AN EXPLORATION OF STUDENT PERSPECTIVES OF PRIMARY CLASSROOM DESK CONFIGURATIONS

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ABSTRACT

Desk arrangements in primary classrooms can encourage or negatively influence learning. With no previous research reporting on student perspectives, we explored perceptions of two common desk configurations (Year 3, n=32, mean age=8 years). Qualitative data were collected by means of open-ended questionnaire, with an even spread of most preferred desk arrangements (n=16 Clusters, and n=14 Traditional Rows. Clusters were preferred for "increased interaction with friends", clearer view of the board" and "ease of movement/easier to get out of my seat". The reasons given for preferring Traditional Rows were "minimisation of peer distractions", "familiarity", "clearer view of board", and "can hear the teacher". Researcher observations were also undertaken during ten normal handwriting lessons (5 observations with Traditional Row configurations in place, and 5 observations during Cluster configurations). We observed fewer off–task behaviours during lessons held with Cluster desk configurations. Students tended to turn around more during lessons with the Traditional Row desk formation in place during completion of an individual task. Future research is needed to illuminate the impact of desk configurations incorporating a greater range of desk formations, larger sample sizes, varying socio-economic groupings, open–plan versus conventional classroom spaces and comparison of diverse technologies, student groups and lessons.

Keywords: Classroom spaces, desk configurations, perceptions

A BACKGROUND OF TYPICAL PRIMARY CLASSROOM DESK CONFIGURATIONS

Typicalprimary school classroomspaces from the 1930s to 1970s usually only exhibited the Traditional Rows desk formation. The Traditional Rowsconfiguration has desks evenly spaced in straight lines, with all students facing the front of the class, and the teacher's desk prominently positioned at the front (see Figure 1). According to Kathleen Lynne Lane, Holly Mariah Menzies, Allison L. Bruhn and Mary Crnobori (2010), this layout helps to focus student attention on the teacher. The rows formation provides an ideal environment for conducting individual work or student examinations (Unger 2011). For this particular purpose, desks can be spaced further apart to prevent wandering eyes and enable the teacher's ease of movement when supervising a test (Lane, Menzies, Bruhn and Crnobori 2010). Unfortunately, the Rows layout tends to limit student–to–student interaction and collaboration (Balli 2009). The other characteristic of this formation is that it can tend to take up a great deal of floor space (Unger 2011).
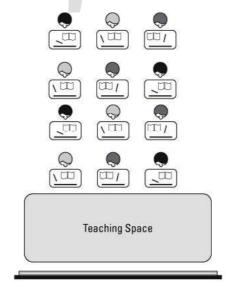

Figure 1: The Traditional Rows Desk Formation (Kelley 2016)

The Clusters Desk configuration arranges desks together in groups with students facing each other, but also being able to turn slightly to see the instructor if necessary out the front of the classroom (see Figure 2). This design encourages group projects and discussion as students' desks are directly touching enabling students to interact and establish eye contact (Balli 2009). This configuration, which may also be referred to as pods, is considered to most support group work or self-directed learning (Callahan 2004; Lofty 2012; Unger 2011). When desks are arranged into clusters, students can more easily collaborate and discuss ideas. Teachers can even strategically allocate students into groups such as combining gifted students together with struggling students, or noisier with more productive. Bennett and Blundell (1983) found that students seated this way produce a higher quantity of work overall compared with other arrangements. Students who do not work well together may also be easily moved to another cluster (Unger 2011).
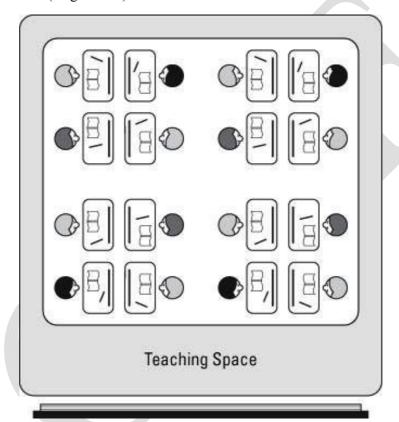

Figure 2: Cluster or Pod Desk Formation (Kelley 2016)

This design may be less ergonomically comfortable for students located in a position where they need to turn a great deal to be able see the teacher or board (Balli 2009), limiting its use for 'chalk and talk' lessons. Unlike the Traditional Rows formation, Wright (1998) found that instances of cheating increase when desks are placed in clusters. Therefore this seating arrangement is often less preferable for use during examinations. W. Michael Kelley (2016) also concluded that with this configuration, the farther apart the clusters, the more independent the groups may become with time. So he didn't recommend using this seating arrangement for the entire school year unless the teacher was willing to mix up the groups every now and then. Otherwise he said, students could become overly familiar with one another and begin to form their own rules.

The U–Shaped desk configuration (Figure 3) also referred to as the Horseshoe, places desks side by side in a large semi-circular pattern in the classroom, enabling students to see each otherand to see the teacher/instructor up-close when he/she steps into the 'U'. The teacher's desk may also be situated at the front, increasing her/his presence. This design fosters whole-class discussion or debate as students

are able to see and interact with one another, but it also enables the teacher to remain the central feature. The teacher may move freely through the teaching space, assisting a range of individual students at their own desk, or clearly demonstrate lesson tasks and homework assignments. Unfortunately, this configuration requires considerable classroom space for accommodating large numbers of students and it may not be possible to implement this desk layout in classrooms with too many students. One alternative is to line three Perimeters or walls of the classroom with one or two rows of desks joined side by side, forming a U–shape with straight lines. Free spaces or aisles allowing movement between desks to a front teaching space may be included in the configuration if required.
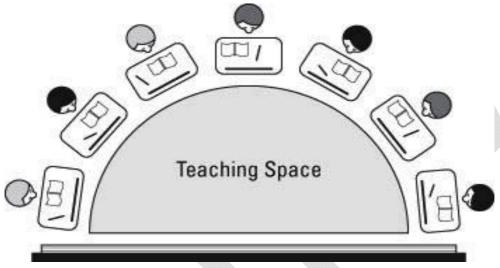

Figure 3: U-Shaped or Horseshoe Desk Formation (Kelley 2016)

The Two–Sided set up, also referred to as the Runway model or sectioned classroom formation, involves the teacher dividing the room in half, with half the desks on one side facing the desks on the other side, and the teacher located in–between (see Figure 4). This design provides ease of movement
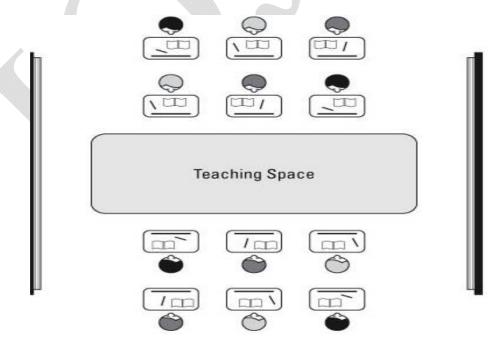

Figure 4: Two-Sided or Runway Desk Arrangement (Kelley 2016)

for students in the room while providing more opportunities for discussion than the Traditional Row design. This form of desk arrangement also changes the space in which the teacher manoeuvres, but it may be deemed effective in rooms that have blackboards located on each end of the room. This arrangement enables interaction between a greater range of students and puts the teacher in a facilitator role. However, students may start to 'identify' with their section in a team–like manner, which may contribute to competitive approaches. The layout may restrict discussion input from individual students who do not wish to exceed general contribution levels made by others from their section. This design is optimal for classes where mobility and teacher focus are crucial.

In comparison to the Traditional Rows and Two–Sided set-up, the E–Arrangement (in Figure 5) may be considered the most space efficient for most classrooms. This configuration

Figure 5: The E-Desk Arrangement

also suits large classes, smaller learning spaces, or computer labs. The Battleship desk arrangement (Figure 6) is not as commonly implemented within classrooms, but might serve thepurpose of reinvigorating learning or for when students have become demotivated. It might be a nice surprise too for students to suddenly walk into their room in the morning and see it arranged in a crazy design, instantly sparking their interest levels.

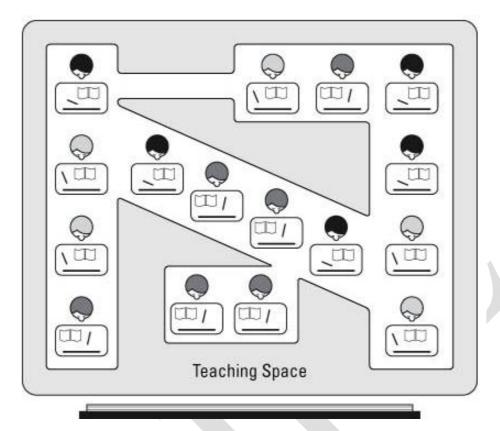Figure 6: The Battleship Desk Formation (Kelley 2016)

THE RELATIONSHIP OF DESK CONFIGURATIONS WITH CLASSROOM LEARNING

Changing the classroom environment can increase academic engagement and decrease disruptive behavior (Caroline Guardino and Elizabeth Fullerton 2010, 8).

Researchers postulate that a well–organised classroom facilitates more positive interactions between children and teachers and reduces the probability that challenging behaviours will occur. There are many ways that classroom spaces can be modified, including improving student accessibility to equipment, delineating and clearing traffic areas, placement of partitions or barriers at particular locations, distinction between individual and group space, and rearranging desks (Guardino and Fullerton 2010). Following Caroline Guardino and Elizabeth Fullerton's (2010) modifications to a primary classroom space, they noticed a 45% increase in academic engagement of students.

Wheldall and Lam (1987) studied the impact of classroom desk configurations on learners in a large special school catering for children with moderate learning difficulties. Their study attempted to measure the potential effect of Clusters and Traditional Rows desk formations on classroom behaviour. They concluded that deskconfigurations have significant effects on children's classroom behaviour, and that Traditional Rows was an effective means of increasing on–task behaviours with fewer disruptions or distracted behaviours apparent in the classroom.

Callahan (2004) approached this area of research in a different manner and examined teachers' preferences for desk arrangements according to both teaching style and student learning. Two teachers stated that they preferred a Traditional Row arrangement versus a Cluster arrangement, whereas the other three teachers preferred Clusters although they had never taught with that desk arrangement present in the classroom before. They justified their decision by stating that the pod arrangement

allowed ease of movement throughout the room and increased ability to see more students' computer screens.

Lotfy's (2012) research explored the impact of desk arrangements in regards to students' on–task/off–task participationduring cooperative learning activities and discovered that when students sit in Clusters facing each other, they have a better opportunity to interact, assisting the overall learning process and development of on–task behaviour. The results of Rosenfield, Lambert and Black's (1985) study was similar to Lofty (2012), indicating that students seated in circles engaged considerably more with on–task behaviours as opposed to those at desks arranged in in Traditional Rows (1985). Furthermore, Moore and Glynn (1984) found that a student's desk location in the classroom is related to the number of questions he or she asks the teacher, which may influence the student's opportunity to learn through gaining feedback, clarification and reinforcement.

Hastings and Schwiesco (1995) experimented with optimal desk arrangementsand confirmed that a change from Traditional Rows to Clusters significantly enhanced the degree of on–task behaviours of students, including 3 challenging children. The level of behavioural disruption demonstrated by the three children decreased significantly. Bonus and Riordan's (1998)study determined that the U–Shaped configuration produced the greatest amount of social interaction between students, deemed to be the most valuable layout in lessons where the goal was to promote discussion, role–playing or other cooperative learning activities (Bonus and Riordan 1998). They recommended that Traditional Row arrangements be used for more independent student learning activities such as test–taking.

Creation of positive learning environments through physical layout such as desk arrangement is an area warranting further research (Hood–Smith and Leffingwell 1983). However, there has been no previous research published evaluating and reporting on students' perceptions of theirclassroomdesk configuration. As classroom desk layout has been proposed as a key fundamental step in establishing a positive learning environment (Savage and Savage 2010), we attempted to gauge the opinions of a class of primary students regardingtheir views of Traditional Row and Cluster desk formations. In doing so, we focused on the following two research questions; (a) What are the students' perceptions of Traditional Rows and Clusters desk formations in terms of preferences and reasons why,and (b) Which desk configuration is associated with the highest frequency of on–task behaviour? The next section outlines the methods used to access the data and analyse the findings.

METHOD

The main purpose of this case study was to explore student views of two types of desk configurations, Traditional Rows and Clusters.The case study method as outlined by Denscombe (2007) was used to obtain data, with observations of classroom behaviours and a written questionnaire allowinga 'very rich' picture of the real–life setting to emerge.

The participants (n=32, boys=17, girls=15, mean age=8 years) attended a Year 3 class at a primary school situated in a low socio–economic community located in South Western Sydney. The school had a diverse student population with over one thousand students, predominantly from low socioeconomic backgrounds. Ninety percent of the students enrolled at the school were from Non–English Speaking Backgrounds (NESB), predominantly Chinese, Vietnamese and Khmer. In the participating class, seventeen students spoke Vietnamese at home, six spoke Chinese, three Arabic, two Cambodian, one Laos, one New Zealand Maori, one Spanish and one student was from a Torres Strait Islander background.

Ten structured/systematic lesson observations (Traditional Rows=5, Clusters=5) were carried out in the classroom to help gain insight into those real-life situational factors that might influence human behaviours and viewpoints in the context of actual classroom learning situations and desk layouts.

Students' behaviours were observed, recorded, and measured using a checklist instrument. The overall research data were collected throughout a period of four weeks, accumulating to five morning lesson observations for each desk configuration, conducted on average three times per week. The observations were conducted from 9:10am-9:50am on Tuesdays, Wednesdays and Thursdays during Handwriting lessons. The researcher sat in the same unobtrusive location in the back corer of the classroom, and the students knew why she was present. Complete observation sessions each lasted for 40 minutes, totalling 200 minutes of observations for each desk arrangement and 400 minutes for both desk arrangements. The classroom desks were always replaced in the regular default arrangement following any data collection. Handwriting and spelling lessons were consistently taught in terms of lesson structure and learning approaches across multiple lessons or occasions. The learning strategies used in the lessons mainly involved spelling tests, handwriting tasks, copying from the board as well as spelling activities using the dictionary. The classroom teacher guided the handwriting lessons step-by-step.

On–task behaviour was defined as a student engaging with and attending to the teacher or set task, demonstrating an orientation towards completing the appropriate learning activity (e.g. writing or manipulating books, pencils or aids), or being out of one's seat with the teacher's permission. Off–task or disruptive behaviour of students was defined as interruption by a student that drew the attention of others in the class away from the learning task(s) they were engaged in. Typical examples include getting out of seats without the teacher's permission, not following a teacher's directions, playing or fiddling with something on their desk, not focusing on or commencing the task at hand (e.g. daydreaming, staring at something else in room), inappropriate talking such as social conversations amongst students not concerning classroom lesson content, making unnecessary noise, turning around, banging the desk, as well as aggressive acts towards peers. Inappropriate talking with other students involved talking that did not concern classroom content. Noise level did increase when students worked in pairs whilst completing dictionary activities. Hence, identifying talking that did not concern classroom lesson content was more difficult throughout this particular task.

The self-administered questionnaire was designed to specifically elicit qualitative data on the students' views of each desk configuration and any reasons for their preferences. Thirty students completed the questionnaire, as two were absent on the day. The written responses were content analysed using line-by-line coding. Relationships between categories were identified using the axial coding technique described by Strauss and Corbin (1990). The next section outlines the major findings.

FINDINGS AND DISCUSSION

Students' most preferred classroom desk configuration

The questionnaire responses (n=30) revealed that sixteen students preferred Clusters, with fourteen stating they preferred Traditional Rows in the classroom (see Figure 7). This was a fairly even split of opinions. Table 1 presents an overview of the main themes or reasons provided by the students
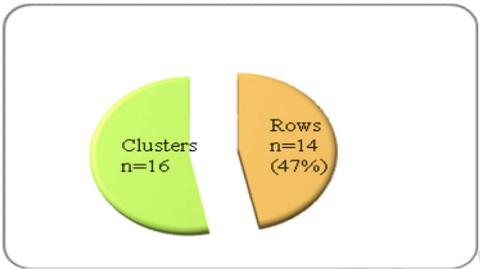
Figure 7: Students' Most Preferred Desk Configuration

Justifying their choice of desk arrangement. The most common theme to emerge regarding why students preferred Clusters was that it provided greater opportunity for interactive collaboration with friends. For the students who stated they preferred Traditional Rows, the main theme to emerge explaining this phenomenon included having a clearer view of the board. The second theme was its familiarity, as it was the current default desk arrangement that perhaps students were used to and felt most comfortable with.

Table 1: Insights to Most Preferred Desk Configuration

Themes	Examples
Clusters	
Increased interaction with friends	"I get to look at my friend's faces" "I can sit next to friends" "I can talk to my friends" "I can work together with my peers in groups" "I can see what my friends are doing" "I am able to ask my peers if I need help"
Clearer view of the board	"I can see the board better"
Ease of movement/Easier to get out of seat	"There is more room at the back and front of the classroom" "It is easier to get out of my seat"
Traditional Rows	
Clearer view of the board	"I can see the board better" "I can write easily as I don't have to keep turning around to see the board"
Minimisation of peer distractions	"Nobody will distract me"
Familiarity with desk arrangement	"I am more used to this arrangement"
Can hear the teacher	"I can listen better to the teacher"

Student reasons provided for the non–preferred desk configuration

The main reason and theme indicating why students did not prefer a Clusters desk formation was that it offered a poor view of the board. The main reason students provided for not preferring Traditional Rows was the lack of peer interaction possible. Table 2 below summarises the main themes to emerge from the data.

Table 2: Insights to Non–Preferred Desk Configuration

Themes	*Examples*
Clusters	
Poor view of the board	"I can't see the board" "I have to keep turning around to see the board so it is difficult to write"
Peer distraction	"Some people distract me in clusters"
Lack of familiarity with the arrangement	"The teacher gets confused about where students are seated as it is not our normal arrangement"
Traditional Rows	
Restricts collaboration	"It is difficult to see faces so I can talk" "My friends are too far" "It is difficult to see people in group" "I have to turn my head around to see others" "If I need help, I have to ask people behind me" "We cannot work together" "I cannot see what my friends are doing" "I might not like the person I am sitting with"
Restrains movement	"It is more difficult to get out of my seat"
Difficulty viewing the board	"It is difficult to see the board"

Off–task behaviours observed during lessons with clusters desk configuration

Tables 3 and 4 present the scores collated from all observations of lessons with the desks in clusters or rows formations. Every student in the class was observed (n=32). A greater mean incidence of off–task behaviours was noted during the lessons with Traditional Rows (mean=11.6) formation compared with Clusters (mean=8.6). However, this only equates to an average difference of 3 behaviours across a whole 40–minute lesson, so the variation is not vast.

Table 3: Summary of Off–Task Behaviour Observations During Cluster Configurations

Observation of Off–Task Behaviour	*Lesson 1*	*Lesson 2*	*Lesson 3*	*Lesson 4*	*Lesson 5*	Frequency Total
Getting out of seat without teacher's permission	III					3
Not following directions	I					1
Not focusing on task: Daydreaming or looking at something else in the room		I	III			4
Inappropriate talking with other students (Does not concern classroom lesson content)	IIII-I	III	II	III	III	17
Talk-outs						0

Making unnecessary noise					0
Turning around	IIII		I	I	6
Banging the desk					0
Aggressive acts towards peers					0
Swinging on the chair	I				1
Fidgeting with object(s)		IIII	III	I	II	10
Total Frequency per Lesson	*15*	*8*	*9*	*5*	*6*	**Mean Lesson Score: Clusters = 8.6**

As indicated in Figure 8, the most frequent off–task behaviour observed during a lesson with Clusters desk configuration was Inappropriate Talking. So even though students nominated the main reason they prefer Clusters to be social interaction, the findings suggest that it may be linked with off–task talking and chatting between students, and not necessarily communication associated with the class learning activity at hand.
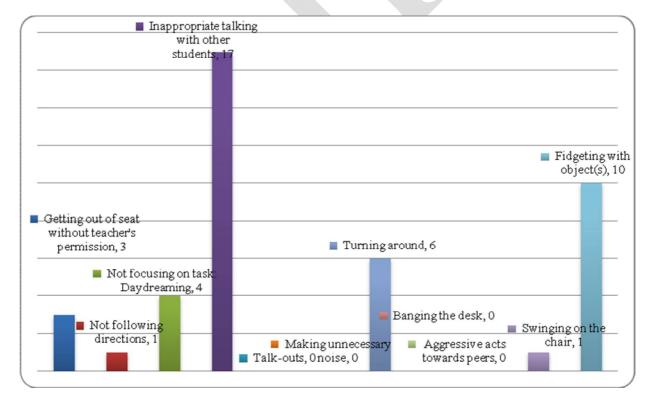

Figure 8: Frequency of Off–Task Behaviours During Lesson With Clusters Desk Configuration

Off–task behaviours observed during lesson with traditional rows desk configuration

Figure 9 below illustrates the frequencies of off–task behaviours highlighted in Table 4. We observed during lessons with Traditional Rows desk arrangements in place that inappropriate Turning Around was the most frequently occurring off–task behaviour (n=25). When students were seated in Clusters, this behaviour only occurred 6 times in total. While Inappropriate Talking occurred 14 times, this was similar to the score of 17 occasions during lessons with Clusters. Perhaps students want to see what's 'going on' or check with a peer that they are on the

Table 4: Summary of Off–Task Behaviour Observations During Traditional Rows

Observation of Off–Task Behaviour	*Lesson 1*	*Lesson 2*	*Lesson 3*	*Lesson 4*	*Lesson 5*	Frequency Total
Getting out of seat without teacher's permission		I				1
Not following directions				I		1
Not focusing on task: Daydreaming or looking at something else in the room		II		I	I	4
Inappropriate talking with other students (Does not concern classroom lesson content)	III	IIII I	I	I	III	14
Talk-outs						0
Making unnecessary noise						0
Turning around	IIII IIII	IIII	IIII	IIII III		25
Banging the desk						0
Aggressive acts towards peers						0
Swinging on the chair					I	1
Fidgeting with object(s)	IIII	IIII	I		I	12
Total Frequency per Lesson	*17*	*18*	*6*	*10*	*7*	**Mean Lesson Score: Rows= 11.6**

right track. Students may be attempting to communicate with each other or view what is taking place around them in a way that Clusters facilitates. Use of a Data Projector by the teacher to help explain, or provide a visual view of the class work that is expected and should typically 'look like' at that stage of the lesson might assist and help prevent students from turning around to the desk behind their own.

The findings may be explained to the extent that exists between the degree of a student's on–task behaviour and the proximity of his/her desk to the classroom teacher (Good and Brophy 1977). That is, the closer the student's desk to the teacher, the more appropriate her or his behaviour becomes. When the teacher is easily accessible, students may be more likely to receive positive reinforcement and verbal cues (e.g. praises), or non-verbal cues (e.g. smiles, eye contact, head nods), which increases the probability of positive and more desirable classroom behaviours. It was not known in our study, whether the generally more disruptive students of the class were located at desks to the rear of the room or further away from the teacher's location at the front of the room during data collection.
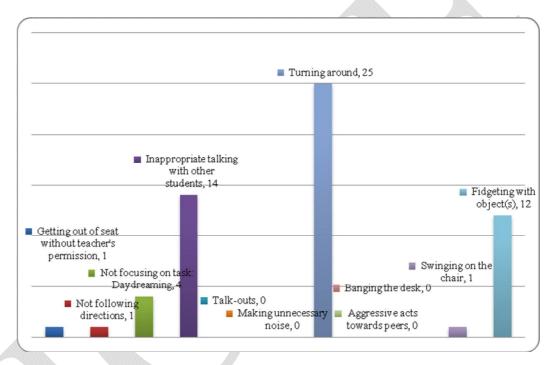

Figure 9: Frequency of Off–Task Behaviours During Lesson With Traditional Rows Desk Configuration

Students seated at a rear or side–facing desk as part of a Cluster might feel less connected or influenced by the teacher's presence, so more free to engage in social chatter. Similarly, students seated at the back few desks in the Traditional Row arrangement may be more tempted to turn around as they feel they can 'get away with it' and that the teacher doesn't notice. It might be necessary to seat more responsible, independent or capable students in desks located much further away from the teacher's desk or main 'teaching area' or the perimeters of classrooms.

According to Marx, Fuhrer and Hartig (1999), it is even possible, with a degree of certainty, to promote question–asking behaviour of fourth graders through manipulating classroom desk arrangements. Children's question–asking behaviour may be influenced by whether or not their desk location is inside or outside 'action zones' with the classroom. For example, the semi-circular space in front of the U–shaped desk arrangement is an action zone, and stimulates children's question–asking to a greater degree than when students are seated in rows (Figure 1). The front few desks of the Traditional Row arrangement is also an 'action zone' or location in classroom which stimulates engagement by students and greater question–asking by students (Marx, Fuhrer and Hartig 1999;

Rosenfield, Lambert and Black 1985). Closer proximity to the teacher or to other students may encourage greater social interaction because individuals feel more obligation plus are able to effectively establish face-to-face contact Steinzor's (1950).

Figure 10: Modifications to the Classroom To Suit the Activity May Increase Engagement (Source: Currie, 2014, 6)

CONCLUSION

The full impact of the arrangements of the desks in classroom spaces is not yet known. While we were able to establish some baseline student preferences, much research needs to be conducted on student behaviour in relation to the variance of classroom layouts, desk arrangements and space. This is an important area to explore as attention to seating arrangements can potentially make an important contribution to improvements in student behaviour and academic performance, particularly for those children whose behaviour and progress cause concern. When effective desk arrangements are put into place, teacher availability or time spent on learning–focused activities may then be increased. This then promotes learning and pro–social behaviours on the part of the students instead of management. Additionally, anxiety, tension as well as stress are then reduced as a result. This in turn promotes more teaching time through a decrease of discipline demands. Consequently, with an effective desk arrangement, less time is spent on behaviour management, and more on learning, so that we maximise student learning.

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