

The assignment intervention will look at the responses of the individual in what Tymms (2012 cited in Arthur et al) classifies as 'individual random assignment.' (p.138). For Elliott (1992 cited in McAteer) action research is part of on-going professional development with an aim to improving practice. In order to fully benefit from action research the nature of observation and reflection must be recognised. Kemmis & McTaggart (2000) see action research as cycles of planning, observing and then acting on consequences. (*appendix 4*). However, for McNiff (2002) the process can be seen as messy in that it evolves and regenerates and is unpredictable (*appendix 5*). As touched on previously, qualitative data is open to interpretation therefore any subsequent quantitative analysis can be brought into question (Coe 2012 cited in Arthur et al 2012). Coe maintains that, in terms of recording data on pupil work or behaviour, validity may only be granted if all supporting evidence and context is considered. Content validity relates to the target domain and whether the whole of the domain was investigated by the assessment process. However, Munn-Giddings (cited in Arthur 2012) reveals that action research is not designed to simply describe a situation but is an educative process working towards change.

Undoubtedly, the research is unique to the time and place. For Coles & McGrath (2010) this kind of research is relatable as opposed to generalizable in that only similar schools in similar areas may benefit something from the results. Nonetheless, even quantitative data should be analysed with caution, Coles & McGrath (2010) stress that ratings or scores are often based on

opinions. Therefore, a piece of work in the classroom is graded based on the interpretations of the assessor; in cases such as this, the foundations for any quantitative results are built on the perceptions of the investigator. Classroom investigations require discretion as any qualitative input needs validity. It is difficult to gain validity when measuring feelings. A diary entry may describe pupils as 'engaged' but this in itself means different things to different people. McAteer (2013) makes a strong case for accepting the validity of attitudinal responses. She identifies the difficulties of objectivity in classroom based research because educators can only understand their role when they acknowledge human or anthropocentric approaches.

The work of Frankel and Warrel (2008) suggests a causal – comparative design may be appropriate for the action research as the differences in achievement between the pre and post-test groups can be compared. However, they warn that conclusions must take into account any amount of extraneous variables such as teacher experience or student background. Finally, connected to validity, is the usefulness of educational research. Gay et al (2012) recognize that, by undertaking research, teachers can become an authority on what works for them in the classroom. A willingness to identify an area for change and reflect on practice fosters professional endeavour. In fact, good teachers regularly partake informally in action research even if they don't realise it, because by looking at teaching and learning in a systematic way they are conducting research.

The following three paragraphs look at the research procedure along with the ethics involved. Pupils were notified of the research plans in advance, and given the opportunity to opt out. The cohort, a mixed-ability year nine class, were assured of confidentiality, and given two opportunities, one week apart, to complete a task which involved interpreting data and drawing a graph. All the pupils had drawn graphs previously. They were part way through a series of lessons on tropical rainforests which was broken down into three discrete sections: the location and features of the rainforest, the people of the rainforest, and deforestation. For the teacher, a diary was used for note taking. The notes were shredded after being typed up and any findings were kept on a password-protected memory stick.

On the first occasion the pupils were arranged in the standard class layout (*appendix 6*). This comprised of six tables, each of which could accommodate up to six pupils. Pupils were encouraged to work independently and, although they shared a table with at least one other, they had plenty of space around them and were discouraged from speaking to one another. The lesson was delivered by the teacher giving clear step-by-step instructions, each stage being backed up with examples that were displayed either on the whiteboard or on a PowerPoint slide. The pupils were provided with graph paper. The teacher reinforced the intended learning outcomes regularly by making use of the whiteboard. This teaching method could best be described as guided learning. However, at no point was the complete solution shown.

On the second occasion, the pupils undertook a very similar exercise but, as part of the intervention to encourage discovery learning, pupils were directed to sit in pairs with friends (*appendix 7*). This resulted in around half the pupils sitting somewhere other than where they had sat one week previously. Again, graph paper was provided for the pupils. However, on this occasion, the teacher, having introduced the task, provided only minimal guidance, for example, pointing out that the graphs had to allow room for the axis to be labelled. A much more flexible approach to classroom management was also adopted such that pupils were no longer discouraged from talking to one another but, conversely, encouraged to collaborate on the task. Pupils had no access to any work which they had done previously and, because the data had been altered, there was nothing to be gained from trying to remember the shape of the previous graph. The planned differences between the two lessons are illustrated in the table (*appendix 8*). On both occasions the standard of each pupil's work was assessed and the extent of their achievements recorded by placing it in one of four categories: (1) Task 1 only partly completed, (2) task 1 completed, but to a poor standard, (3) task 1 completed to an adequate standard, (4) both task 1 and task 2 completed. The pupils' achievements under each set of conditions are found in *appendix 9*.

Results & Evaluation

The intervention lesson was designed to be different in only two ways; the position of the seats and, who was in control of the learning. For seating in the first scenario, pupils were isolated while in the second they were asked to sit in 'paired pods'. Learning in the first scenario was teacher led, whereas, in the second scenario, it was designed to be pupil led. The intervention strategy proved to be trouble from the very start when two students, who are known for their reluctance to follow instructions generally, refused to move to the seats which they had been allocated. This meant that the intervention lesson was not set up from the start as was first intended and only around half the students were in a different seat from the outset.

That said, the students responded positively to the opportunity that they were given to sit with friends. They liked the idea that they had been encouraged to collaborate with one another. However, it seemed nobody had ever told them what 'collaborating' meant in the classroom. It was assumed they would know. For Lemlech (1991) co-operative work needs to be taught in order to create a positive, interactive environment. Consequently, as the intervention pupils had no training in collaboration, it was not long before they resorted to mischief instead of working together. The initial enthusiasm turned to low level disruption, including irrelevant chatter and other kinds of off-task behaviour. Discussions about how to proceed with the work, in many cases, then fell apart and, because the pupils did not have any negotiating skills to speak of, what often happened was

that one pupil dominated the other, who simply copied his or her work. As a result few if any pupils learned any more than they already knew. Pupils never really seemed to get over the novelty of the alternative seating arrangements and quickly saw that the intervention gave them more opportunity to gossip, which they definitely exploited to the full. Several pupils enquired of the teacher whether the seating arrangements put in place for the intervention lesson might remain in place for longer – not because their attainment and progress improved but because it would increase their chances of socialising as opposed to working during the lesson. Levels of engagement decreased significantly as the lesson wore on and all but the most talented students became both disaffected and distracted. It could be argued the intervention group lack ‘oneness’. Lemlech (1991) reasons that, a change of teacher or change of layout creates variables that can affect any prior interrelationships. In terms of human relations, the class group could be considered more as a crowd of spectators as ‘oneness’ has never been developed.

On a more positive note, pupils’ mood was better during the intervention lesson but this is possibly because they were able to waste a great deal of time on off-task behaviour. A change in attitudes could be put down to gender. Bramwell (1987 cited in Tillbury & Williams 2007) found that in geography, girls preferred drawing maps and group-work. Although Bramwell’s study is from a different era, the principle is the same. There may well be considerable differences in the topics that engage boys and girls. Martin & Marsh, (2005) have even shown that pupil’s levels of

motivation vary, according to whether pupils are being taught by a teacher who is the same gender as them. It is worth noting, that, regardless of gender, the more talented students appreciated the freedom afforded to them by the arrangements in the intervention lesson; furthermore, that the 'chaos' that was going on around them did not seem to affect them in any great way. As can be seen from the results, the number of pupils who managed to complete both tasks to a satisfactory standard remained the same in the intervention lesson as it did in the original, showing a surprising resilience.

In order to determine whether the differences in pupils' attainment in the two scenarios was statistically significant, each pupil's achievements were scored as shown in *appendix 10*. This gave a total score of 60 points for the whole class when using the usual classroom layout and 54 for the intervention layout. The averages of 3.00 and 2.70 points per pupil respectively show that the 'average pupil' barely completed even the first task to an adequate standard in either lesson and that they were further from achieving this while seated according to the intervention layout than they were when seated according to more traditional arrangements.

The results of the two different scenarios were subjected to further statistical analysis. First, a *T*-test was conducted to test the null hypothesis

h_0 = *seating pupils in collaborative pairs has no effect on their attainment*

The results of the *T*-test, for which the calculations are shown in *appendix 11*, give a *p* value of 0.47. This suggests that there is a likelihood that the changes in pupil attainment observed in the two lessons happened by chance. This is too great to pass even the most generous significance test ($p \leq 0.10$) so the null hypothesis stands, that is that changing the seating arrangements and encouraging collaborative learning does not significantly affect pupils' levels of attainment.

However, it would only have required four more pupils to complete the first task satisfactorily when seated in the traditional arrangement for the null hypothesis to be rejected. This is on the basis that, when sat in collaborative pairs, pupils performed *significantly worse* ($p \leq 0.05$) when the intervention was put in place. Put another way, the experiment came quite close to illustrating that implementation of an alternative seating arrangement had a detrimental effect on pupil performance in this class. For example, further analysis shows there was a marked difference in the number of pupils that completed the task to what was deemed to be an adequate standard. This fell considerably while the alternative seating arrangements were in place from ten students (50% of the class) to just six students (30%). The number whose efforts were deemed "poor" also increased by two, as did the number who failed to complete even the first task. This is a noticeable decline and, potentially, these students had, until then, derived a lot of their security from the obvious presence and guidance of the teacher.

For Rogers (2006) it is students that are able to benefit from the expectation that a teacher maintains a positional place to boost attention and focus. Consequently, once the intervention was applied, and the teacher role became more 'laissez faire' it was no longer clear to the pupils who were responsible for their learning. Mcmanus (1989 cited in Smith & Laslett) points out that any lack of structure or routine is seized upon by students as an invitation to push the boundaries of behaviour. Similarly, Weber (1982 cited in Smith & Laslett) has shown how predictable routines can help reduce unacceptable behaviour. While some saw the intervention as an opportunity to step up to the plate and show that they were able to work independently, a significant minority took it upon themselves to use this as a chance to feign confusion. This probably explains why the number of points deducted for poor behaviour is greater in the intervention scenario than in the traditional one. Lemlech (1991) stresses the importance of classroom community, particularly the responsibility of the teacher to facilitate positive relationships and interactions. Perhaps this lack of guidance meant the intervention class were unable to appreciate the learning experience.

It is also possible that, because of the teacher's constant presence and intervention in previous classes, these low-achieving students have fallen into a state of "*learned helplessness*" (Study.com, 2018), that is they have come to believe that they are incapable of completing tasks and that they have little or no control over their environment. Such students are likely to attribute their failure to complete a task to their own lack of ability (internal attribution) while believing that

their occasional successes are not down to anything that they have done (global factors attribution). They are therefore predisposed to thinking that changing the seating arrangements in the classroom is not going to make any difference to their ability, in this case, to draw a graph. The intervention, which lacked any differentiation, perhaps backs up research carried out by Kerry & Sands (1984 cited in Smith & Laslett). They found that the vast majority of group work is not differentiated, which in turn can limit engagement and learning. Another limitation to engagement is the type of activity. Roberts (2013) considers some geography tasks as more suited to group-work than others. For example, a presentation that can be discussed beforehand and which there is no single definite answer. This belief runs contrary to the intervention activity. It is clear that any outcomes are highly dependent on a seemingly endless set of values.

A closer examination of pupils' achievements under the two different scenarios reveals a number of other points of interest. To begin with, the change in approach has the least effect on what might be termed as the two extremes of what Belsky & Pluess (2009) refer to as a spectrum of engagement (*appendix 12*). This tool places students on a continuum from the inimical, who show actual hostility towards the task, through the passive and plastic who can be persuaded, to the proactive who are able to seize the task and apply themselves. For the purposes of this investigation, the two extremes are represented on the one hand by pupils who completed only part of task one (least engaged) and those who completed both task one and task two (most

engaged). Under both sets of conditions, an identical number of pupils managed to complete both tasks and the numbers of pupils who made the least progress only varied slightly from four under normal conditions to six under the intervention. Belsky and Pluess suggest that this may have something to do with differences in human plasticity, that is to say that some individuals are more open to doing things differently than others because of what they have experienced when they have taken risks in the past. It might therefore be the case that the class comprises a large number of students whose experiences have caused them to 'pull down their emotional blinds' and become 'hard-hearted'. These emotionally resilient pupils, perhaps with closed developmental avenues, are unlikely to respond to changes in conditions whether they are supportive or unsupportive. It is possible that several students cannot be significantly changed by any future experience.

In the realm of neuroscience, Feder et al, (2009) studied those individuals who adapt well to being in a stressful situation such as a disruptive classroom environment. Those who can successfully manage their responses to the triggers that they are experiencing and not go 'off the rails' are able to demonstrate 'psychobiological allostasis'. Masten & Coatsworth, (1998) have explored the psychosocial determinants of stress resistance. For example, capacity for self-regulation, positive emotions, and social capability with peers were just some of the factors. More recently, significant scientific advances have made it possible for people to begin to understand

the underlying biological processes that are going on in the minds of those who are uncharacteristically able to cope with whatever gets 'thrown at them'. For example, studies undertaken by Heim and Nemeroff (2001) showed that when subjected to significant stress in early life, excessive amounts of a corticotropin-releasing hormone (CRH) are released into the bloodstream and that, when levels of this hormone reach chronically high levels, patients' cognitive functions are impaired. Furthermore, large amounts of noradrenaline released in stressful situations can lead to anxiety disorders which cause pupils to lose the confidence that they need to tackle new problems with any degree of self-belief.

Conclusions

The intervention lesson certainly did give opportunities for pupils to extend themselves as the school policy required, but most students seemed ill -equipped to take advantage of them. They had not received sufficient instruction in how to go about directing their own learning, so that when the time came for them to work alone, they lost focus and decided to socialise instead.

The difference in the extent to which pupils succeeded in completing the work when they collaborated in 'paired pods' as opposed to when they sat in the more traditional layout could be put down to any one of several complex social factors as noted earlier. These include whether the pairs were single-sex or mixed-sex, the difference in cognitive ability between the paired pupils,

their emotional and/or physical state, even whether they had eaten breakfast that morning. Certainly, a consideration of gender may have revealed points of comparison with the work of Bramwell (1987). The fact that pupils were free to choose their partners also opened up the possibility that they would select people on the basis of friendship. There was no attempt to put able with more able, have single sex or mixed pairs. In short, there were many things going on, as explored earlier, that were beyond the realm of the classroom intervention but which may have affected the outcome in unforeseeable ways.

Second, the research tools were too blunt and open to interpretation. The classification of work into categories was a subjective task. In essence, what one researcher might consider completed to an “adequate” standard, another might consider “poor”. Also, there is the issue of when a piece of work is “completed”. Is a graph without a title, for example, “incomplete” or is this seen as a significant omission on the part of the pupil?

The differences between the two seating arrangements were also, potentially, too few to make a significant difference. The dynamics of the classroom were never going to be transformed to any great extent if only some of the pupils sat somewhere other than where they normally did. Also, it should be noted that at least two of the students protested at being allocated different seats and were not willing to participate in the intended intervention lesson. Such studies, taken individually, are seriously limited in *generalizability*. If, however, several teachers in different

schools within the same local authority, for example, were to investigate the same question in their classrooms (thereby *replicating* the research of their peers), they could create a base of ideas that could generalize to policy or practice.

From this research, it is not clear than whether seating plans have any impact on pupils' attainment. It proved too much of a challenge to isolate that one aspect of classroom management to be able to say with any conviction that it was seating arrangements alone that affected pupils' levels of motivation and attainment. There are, however, some useful conclusions that are worth taking note of.

First, although pupils may respond positively at first to changes in the classroom environment, especially when they appear to offer the pupil increased autonomy and responsibility, they invariably lack the capacity to see beyond the novelty of the situation and the change in the classroom dynamic is not sustained. This may be because many students, through years of 'teacher-led' learning where they have rarely been challenged and often given the answers 'on a plate', have got into a state of learned helplessness. They expect teaching to be 'done to' them rather than 'done with' them. As a result, these pupils have very low boredom thresholds and become disengaged almost as soon as it becomes clear that they are being required to think for themselves.

Second, it seems that, even though there is a large number of students who end up adopting this helpless mind-set, there is a minority who will thrive in the classroom in spite of all the chaos that is going on around them. These pupils, rather than being phased by the less structured classroom environment are able to use it to their advantage and showed increased levels of interest in the work.

Seating plans certainly have their part to play in allowing teachers to exert their authority over a class, especially in the early part of the academic year when the teacher does not know a class well but 'playing around' with them in an unstructured way allowing pupils to wrestle control of who sits where from the teacher is counter-productive. Conversely, being evangelical about one's seating arrangements can also backfire on the teacher, particularly if sticking to them religiously precludes the possibility that pupils might get the chance to collaborate on occasions. The best approach seems to be for each teacher to find out what seating arrangement works for them personally and, then, have the classroom management skills to stick with it and not be influenced by the pleas of students who would, for whatever reason, rather sit with their friends. Whatever the case, personal choice is linked to hierarchical decisions. Donaldson (2015) has made recommendations which are gradually being implemented by many Welsh local authority schools. Teachers that are unwilling to consistently embrace collaborative learning are perhaps failing to equip pupils with an important life skill which is key to the ideas in 'Successful Futures'.

Limitations and Future Development

The value of this study could be seen as somewhat limited. This was, at least in part, because there were too many variables that were not explicitly considered and even if they were to have been expected, could not be controlled. The unwillingness of certain students to co-operate and accept the new seating arrangements caused problems from the outset and the challenge of managing the pupils who either did not know what to do or exploited the state of uncertainty that arose in the classroom meant that the teacher was distracted. So, instead of focusing on research aims, the teacher becomes involved in dealing with incidences of low-level disruption.

The evidence gathered from this one class is not enough to go on to draw any generalized/generalizable conclusions, nevertheless a lack of 'oneness' could be investigated in future from a school or relatable viewpoint. For example, it does perhaps illustrate some of the difficulties teachers are likely to face in terms of implementing Welsh government guidelines, especially in schools that have yet to instigate collaborative pedagogies. In particular, such a study may be of use to an inexperienced teacher as they juggle with current recommendations and classroom layout. It might be argued that a trainee's lack of classroom management skills and inability to keep all the pupils on task during the lesson meant that any benefits that might have accrued to pupils through collaborative learning were all but lost in the disordered classroom

environment. A more experienced teacher may have been able to exert more control over students and gathered more focused results.

Nonetheless, it is the resilient cohort of a minority of pupils who proved to be of greatest interest and it would, be genuinely useful to take the study further with these pupils who, in spite of others misbehaviour and disengagement, were able to complete both of the tasks in both the traditional and intervention scenarios. Could they, for example, have achieved *even more* under the intervention scenario had there been a third task? What was it about their attitude to learning that meant that, even when others were disruptive and lost interest, they were able remain on task? Was their ability to persist attributable to their gender, perhaps? Was the task suitable for group work? Perhaps taken separately, these are credible issues for future interventions.

The influence of the character traits of different pupils and how these can be taken into consideration when implementing seating arrangements is also worthy of further study. When determining seating plans, many teachers refer to information about students' attainment, their reading ages, their special educational needs and their patterns of behaviour. These are all useful but it could also be beneficial to look more carefully at pastoral information such as details of friendship groups and past conflicts. A more carefully controlled experiment, which made more effort to isolate just one or two, factors that influenced pupils' attainment might also be more worthwhile. Specifically, pupils could be paired up with someone whose attainment levels differed

greatly from their own or, alternatively, with the person whose cognitive abilities were most similar to theirs. Would pairs of pupils at a similar level of understanding collaborate more effectively than, say, pairs when one was a talented pupil and the other was one of the least able in the class? Is it a desk right in front of the teacher's nose?

More invasive and, therefore, fraught with ethical problems would be an investigation into levels of certain chemicals in the brains of different students and how this either enhances or detracts from their ability to work independently and persist in the face of difficulties. It is, however, at this microbiological level, where the potential exists to find things out that would significantly increase our understanding of why some people can, by and large, teach themselves and others need clear instruction and close supervision.

The research results suggest pupils were not capable of producing good work based on collaboration and minimal instruction. There were too many variables at work and, despite attempts to make the two lessons as similar as possible, controlling them all to the extent that it could be claimed that it was the seating arrangements alone that made the difference was virtually impossible.

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