

How do teachers help students learn?

According to the *Department for Education (2010)*, the most important factor in determining how well children do in school is the quality of their teachers and the teaching they provide.

This idea is not restricted to the **United Kingdom**. Worldwide the argument stands that the most effective education systems are determined by the quality of the teachers (*Barber and Mourshed, 2007*). **Although** the link between teaching and learning is clear, there are numerous ways in which teachers can help students to learn.

Comment: The implication here is that the DfE governs education in the whole of the UK this is not true – Scotland, Wales and NI all have their own education departments.

Comment: Why “Although”?

One of the ways in which teachers can help students to learn is by having strong subject knowledge and understanding. In recent years, the United Kingdom government have offered financial incentives to those with higher class degree qualifications suggesting that they regard those with strong academic backgrounds as being more effective teachers (*DFE, 2010*). *Allington and Johnson (2000)* support the idea that academic success can influence teaching ability and claim that it makes the biggest difference to teaching ability when combined with other desirable teaching qualities such as interpersonal skills, strong literacy and numeracy levels and the enthusiasm to **teach**. **Although** they recognise the importance of academic success and **thus** **subject knowledge**, they also suggest other factors which are important. *Shulman (1986)* argues that “mere content knowledge is likely to be as useless pedagogically as content free skill” thus indicating that subject knowledge alone does not help teachers be effective at helping students to **learn**.

Comment: Yes but other empirical studies suggest little connection between degree class and quality of teaching. E.g. Clark (2013)

Comment: The other question here is what is the correspondence between degree subject knowledge and school subject knowledge why should the Physics Degree make you a better science teacher?

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Comment: Some good argument of both sides here – Shulman is important here – I would also look at Leach (2002)

External factors are arguably the most difficult for teachers to control in order to increase students’ ability to learn. External factors can vary from socio-economic backgrounds of students, to the amount of sleep students receive before lessons, all of which can influence students’ capacity to learn. Many of these factors are beyond the ability of the classroom

teacher to control and thus can and do hinder children's ability to learn and succeed.

According to the *DFE (2010)* those students from poorer homes continue to be outperformed at school by those from more advantaged backgrounds. Educational initiatives such as the pupil premium, in which schools will receive up to £2.5 billion between 2014-2015 to support those from disadvantaged backgrounds, have been introduced to address this educational gap (DFE, 2010). However, to date there has been negligible impact and of those who meet the requirements for the pupil premium, only 36% achieved 5 GCSEs A*-C (including English and Maths) in 2011/2012 compared to 62% of those who would not be eligible (i.e. are from more advantaged backgrounds.) (DFE, 2013) If governmental educational initiatives are failing to manage external factors then surely the impact of the day to day classroom teacher is to be minimal.

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Comment: An interesting supposition – and you are correct to identify the limiting impact of this Salhberg (2012) comments on this as the teacher probably only has 30% of the impact on the final achievement of the student and Duckworth's work on grit is also interesting.

According to *Kyriacou (1991)* "effective teaching is primarily concerned with setting up the learning activity which brings about the type of learning the teacher intends" suggesting that the effective planning of lessons can help students to learn. This link between effective planning and the quality of the learning in the classroom has been explored for many years and there is plenty of evidence to support this idea (*Hay Mcber, 2000*). *Lambert and Balderstone (2010)* acknowledge a close relationship between the quality of teaching and learning and the effectiveness of planning, yet they suggest that more importantly than this is the understanding of how students learn in general and how the teacher's class learn as individuals. This would indicate that perhaps the effectiveness of planning is determined by a teacher's ability to understand and indeed manage their class's learning and not by applying a one-size fits all approach to their classes.

Comment: This is a very important observation the dynamic relationship between the plan and the teaching and the learning and the key not the "perfect" plan – there is no such thing as the "perfect" plan.

There is also an argument that effective planning can minimise behavioural issues, which can negatively impact learning, as students are engaged in high interest lessons, thus self manage

their own behaviour (*Moore and Hansen, 2011*). Although theoretically this principle seems well evidenced, it is based upon the assumption that the students have the ability to self regulate their behaviour and that they will all find the same topics and activities interesting and engaging which may not be case.

Comment: Though as you note above a teacher who knows the individuals is more likely to be able to target activities that engage..

Although teachers can help students to learn in many different ways, the chosen focus of this paper is on both classroom management and on an understanding of neuroscience and will discuss the extent of how an understanding , and application, of theory in these fields can impact teachers' ability to help students learn and explore any possible limitations of putting this theory into practice.

Comment: Good. A good introduction with a clear description of what you are focusing on. It would have been useful to have a rationale for these choices.

Despite widespread acknowledgement that education is dependent upon brain processes, the field of neuroscience in relation to education is still quite a new phenomenon and very little is understood about these processes and their relationship to learning (*The Royal Society, 2011*).

Comment: I think I would say "young science"

With new research aiming to shed light upon the mental processes involved in learning, the field has great potential to impact and shape the future approaches to education (*The Royal Society, 2011*). This is particularly well highlighted by the recent announcement that £6 million worth of funding is to be placed in evidenced based research into how secondary school student's brain functions (*BBC, 2013*). Due to the dynamic nature and indeed uncertainty of the impact of neuroscience on education, this topic is of particular interest to the author, and this essay aims to assess the impacts, and practicality, of teaching using an understanding of neuroscience within the classroom to aid students' learning.

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Savage and Savage (2010) define classroom management as 'the establishment and maintenance of the classroom environment so that educational goals can be accomplished'.

This definition in itself would suggest that effective management of the learning environment can help or hinder the ability of students to learn. But what exactly constitutes the maintenance of the classroom environment? This essay will consider the establishment of routines, the use of seating plans, and the management of behaviour as methods of managing the learning environment in order to enable students to learn.

Although these areas; classroom management and neuroscience, appear to be quite abstract, there are areas in which research into the fields overlap and therefore it is possible to discuss how an understanding of neuroscience can influence classroom management. There is little argument that a key factor of classroom management is the management of behaviour yet one of the largest areas of neurological research in education is into rewards based systems and how the brain processes these rewards (*Howard –Jones, 2008*). These reward based systems are highly recommended by OFSTED who suggest that the most effective schools use rewards to encourage positive behaviour (*OFSTED, 2001*). Therefore not only can neuroscience have the potential to impact future education approaches but can also influence existing classroom management.

Comment: It would have been good at this point to bring in the behaviourist approach to learning as this is well established and Howard's work is now providing a neuroscience explanation for the idea of Pavlov, Skinner et al.

Establishing clear routines in the classroom can enable students to learn more effectively and can increase academic performance (*Vallecorsa, DeBattencourt and Zigmond, 2000*). At School X teaching staff are expected to meet students at the door and provide a settling activity for students to complete as they enter the classroom. This is followed across the school in order to establish a consistent routine where students are aware of what is expected of them and are immediately completing learning activities which either introduce the new information for the lesson or recap the previous learning. This enables students to begin their process of learning immediately after entering the classroom yet also enables them to become

effective self-managers and take responsibility for their own learning whilst enabling the teacher to conduct administrative tasks such as taking the register and checking homework (Colvin and Lazar, 1995).

Establishing this routine as students enter the classroom can also improve behaviour for the lesson as students are immediately engaged in the learning and as such the opportunity to misbehave is removed (Docking, 2002). In a Year 9 geography lesson at School X, the student teacher found that by providing an easy and engaging settling activity of a key words word search to students as they entered the classroom resulted in an improvement in students' behaviour at the start of a lesson, thus making it easier to achieve the learning objectives. Disruptions were minimal as students were focused on the task provided and this enabled the student teacher to deal with administrative activities and latecomers quickly. Whether this improvement in behaviour can be attributed directly to the routine or to the provision of the activity is questionable as it must be noted that external factors can also influence behaviour, and in this case, possibly the growing relationship between the student teacher and the students may be accountable for the positive behaviour.

Comment: Is there an assumption of an agreement what "misbehaviour" is noise is often equated with misbehaviour for example – if the activities are not offering learning gain then are they productive?

Although it is suggested that having a clear classroom routine can positively impact student's ability to learn, there may be negative consequences on learning when the routine is disturbed (Burden, 2003). During observations at School X, it has been noted that when there is a disrupted start to the lesson and the established routine can not be followed, then the amount of time it takes students to settle and begin the learning cycle is increased. In an observed Year 7 Religious Studies lesson, the classroom teacher arrived late to the lesson due to a behaviour incident on the corridor, therefore, the set routine could not be followed, and the

Comment: Does this counter the idea that students are being conditioned to be self-managers of learning?

number of behaviour incidences increased and thus, the learning objectives were not fully achieved.

So, whilst having a clear routine has some positives, in the instances when the routine must be broken, for example, in the case of a teacher's absence it may be problematic and hinder student's ability to learn.

Teachers can help students learn through the implementation of a seating plan. According to *DFE (2006)* 'all teachers should operate a classroom seating plan' and placing students in rows can help minimise disruptions and increase the amount of time spent on-task (*OFSTED, 2005. Hastings and Schweiso, 1995*). At *School X*, the student teacher has seen positive results on behaviour, and thus fewer disruptions to learning, when placing students in seating plans. This being said, with some classes, the student teacher hasn't found it necessary to place students in seating plans as with some groups, regardless of no set existing plan in place, there are little or no behavioural issues which disrupt learning. Therefore, a further argument could stand that the teacher's knowledge and relationship with the class can determine the effectiveness of a seating plan, an idea which is further explored by *Higgins et al, (2005)*.

Comment: I think this is the Steer report you are referring to – so

Comment: Again a nice critical approach to the assignment drawing on your own experiences to question a "set" idea.

Although there is little debate on the creation of seating plans there is however, great discussion on the layout of the seating arrangements. *Hastings and Schweiso (1995)* suggest increases in the amount of time spent on-task when seating plans change from group based to rows, a view which is further supported by *Higgins et al (2005)*. However, this could arguably hinder learning if the Vygotskian learning theory is considered. If, as Vygotsky, suggests, learning is a social activity in which students learn from the 'more knowledgeable

other' which can be their peers, although students may be more 'on task', is it possible that they aren't being stretched or their learning is being hindered due to the seating arrangements in the learning environment (Vygotsky, 1978). Beadle (2010) agrees with this and suggests that group seating arrangements can help children to learn as they allow for group speaking and listening activities which help students to learn 'most effectively'. This dialogic way of learning where students to teach each other and discuss issues, ideas or concepts may actually help the students gain a deeper understanding (Slater, 1989).

Comment: I think the question that should be explored here is what is "on task" there can be an assumption that children who are (i) quiet (ii) producing more quantity are "on-task" – the key question must always be "what learning is taking part in this classroom" and how can we measure that.

Comment: Also Alexander and Mercer's work on dialogic suggest this.

At School X, in a year 7 lesson on rivers, the student teacher placed students in groups to complete a river management decision based lesson, as opposed to their usual rows. The student teacher found that there was increased engagement with the lesson and it was easier to begin these dialogic learning conversations in which students were discussing the positives and negatives of each river management technique. Furthermore, students with lower target levels were verbally giving more sophisticated and higher level answers than was anticipated. It would be easy to attribute this entirely to the mixed ability grouped seating arrangements where students are supporting and challenging each other yet equally, it is possible that the novelty of the seating arrangements and the learning activities planned are responsible for the increased engagement.

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Comment: Do you mean with the lesson or with the tasks / learning – a subtle but important difference.

Comment: Well recognized this is know as the Hawthron effect where novelty has a positive effect on learning. However the social interaction as an impact should not be discounted. A very useful illustration and a good use of learning theory to support this idea.

Although there appears to be pedagogic value in having certain seating plans sometimes it may not be possible for teachers to make these decisions due to group size or room size. (Mcnamara and Waugh, 1993). Nevertheless, the evidence for using a seating plan to manage behaviour as well as for pedagogic reasons is compelling although the particular layout of the seating arrangements may well be dependent upon both the teachers' pedagogic views and the behaviour choices of the students.

Teachers can help students to learn by managing students' behaviour in the classroom.

According to the *National Association of Schoolmasters Union of Women Teachers* (NASUWT), on average, UK secondary school teachers lose fifty minutes per day of teaching time due to poor student behaviour (*NASUWT, 2010*). Furthermore, students have also acknowledged the impact of poor behaviour on their ability to learn and in studies conducted by *OFSTED (2007)*, 40% of students felt that being in 'a better behaved class' would help them to achieve at school. This would suggest that if teachers effectively manage behaviour in classrooms then the amount of time teachers could spend helping students to learn and the achievement of students would increase. *Bru (2009)* however, disagrees and suggests that the academic achievement of students is not significantly lower in classes which have higher numbers of disruptive pupils. In School X, the student teacher has two year eight classes of equivalent academic ability (based upon target grades and the school pathway system) however, one class is more behaviourally challenging than the other. In a lesson on rainforests, one class completed more of the learning activities than the other in a lesson of equal time. The class which produced the least work also had more behaviour incidents which the teacher had to deal with and as such the learning was impacted due to time lost because of behaviour incidences. Although, it must be noted, that the classes contain different pupils each with individual needs and external factors such as time of day, day of the week can impact the amount of work produced, it is strongly believed that at least part of this can be attributed to learning time lost due to behaviour incidents.

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Comment: Be careful of aggregation taking away the story of the individual. So, in extremis, a class of children split evenly between high and low achievers could appear the same as a class of median achievers but other issues would probably happen in the disparate class.

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The management of the behaviour itself can help students to learn; learn about what is expected of them in the classroom and learn about which behaviours are acceptable and which are not so. Teachers can help students learn by establishing rules and consistently

enforcing them. This can be done by teachers using an understanding of learning theory. A rewards based system based upon the work of *B. F Skinner (1950)* can be beneficial, where, the positive behaviour (which the teacher wants students to continue) are rewarded (*Evans et al, 2003*).

In School X, students who show positive behaviour and meet the expectations of the classroom teachers are given rewards cards, which are then redeemable for VIP school passes which enable students to privileges in the lunch queues and at home times as well as being entered into prize draws for football tickets and shopping vouchers half termly. *Hoffman et al. (2009)* have however, suggested that the effectiveness of these rewards systems are dependent upon both the teacher's efficiency on remembering to give these rewards and the students desire to earn the rewards, and he argues that these rewards based systems tend to be aimed mainly at younger pupils, with the effectiveness being severely reduced with older students. At School X, due to the financial benefits of the rewards, the rewards based system still has some credibility with the majority of the students yet it has been noted that some of the older students are less engaged with the rewards system than younger students. At School Y, (where the author has previously worked) this disengagement with the rewards system with the older students is more obvious but this is possibly due to the fact that there isn't the same financial reward system from the school and thus there is less desire to earn the rewards. Another factor to consider in the effectiveness of these rewards based schemes in helping students to learn, is the socio-economic status of the catchment area. At *School X*, the majority of the students are from more disadvantaged backgrounds (as indicated by the Free School Meal Data) so the financial incentive of the reward may have more credibility than at *School Y* which is in a more affluent area and has fewer students entitled to Free School Meals. This would indicate that perhaps, as *Hoffman et al, (2009)*, suggest that the

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Comment: Again good use of illustration in the practice to illuminate the theory.

strength of these rewards based schemes is in the students' desire to earn the rewards and as such, the quality of the reward as well as external factors such as socio-economic factors can influence its success. Thus, although teachers can use rewards based systems to encourage positive behaviour and help students to learn, the real success of these can arguably be down to the students and their desire to obtain the rewards.

Comment: Good observation and analysis.

An understanding of neuroscience research can help teachers adapt their behaviour management in order to decrease the amount of time wasted due to behaviour incidences, thus increasing the amount of time spent on learning activities. There is an argument that the brain's response to reward or sanction is dependent upon the age of the child, as students move into the adolescent period, the use of negative feedback e.g sanctions is more effective in improving performance than reward based strategies which work more effectively with younger students (*Van Duijvenvoorde et al 2008*). This could also be used to explain the lack of effectiveness of rewards based behavioral systems with older students as discussed. This would indicate that teachers can help students learn by varying their use of behaviour management strategies dependent upon the age of the students in their classes, thus helping them learn about what is expected of them in the classroom environment.

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Comment: Good.

Teachers can help students learn by creating new experiences for students or linking subject material to existing experiences as this can help students gain a deeper understanding of what they are learning (*Westwater and Wolfe, 2000*). This idea is supported by *Fletcher et al (2003)* who suggests that when you link information to existing experience there is an increase in the activity in the left interior prefrontal cortex of the brain which is the area in which meaning is constructed, this making information more memorable. In a geography lesson at *School X* focused around flooding, the student teacher chose to use the 2007 Hull

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Comment: Sorry only English and other languages get a capital ;-)

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floods as a case study of the causes and effects of flooding. As *School X* is in Hull some of the students had experiences of the Hull floods and chose to share these personal experiences with the class. *Westwater and Wolfe (2000)* suggest that by making the connection with information already stored, the brain will have enhanced ability to make sense and process this new information. As students already had an understanding of the floods and information was stored in one area of the brain, it is possible that students had a greater understanding of the new information provided. This idea is also supported by constructivist learning theorists such as *Bruner*, who suggest that learners construct new knowledge based upon current or past experiences (*Bruner, 1960*). It is possible that linking subject material to existing experiences can have a negative effect on learning, for example, if the current or past experiences contradict or cause confusion with the subject matter at hand. An example of this can be seen at *School X*, where, following a lesson on the Hull floods of 2007, tidal surges caused flooding in the Hull and Hessle area in December 2013. Thus, in subsequent lessons, despite students having shown an understanding of multiple causes of flooding, they continued to discuss tidal surges as that was the most current and relevant experience to their personal lives at this time. This would suggest that although there are benefits to helping students make connections in order to enhance their learning and brain functions, perhaps teachers should exercise this with caution to ensure students aren't getting a limited or restricted view on the subject based upon their own experiences.

Comment: This is a very strong passage linking in your ideas from neuroscience, constructivist theory and your school experiences.

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Teachers can help students learn by using small, varied activities which suit a variety of learning styles. Due to the teenage brain being 'less ready than the adult brain to carry out certain processes' teenagers can find it difficult to complete tasks such as directing attention for long periods of time (*Howard-Jones, 2009*). At *School X*, lessons are one hundred minutes in length, meaning that students are required to concentrate for particularly long

periods of time (in comparison to other schools) despite, according to *Howard-Jones (2009)*, their brains having limited capacity to do so. Thus, there would be some benefits in teachers using shorter more varied activities to enable students to direct their attention.

Comment: Or having a "5 min stretch" in the middle of this period.

There has been recent debate as to whether movement, prior to and during, the learning process can help students concentrate, store and recall information more effectively, thus improving the capacity to learn. This idea of 'Brain Gym', coined by Paul and Gail Dennison in the 1970's, is based upon the theory that if more areas of the brain are working (and the brain is balanced) then students will learn more effectively due to the interconnectivity of the brain (*Dennison, 1981. House of Commons Science and Technology Select Committee, 2009*). This would suggest that teachers should incorporate some opportunity for students to move during the lessons as a way of increasing the capacity to learn. However, recent neurological research in the field has shown that there is little quality evidence to suggest that this is effective in raising academic achievement and any research that has been undertaken in the field suggests that it may be due to other neurological reasons and not those which Dennison suggests (*Howard-Jones, 2008*). An alternative reasoning for brain gym is provided by *Hileman (2006)* who argues that small amounts of movement (even standing) can help students learn as it helps blood flow and oxygenates the brain, thus enabling it to perform more effectively.

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Comment: Yes the studies (such as Hileman) indicate that blood flow and this oxygen is the reason as the majority of the oxygen use is in the brain – MRI scans have show this increase after moderate exercise. Brain Gym as a learning activity has been pretty discredited.

At School X, the student teacher has tried to incorporate opportunities to move around the classroom for students in lessons to varying degrees of success. In a Geography lesson, year 7 students were involved in a carousel activity in which they moved around the classroom to look at photographs of flooding and make inferences about the effects. The students appeared

to have engaged with this activity and commented on how they enjoyed it, however whether this can be attributed to neurological reasons or novelty value is difficult to assess.

Comment: Excellent self-critique.

During observations at School X, one teacher encouraged his year 8 class to create dance moves for each of the plate boundaries and in subsequent lessons students were seen to be utilising the dance moves by way of memory recall. Although this would indicate that this type of movement could be successful, the observation also highlighted a potential problem with this type of activity as some of the students refused to engage with the activity due to concerns about what peers would think. Although, evidence in this area is highly debated, until disproven small amounts of movement can easily be incorporated into lessons by teachers as part of their classroom management, such as asking students to hand out equipment or by moving around the class to find a partner, if there is some potential benefits to learning. At the very least, due to the longer length of the lessons at School X, this could be a welcome break for students so that they can regain concentration.

Comment: Walsingham has done work on this idea of embedded or mnemonic memory where multi-pathways are lit with multi activity thus giving higher activity in the synapses and stronger memories.

Although teachers can utilise some aspects of neuroscience research to impact their teaching and thus their ability to help students learn, some aspects are very difficult for teachers to control. There is strong evidence to suggest that external factors such as physical health, exercise, sleep and nutrition have significant impacts on the cognitive function of the brain and thus can impact the ability to learn (*The Royal Society, 2011*). In a study by *Dang-Vu et al., (2010)*, sleep deprivation was found to have considerable effects on memory recall and can therefore, potentially hinder the ability of students to recall information from previous lessons. Although teachers have little to no control over the amount of time that their students sleep for, school initiatives and the emphasis on physical wellbeing and health in a general sense could possibly result in increases in the learning potential of students. For example,

Comment: But perhaps this means teachers should be in bed by midnight ;-)

School X, incorporates personal health, social and wellbeing education within its tutor programme and was awarded a healthy school's status, as well as holding strong partnerships with local sports teams. That being said, all teachers can do is promote this healthy lifestyle and cannot control it, especially outside of school hours. This is highlighted particularly well by their OFSTED report which praised School X for promoting healthy lifestyles, particularly with their partnerships with local sports teams, yet showed that the uptake of healthy lifestyles was merely satisfactory (*School X OFSTED report, 2011*).

To conclude, much of the work on classroom management is based on the assumption that effective learning comes from effective behavior management with seating plans, rewards systems and routine having an impact on this behavior. Although teachers can create and enforce these management techniques, it could be concluded that for each of them other factors such as the relationship between students and their teachers, or student's desires and motivations to participate in routines and rewards systems that determines their effectiveness. The relationship between the students and their teacher suggesting which seating plans or rewards are indeed effective with their particular class and the self-motivations (perhaps neurologically based or behavioural) of the students in dictating their responses. It would be fair to conclude that although teachers can have an impact on students' learning through understanding their students and the theory behind how students learn, students have to take an interactive role in this process and have the motivations and attitudes to learning.

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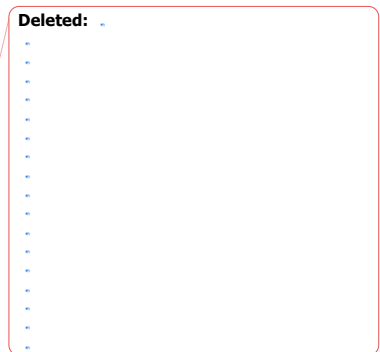
The areas of neuroscience looked at can easily be incorporated into everyday teaching to some degree; such as trying to connect areas of learning to familiar experiences or enabling students to move slightly around the classroom. Although there is still great uncertainty over some of the areas of neuroscience due to the dynamicity and relatively new nature of the

field, surely if there is a benefit to the students, then it is the responsibility of the teacher to explore these in an attempt to give their students the best possible opportunities to learn. Obviously the extent to which teachers incorporate these is at their discretion; it is not suggested that every teacher insists on their students doing aerobic exercises in order to increase blood flow to the brain, yet enabling students to move to find a partner or the teacher promoting healthy lifestyles is not particularly radical yet may have impacts upon the ability of students to learn. The recent announcements of funding into neuroscience education should be most welcomed and can potentially increase the ability of teachers to help students to learn in the future.

Finally, teachers can impact students' learning in a variety of different ways, with the use of effective classroom management and an understanding of neuroscience being amongst them. However, it is very difficult to draw solid conclusions about the impact of one area in isolation. There are multiple contributory factors which are all interlinked which have an impact upon students' learning, therefore it is very difficult to attribute, for example, students engagement in a lesson down to the seating plan and not to the planning or indeed the growing relationship with the teacher.

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