

Investigation into student seating preferences of middle and secondary school science teachers

By

Matt Jones Young

A report submitted in partial fulfillment of the requirements for the degree of

Master of Education

Education Department

School of Sciences and Education

Milligan College, TN

2020

**Copyright Page**

@2020

Matt Jones Young

ALL RIGHTS RESERVED

### **Abstract**

Knowing how and where to sit students in the classroom is a key component in managing student behavior and creating the best environment for student achievement. In some instances, an educator may have a boisterous classroom where students talking unnecessarily is a discipline issue. The teacher may want to assign seats to students and place them in areas of the class where they are less likely to talk and be disruptive. Another facet to consider is how the students are arranged. Rows, circles, and groups are just a few ways that teachers can position their students and each arrangement has its own benefit. The purpose of this research is to explore this topic in greater detail to answer the question: Is there an optimal seating method that can be used in the science classroom to maintain discipline and improve student achievement? A qualitative approach was utilized to gather information by interviewing secondary science teachers about their seating preferences. Themes were identified and recommendations have been made as to the most efficient way to maintain discipline in the classroom while stimulating achievement through seating.

## Institutional Review Board Approval



Date: February 24, 2020

From: The Institutional Review Board (IRB) at Milligan College

Re: *Investigation into student seating preferences of middle and secondary school science teachers*

Submission type: Initial Submission

Dear Matt,

On behalf of the Milligan College Institutional Review Board (IRB), we are writing to inform you that your study, *Investigation into student seating preferences of middle and secondary school science teachers* has been approved as expedited. This approval also indicates that you have fulfilled the IRB requirements for Milligan College.

All research must be conducted in accordance with this approved submission, meaning that you will follow the research plan you have outlined here, use approved materials, and follow college policies.

Take special note of the following important aspects of your approval:

- Any changes made to your study require approval from the IRB Committee before they can be implemented as part of your study. Contact the IRB Committee at [IRB@milligan.edu](mailto:IRB@milligan.edu) with your questions and/or proposed modifications.
- If there are any unanticipated problems or complaints from participants during your data collection, you must notify the Milligan College IRB Office within 24 hours of the data collection problem or complaint.

The Milligan College IRB Committee is pleased to congratulate you on the approval of your research proposal. Best wishes as you conduct your research! If you have any questions about your IRB Approval, please contact the IRB Office and copy your faculty advisor if appropriate on the communication.

Regards,

A handwritten signature in black ink, appearing to read "T. Taylor", written over a horizontal line.

The IRB Committee

### **Dedication**

Always first, to my wife Shelly. The woman whose crazy ideas have taken me around this Earth. We quit our careers together, made it 600 miles on the Appalachian trail together, explored the vastness of this beautiful world together, and will hopefully retire early to some South American country together. You ground me as well as enable me. We will never know how far we can go until we go too far.

I would also like to dedicate this work to the men that taught me that you should never let someone own you. Dave Chappelle, who gave 50 million dollars back to the TV networks because they took away his freedom of creativity. Peter Gibbons, of Initech, who knocked down the walls of his cubicle so that he could see outside. Ronnie Van Zant, who provided the soundtrack of my youth. Steve Prefontaine, who would rather die than let someone beat him. Ron Swanson, who reminded us that “The whole point of this country is if you wanna eat garbage, balloon up to 600 pounds and die of a heart attack at 43, you can! You are free to do so!”. And Finally, my 6 times great grandfather Robert Young, who shot and killed General Patrick Ferguson in the battle of King’s Mountain During the revolutionary war. These gentlemen are the embodiment of what it means to be an American and are the definition of gumption. I can only hope to be able to continue on with their legacy.

### **Acknowledgments**

I would like to thank Dr. Dula for his patience and humor through this entire process. He is a patient man that understands that life happens. I would also like to thank the faculty of Milligan College for instituting mandatory workdays throughout the semester; had I not had these I may have lost my mind. Finally, I would like to thank my colleagues in the program Russ and Danial. You all had the good sense of time and experience that helped to redirect me when I was out on a limb.

## Table of Contents

Abstract .....	i
Institutional Review Board Approval .....	ii
Dedication .....	iii
Acknowledgments .....	iv
CHAPTER 1 .....	1
Introduction .....	1
Purpose Statement .....	2
Significance .....	2
Research Questions .....	2
Limitations .....	3
CHAPTER 2 .....	4
Literature Review .....	4
Introduction .....	4
Differentiation .....	4
Different types of seating arrangement found in the classroom.....	6
Issues within seating arrangements .....	9
Conclusion.....	10
CHAPTER 3 .....	12
Methodology .....	12
Study Group .....	12
Data Collection and Procedure.....	12
Research Questions .....	13
Data Analysis .....	13
CHAPTER 4 .....	14
Findings and Results .....	14
Interview Findings and Results .....	14
Question 1 .....	15
Question 2 .....	16
Question 3 .....	17
Question 4 .....	17
CHAPTER 5 .....	19

## SEATING IN THE SCIENCE CLASSROOM

Summary of Findings .....	19
Discussion .....	19
Limitations of the Study .....	20
Conclusion.....	20
Recommendations for Future Research .....	21
Bibliography .....	23
Appendices.....	25
Appendix A .....	25
Appendix B .....	27



## CHAPTER 1

### *Introduction*

Where to sit is a question that people ask themselves daily. It is a practical part of our daily life, and becomes of monumental importance when attending weddings, sporting events, or formal dinners; these situations where our placement is of great significance can cause anxiety, sweaty palms, or potentially excitement, like getting to sit next to your crush at the basketball game. Seating placement is an important variable in our society because where we sit influences our experience. However, the impact of seating placement does not just pertain to social settings, it also applies to the classroom as well. This seating placement variable is an integral part of a teacher's role in the classroom.

In the classroom, educators must determine the best way to seat their students to achieve different goals. In some instances, an educator may have a boisterous, extroverted classroom where student talking becomes a discipline issue. The teacher may want to assign seats to place students in areas where they are less likely to talk and disrupt class. Other times disruptive talking is not an issue and the educator can allow students to choose where they sit organically, giving the student agency in their own learning (Greenburg, 1976).

How student's desks or tables are arranged is another tremendously important variable that an educator must consider. The traditional high school classroom arranges desks in an orderly fashion within rows and columns where the students face the front of the class. More recently, desks are being arranged in groups of three or four to encourage student interaction and group work. Another alternative seating arrangement that has gained popularity is organizing desks in a circle that faces inward, or a semicircle that faces the front. All of these desk arrangements have positive attributes and shortcomings associated with them (Wannarka, 2008).

## SEATING IN THE SCIENCE CLASSROOM

With all of the ways it is possible to sit students in a classroom the question must be asked: is there a superior form of seating that encourages student performance and discipline?

### *Purpose Statement*

The purpose of this study is to determine if teachers in middle and secondary science classes in upper East Tennessee prefer one type of seating and desk arrangement over another to improve student discipline and performance.

### *Significance*

Numerous studies have been performed regarding variables associated with seating, however, there have been few that have concentrated on subject specific seating (Gremmen, 2016). What may be effective in an English classroom might not work as well in a science or math class and vice versa. This can become an issue for new teachers who are still trying to develop their teaching style. A goal of this study is to provide recommendations to middle and secondary science teachers in how to arrange their classroom in order to foster the best learning environment for their students. Hopefully, the knowledge gained in the years of experience from the study group can be passed along to a new generation of educators and help them sidestep some issues they may face in their development.

### *Research Questions*

In conducting this study, a survey was used to collect data and perspectives of professional educators regarding their seating preferences. The questions on the survey related to the following research questions:

1. Is assigned seating effective in managing student behavior in the science classroom?
2. Is assigned seating effective in improving student performance in the science classroom?

## SEATING IN THE SCIENCE CLASSROOM

3. Is there a preferred seating arrangement for managing student behavior in the science classroom?
4. Is there a preferred seating arrangement for improving student performance in the science classroom?

### *Limitations*

1. The research will be conducted in a localized regional area and may not be indicative of preferences nationwide.
2. There are only three desk configurations that are being considered in this study. There may be other desk configurations that are superior in terms of student discipline and performance that could provide additional support to new teachers.
3. Sample size is another limiting factor in that only 5 science teachers were interviewed. Future research could bolster this study's claims.

## **CHAPTER 2**

### ***Literature Review***

#### ***Introduction***

When considering classrooms around the world, there are a few constant components. Books, computers, and desks are all elements someone would expect to find in any education setting. However, as common as these items may appear each has a profound impact on student learning. Books deliver knowledge, computers help facilitate work, and desks create the environment that students learn and work in. All are pivotal in the learning experience and need to be considered carefully before being implemented in a classroom. This research paper focuses on the desk, or rather, how the desk is oriented within the classroom. Teachers the world over utilize different seating charts and arrangements within their classrooms for various purposes. Furthermore, the question of what seating arrangement works best is useful knowledge to the first-year teacher and the experienced professional alike. This paper explores the effects that seating has on student performance and intends to make recommendations to help future educators create the best learning environment for their classroom.

#### ***Differentiation***

Differentiation is a term that is utilized throughout the education vernacular at all levels. Its meaning and use are as varied as the techniques it encompasses. It is a tool that is touted as capable of increasing a student's performance while improving understanding. However, what does the term differentiation really mean in the education field? Essentially, differentiation is a set of practices or strategies that an educator utilizes to enable their diverse classroom to reach its maximum potential (Civitio, 2016). It is an attempt to meet all student's needs when it comes to instruction that is rooted within the various learning styles. Pam Fitzgerald described

## SEATING IN THE SCIENCE CLASSROOM

differentiation as, “...an approach that considers individual differences in every task and provides flexibility in the ways that students are permitted to undertake their learning” (2016).

Differentiation requires instructors to creatively consider each task and plan for alternative ways to achieve the same goal in order to address each student’s needs in learning.

Differentiation can come in many forms and can generally be broken down into four sub-genres: content, process, product, and the learning environment. Content refers to what the students are learning. Differentiating content might include assigning varying levels of texts or assignments to different learners based on capability. Process refers to how students learn and could include various grouping theories, different time constraints for different students, or creating activities that require the same end goal but include different levels of scaffolding for different students based on need. Product is what the students ultimately produce at the end of the learning segment; product might include giving a student a choice in what they decide to produce. Environment refers to where the students learn. This could include grouping, seating, and other considerations for creating an efficient work environment (Tennant, 2017). Each of these sub-genres represents a major factor of influence and is considered important enough to be scored on the State of Tennessee’s TEAM Rubric, in which teachers are evaluated on a yearly basis (TEAM, 2018). Student choice and mixed pair grouping are two recurring themes or focuses utilized within multiple sub-genres of differentiation and within the Tennessee TEAM Rubric. Student choice allows the student to decide how they complete a task, which task they complete, or where they complete the task. Mixed pair grouping is a technique where a teacher pairs a lower achieving student with a higher achieving student with the hopes that the stronger student will be an aide to the lower achieving student (Roland, 2016). These two themes will be a central focus later in this study and should be noted.

## SEATING IN THE SCIENCE CLASSROOM

Because differentiation's goal is to improve student achievement, each technique considered for utilization within a classroom should be studied for effectiveness. It is important for the continued improvement and success of educators that every differentiation factor being considered for a classroom to be backed by evidence and research. For instance, science literacy has been shown to increase within 4<sup>th</sup> graders when information is presented with the aid of technology (Senturk, 2018). This research would lead a prospective educator to believe that presenting science literature with the aid of technology in their own classroom would also be effective for their students. Dissimilarly, differentiation in seating was not found to have a significant effect on student's motivation (Barley, 2002) and would inform a teacher not to expect a real gain in motivation and would not warrant its use within their classroom if motivation was their overall objective. The overall goal of the research is to inform current teachers on the measured effect different seating patterns may or may not have on a classroom and possibly add some perspective to the conversation of differentiation.

### *Different types of seating arrangement found in the classroom*

When imagining a classroom, the first image a person might create in their head is the space where the classroom exists. The next image that will likely come into someone's mind will be the seats or desks in the class that students use. This is because, the way that students sit in a classroom is, in many cases, the second most important element when considering the classroom environment. If a person was to walk into 10 different classrooms, they could likely see 10 different seating arrangements employed. Seating arrangements could range from row seating, circular configurations, clusters, assigned seating and so on. All of these seating types have different looks and can change the dynamic of the classroom based on their use. One idea within the differentiation paradigm is that students will behave, interact, or perform differently

## SEATING IN THE SCIENCE CLASSROOM

based on how they are seated (Barley, 2002). This notion is of great importance for a teacher when they are designing a lesson plan or setting up their classroom. A teacher may want to manage behavioral issues, increase student cooperation, or promote individual work. Because there are numerous models as to how to arrange students within a classroom each style must be studied to determine its effectiveness. Some of the following seating models will be studied and judged for their usefulness within the classroom.

A traditional version of seating that is familiar to most people is the rows configuration which has desks evenly spaced in straight lines, with all students facing the front of the class. The instructor will usually position themselves at the front of the class where they can observe the entire room and see students' faces. This type of seating is intended to encourage individual work and to create a space in which a student can be assessed, and the likelihood of cheating be mitigated (Currie, 2016). Row seating has been found to increase the amount of individual work that a student can generate because the chances of them getting off topic by talking is less due to their orientation (Simmons, 2015). On the opposite side of the spectrum, Joseph Fallout surmised that row seating often has the effect of constricting the classroom and limiting student interaction, which he deduced negatively impacts the potential for student learning (2014). One can see how the arguments for and against row seating are intertwined. A negative found by Fallout, limiting student interaction, was a positive for Simmons. These two opposing viewpoints on the same subject suggest that variables and effectiveness with regards to seating are in the eye of the beholder.

Another form of seating that might be witnessed in the classroom is the circular or semi-circular seating arrangement. The circular seating arrangement is modeled by students seated in a circle with an instructor either inside the circle or just outside the circle. The semi-circular

## SEATING IN THE SCIENCE CLASSROOM

seating arrangement is characterized by students seating in a semicircle with the instructor at the front of the classroom (Currie, 2016). Joseph Fallout, from the same study as above, found that circular and semi-circular seating arrangements instill belonging within the learning community and have positive benefits for student wellbeing, emotions, and learning (2014). Rachel Wanaranka, echoed Fallout's sentiments about improved student learning in her study where she found that student questioning was highest in a circular or semicircular arrangement. Increased questioning, she surmised, was an indicator of active student learning and involvement (2008).

Seating students in various groups, called cluster seating, is yet another way that teachers can arrange their students. Clusters can include any number of students and can be arranged in various patterns; triangles, circles, squares, etc. Students are oriented to face each other but can also turn to view the teacher (Currie, 2016). Educators have shown a preference to cluster seating when student cooperation was the desired result as Gremmen showed in his 2016 study. Gremmen illustrated that sitting in clusters was ideal for brainstorming and group assignments where interaction between students is necessary (2016). Grouping is also a prominent technique in the subject of differentiation and could pair with cluster seating when utilized correctly. Mixed ability grouping is a term that describes placing students of varying age groups or achievement levels in the same group. The goal of mixed ability grouping is to have the higher-performing, or older students help guide the other students through assignments or learning segments. This is a strategy that can lessen the instructor's workload and increase student comprehension because when peers tutor each other both students learn the material (Rolland, 2016).

A less common version of a seating arrangement that has shown to increase interaction between students is arranging pupils in alphabetical order, giving preference to students who



## SEATING IN THE SCIENCE CLASSROOM

want to sit in the front row first. In this experiment, researcher Julianne Treme utilized row style seating assigning each seat based on alphabetical order with one exception. Students who wanted to sit in the front row could regardless of their place in the alphabetical order. The goal of this research was to observe whether students would create new relationships in class when required to sit beside someone unfamiliar to them. Treme found that at the end of the semester, students had created new learning groups and found the effect that this seating arrangement had on their learning process as a positive one (2018).

Internationally, educators have utilized seating arrangement styles that differ greatly than in the United States. One example comes from an educator in China; Z. Min studied the effect of making a competition out of seating. He uses a hierarchy approach when assigning seats. The highest achieving students are assigned seats in the front row with the lower performing students filling in the rows behind them. The back rows are reserved for the poorest performing students. Min states that in China, having a front-row seat in the classroom is a major honor and is associated with characteristics of good moral quality and are thought to be indicators of future success. Whereas if a student has a seat in the rear of the classroom it is considered shameful and indicates a shortcoming. He found that this type of seating motivates students to perform well and is beneficial for student performance (2019).

### *Issues within seating arrangements*

While differentiation can be a powerful tool to aid students, if used incorrectly or in the wrong setting it can have no effect at all or have an opposite effect. Seating arrangements are not immune to this phenomenon and researchers have shown some seating arrangements were not effective in increasing student performance or were used incorrectly and created negative consequences.

## SEATING IN THE SCIENCE CLASSROOM

One such study, conducted by Kirk Renegar, looked at motivating students in middle school math classes by offering them alternative forms of seating. He allowed students the opportunity to sit in various stools, lawn chairs, or bean bag chairs while they completed their math work; he then compared their scores on assessments with students in classrooms that were not given the option to sit in alternative seats. He hypothesized that the students that were allowed to sit in alternative seats would show increased performance compared to their peers who were not offered alternative seats. Renegar found that there was no difference in assessment scores between the two groups and concluded that alternative seating did not influence performance for middle school math students (2018).

Bias is a variable that might affect the usefulness of a seating arrangement that has been previously found to improve a student's experience. Research conducted by Amanda Fernandez found that, regardless of the seating arrangement chosen, teachers were more likely to place higher achieving students in the front of the class near the teacher, and lower performing students near the rear. The same study questioned teachers about their bias when arranging students and most teachers surveyed stated that they were not biased when placing students in their arrangements. This revelation indicates that the students in the study were experiencing an unintended bias (2012).

### *Conclusion*

A review of the literature related to seating arrangements within the classroom reveals many strategies that may be effective in increasing students' productivity, involvement, and performance. Whether a classroom utilizes rows, circles, or clusters, the effect seating has on the learning experience is palpable for students and teachers both. Gaining a better understanding of

## SEATING IN THE SCIENCE CLASSROOM

how various seating arrangements affect student performance will help instructors to adjust their lessons appropriately in order to give their students the best chance to succeed.

### **CHAPTER 3**

#### ***Methodology***

The purpose of this study is to determine if a certain type of seating arrangement is preferred by secondary school science teachers to improve the discipline and performance of students. The following chapter details, (1) the process that was undertaken to complete this study, (2) the participants of the study, (3) the variables that were considered during testing, and (4) the data analysis process that was used to draw conclusions.

#### ***Study Group***

Participants in this study were comprised of high school science teachers from the Elizabethton City Schools system in Elizabethton, TN. The goal was to assess the predominant perception about the effectiveness of using assigned seating and other various seating arrangements for the use of increasing discipline and performance in the upper East Tennessee science classroom.

#### ***Data Collection and Procedure***

In order to compile data for this study, an interview guide was developed to generate qualitative results; this study necessitates a qualitative approach because interviewees' answers will vary in depth and subject. The survey questions excluded the lab setting; moreover, most labs are conducted in a group seating formation, thus, they do not allow for other seating arrangements to be utilized.

The interview that was administered focused on teacher's opinions regarding the classroom environment. The questions were designed to determine the effectiveness of seating arrangements based on discipline and student performance. The types of seating that were

## SEATING IN THE SCIENCE CLASSROOM

considered were assigned seating, row seating, grouping, and circular or semicircular arrangements. The interviews were administered in person, at Elizabethton High School.

### *Research Questions*

RQ1: Does assigned seating improve student discipline in the science classroom?

RQ2: Does assigned seating improve student performance in the science classroom?

RQ3: Is there a seating arrangement (row seating, grouping, and circular or semicircular) that increases student discipline in the science classroom?

RQ4: Is there a seating arrangement (row seating, grouping, and circular or semicircular) that increases student performance in the science classroom?

### *Data Analysis*

Because this study will utilize a qualitative approach, a narrative analysis was used to draw conclusions and make recommendations. The interviewee's answers were scrutinized for similarities in theme and approach. The parallels, or universal themes, that emerged were used to create a list of best practices that can be utilized by new teachers to help them better understand how to arrange their classroom for their desired results.

## CHAPTER 4

### *Findings and Results*

The following chapter details and explains the findings of this research study. The findings illustrate the perspectives and commonalities of the interviewees' answers. The purpose of this study was to determine if there is a most effective way to seat students in the science classroom to increase student discipline and achievement. The teachers interviewed had varying levels of education and years' experience. The following questions were used to assess the problem and make final suggestions:

- Does assigned seating improve student discipline in the science classroom?
- Does assigned seating improve student performance in the science classroom?
- Is there a seating arrangement( row seating, grouping, and circular or semicircular) that increases student discipline in the science classroom?
- Is there a seating arrangement (row seating, grouping, and circular or semicircular) that increases student performance in the science classroom?

### *Interview Findings and Results*

Interviews occurred at the interviewee's school during their planning period. All participants were advised of their right to refuse to participate and agreed to be recorded. For the purpose of presenting findings, participant's names have been replaced with participant numbers one through four. For a greater understanding of the interviewees' answers, demographics for the teachers interviewed are as follows:

## SEATING IN THE SCIENCE CLASSROOM

	sex	years' experience	Highest level of degree achieved
Teacher 1	Female	26	Masters
Teacher 2	Male	5	Masters
Teacher 3	Male	1	Bachelors
Teacher 4	Female	5	Masters

### *Question 1*

#### **Does assigned seating improve student discipline in the science classroom?**

All of the teachers interviewed except for one were adamant that assigned seating improved classroom discipline.

*Teacher 1: "I definitely believe that assigned seating improves classroom discipline. I don't usually use assigned seating unless the class is so disruptive that they require it, but if I get a class where there are too many disruptions happening I have found that once I do put them in that seating chart that seems to alleviate a lot of those problems."*

*Teacher 4: "Absolutely. I always demand discipline from my students. A component of the discipline I require is making students sit where I want them to. I may be militaristic in this but students are here to learn and become functional adults so that they can contribute to society."*

The one teacher who was not overwhelmingly in agreement, teacher 3, was a first-year teacher who believed that assigned seating does work to increase student discipline, however did not have enough experience utilizing assigned seating to say definitively one way or other.

*Teacher 3: "Being a first year teacher I believe that a seating chart does improve discipline however I may want to institute one at the beginning of the year, rather than later in the year because I think the class got away from me doing it once behavior became a problem. "*

The responses to question one would lead someone to believe that assigned seating does increase student discipline. How and when assigned seating was implemented varied between respondents however they all agreed that it was effective once implemented.

*Question 2*

**Does assigned seating improve student performance in the science classroom?**

Interviewees agreed that assigned seating improved student's performance. Most cited that assigned seating reduces distractions that might cause students to not complete their work.

*Teacher 1: "I think it goes hand in hand (discipline and performance) because they are paying better attention so they seem to give a better effort during the class period so I do think that their performance improves as a result because of that."*

*Teacher 2: "Most of the time you will have those students who will get distracted, now not always distracted but there will be those days where they get distracted because they are close to their friends or someone that they are use to, so I do think it helps lower distractions which helps to improve their performance."*

*Teacher 4: "I do, If students are well disciplined then they won't be distracted while they are trying to complete assignments. Missing assignments are the number 1 reason students do not get good grades, If I can make them more productive during class time in completing their assignments then they will score better by default."*

Teacher 3 looked at the question from a different aspect and determined that assigned seating could help students based on peer cooperation, rather than just minimizing distractions.

*Teacher 3: "I do, sometimes I can assign students to sit in groups with mixed ability levels that helps bring lower achievers along. At the same time the higher achievers can sharpen their knowledge by teaching the other students in the group."*

All of the teachers interviewed agreed that assigned seating improves student performance. This increased performance comes as the result of reduced distractions, and the ability to assign lower-achieving students to sit with higher achievers in order to facilitate peer tutoring.



*Question 3*

**Is there a seating arrangement (row seating, grouping, and circular or semicircular) that increases student discipline in the science classroom?**

Responses to this question were not as pronounced in favor of one seating arrangement over another with only 50% of those surveyed agreeing on one type of seating arrangement. The main theme that emerged was that the classic row and column seating style was preferred when trying to maintain discipline.

*Teacher 3: “From a discipline perspective I believe that the row rank and file system provide the best results. This isn’t to say that that is the best way to sit students to increase achievement.”*

*Teacher 4: “I sit students in lab tables, 2 per table, in rows similar to what you might see in a normal classroom. It has a nice effect in that it is similar to row seating, which I think improves discipline, and gives them a built-in group or shoulder partner that I can ask them to discuss things with”*

Teacher’s responses indicated that although row and column seating was best for maintaining discipline it did not always yield the best results for academic achievement.

*Question 4*

**Is there a seating arrangement (row seating, grouping, and circular or semicircular) that increases student performance in the science classroom?**

There were two common themes that emerged surrounding question 4; grouping was recognized by all interviewees as a tool that increases student enrichment and performance, and that grouping isn’t always effective in improving performance and should be used in conjunction with other seating arrangements.

*Teacher 1: “if they are at tables they try to look for someone to sit with rather than sitting by themselves and when they are at those tables they have someone to work*

## SEATING IN THE SCIENCE CLASSROOM

*with so that if you have a checkpoint during class you have someone there for them to work with in partners, so I think that would be something that I would prefer.”*

*Teacher 2: “I think it all depends on the groups. Some classes I have had perform better in rows rather than actual groups because of behavioral issues I think if they are more advanced classes that work well together you can put them in circles or groups, I think the most beneficial for them is grouping them up but sometimes you have behavioral issues where you aren’t able to do it.”*

*Teacher 3: “I think that grouping gives students the best chance to learn. They can gain better understanding from their peers through group discussion and can help each other see other perspectives about the same topic. You can’t leave students in groups all the time but for enriching activities, I prefer groups.”*

*Teacher 4: “I believe that a combination of row seating and grouping, like what I have in my class is best for student’s performance. As I said earlier, sitting at lab tables in twos and in rows incorporates a discipline element of row seating and the grouping element that I want for times when students need to discuss ideas or work in pairs together.”*

## CHAPTER 5

### *Summary of Findings*

The purpose of this study was to determine if there is an optimal seating arrangement that increases student discipline and performance in the secondary science classroom to help educate new teachers about the best practices. Through a qualitative interview process, the researcher was able to identify guiding themes that answer the research question. The first theme identified was that assigned seating improved student discipline. The second theme that emerged was that assigned seating improved student performance because it reduced student distractions. The third theme that emerged was that traditional row seating was preferred to increase student discipline. The fourth theme that emerged was that seating students in groups was favored for increasing student performance within the classroom.

### *Discussion*

The results of the study helped to determine best practices that new science teachers should consider. This information could prove to be valuable to first-year teachers who shoulder the burden of writing lesson plans, understanding school policy, grappling with classroom discipline, and dealing with a litany of issues that they have never dealt with before.

The initial subject that was explored was the topic of assigned seating, or, placing students in a specific seat with the aim to gain a strategic advantage, whether disciplinary or achievement-based. This seating variable was found to be the most profound as far as its effect amongst educators interviewed. The prevailing thought of the interviewees is that assigned seating can reduce student behavioral problems and increase the likelihood that students perform better because they are less distracted completing their assignments regardless of the seating formation that students are arranged in. This indicates that assigned seating should always be implemented by teachers regardless of their experience or education level.

## SEATING IN THE SCIENCE CLASSROOM

The second subject studied was whether a certain seating arrangement or formation was preferred by teachers to increase performance or discipline. The findings surrounding this question were less pronounced than that of assigned seating. Most teachers agreed that grouping provided the most possibility of enrichment for students. They cited that group discussion and peer tutoring were the strongest attributes of the grouping system. Teachers stated that for assignments or projects that required critical thinking, grouping was superior. However, teachers also stated that for activities that required individual concentration and or individual work that row seating was far better for student achievement. This leads the researcher to deduce that seating arrangements should be chosen based on the assignment or activity that is being presented that day, rather than going with a one size fits all approach.

### *Limitations of the Study*

One of the limitations of the study is that the researcher only had the opportunity to interview four different teachers. More interviews would have strengthened the findings of the research. Another area that could have strengthened the research would be to interview teachers from other school systems and areas outside of Carter County, Tennessee. This would give perspective to what other school systems prioritize and how other teachers manage their classroom. Another variable that could have been considered would be to see how science teachers in middle and elementary schools arrange their students and see if there is a unilateral model that works for all age groups.

### *Conclusion*

Seat or desk orientation is an important component of the physical education environment. Arranging desks with little thought could create circumstances that might detract from the learning process and undermine a student's education. This study found that, in the secondary science classroom, the use of assigned seating was an effective means to increase

student performance while decreasing behavioral issues. The study also found that utilizing a combination of row seating and grouping yielded the best results for increasing student learning and performance. It is this study's recommendation that a new secondary science teacher implement assigned seating in their classroom and modify their desk arrangement between rows and grouping based on the day's lesson or activities. These steps are a passive approach that can yield results for both teacher and student before the class ever begins.

### ***Recommendations for Future Research***

Future research to increase the knowledge base on this subject is needed to address the changing education landscape. The emergence of COVID-19 highlights the fact that there is a real possibility that classrooms will be moving into the virtual world. Currently, teachers are experimenting with apps like Zoom to conduct classes however this approach is unrefined and not as effective as it could be. Further research needs to be done on effective ways to arrange student's displays and online workspace within their virtual classroom in order to maintain student focus and increase interaction. This could be an emerging teaching method and innovation will be key to get ahead of the problems that educators will encounter.

Another area of interest that has not been fully examined is the use of various seating models to motivate students to perform better similar to the way that Min observed Chinese teachers seating students based on their classroom rank (Min, 2019). This is almost identical to the "chair" system many music programs use in the United States to assign what pieces of music students play. It would be enlightening to see if competition within the classroom would improve the overall performance of the student body. Students will inevitably contend with their peers both in college and in the workforce and this model may help them understand the importance of hard work. Seating students this way might also give them a valuable lesson in

## SEATING IN THE SCIENCE CLASSROOM

economics while they are learning other subjects, better positioning the country to be competitive in the global economy.

**Bibliography**

- Barley, Z., Lauer, P., Arens, S., Aphthrop, H., Englert, K., Snow, D., & Akiba, M. (2002). *Helping At-Risk Students Meet Standards: A Synthesis of Evidence-Based Classroom Practices*. (pp. 1-126, Rep.). Aurora, CO: Mid-Continent Research for Education and Learning. (ERIC Document Reproduction Service No. ED475904)
- Civitillo, S., Denessen, E., & Molenaar, I. (2016). How to see the classroom through the eyes of a teacher: Consistency between perceptions on diversity and differentiation practices. *Journal of Research in Special Educational Needs*, 16, 587-591.
- Currie, J., Ly, J., (2016). An exploration of student perspectives of primary classroom desk configurations. *International Online Journal of primary education*, 5(2), 1-14.
- Fallout, J. (2014). Circular seating arrangements: Approaching the social crux in language classrooms. *Studies in Second Language Learning and Teaching* , 4(2), 275–300.
- Fernandes, A., Huang, J., (2017). Teacher perceptions of the impact of classroom seating arrangements on student participation language classrooms. *IJAES*, 31(1), 49-67.
- Fitzgerald, P. (2016). Differentiation for all literacy levels in mainstream classrooms. *Literacy Learning: The Middle Years*, 24(2), 17-25.
- Gremmen, M., Van den berg, Y., seagers, E. (2016). Considerations for classroom seating arrangements and the role of teacher characteristics and beliefs.. *Social Psychol Educ*, 19(1), 749- 774.
- Julianne, T. (2018). Assigned seating with first row preference: An inclusive teaching strategy that builds classroom community. *College Teaching*, 66 (1), 6-7.

## SEATING IN THE SCIENCE CLASSROOM

- Min Z. (2019) 'If you take learning seriously, I'll assign you to a good seat': Moralized seating order and the making of educational success in China's public schools, *Ethnography and Education*, 14:4, 428-447
- Renegar, K., (2018). Alternative seating in middle school math: Effects on student motivation. *Dissertation, Liberty University.*
- Roland, C., & Barber, D. (2016). Untangling differentiation. *Modern English Teacher*, 25(2), 64-66.
- Şentürk, C., & Sari, H. (2018). Investigation of the contribution of differentiated instruction into science literacy. *Qualitative Research in Education (2014-6418)*, 7(2), 197–237.
- Simmons, K., Carpenter, L., Crenshaw, S., Hinton, V. (2015). Exploration of classroom seating arrangement and student behavior in a second grade classroom. *Georgia Educational Researcher*, 12(1), 51-68.
- Tennant, A. (2017). The dangers of differentiation. *English Teaching Professional*, 1(112), 4-6.
- Wannaraka, R., Ruhl, K., (2008). Seating arrangements that promote positive academic and behavioral outcomes: A review of empirical research. *Support for Learning*, 23(2), 89–93.



**Appendices**

*Appendix A*

Informed Consent Form

**INFORMED CONSENT FORM**

You are invited to take part in a research study that will attempt to look at the possible benefits of various forms of seating within the science classroom. This study is being conducted by Matthew Young, a graduate student at Milligan College.

**Background Information:**

The purpose of this study is to determine if there is a preferred seating arrangement that promotes higher achievement or increased discipline in the classroom.

**Procedures:**

If you agree to be in this study, you will be asked to participate in an interview that could last between 10 minutes and an hour depending on how much you want to talk. I would estimate that most interviews will last less than 30 minutes.

**Voluntary Nature of the Study:**

Participation in this study is voluntary. You may choose to terminate your involvement in this study at any time.

**Risks and Benefits of Being in the Study:**

This study poses minimal risk to the participants. Most of these risks would fall under everyday aggravation such as fatigue, stress, or scheduling conflicts. Participating in this study would not pose a threat to your safety or wellbeing.

This study may offer new educators insight into the potential benefits or pitfalls of using various seating arrangements and assigned seating in the learning/teaching process. It also gives the potential for future research to be conducted on the use of different seating arrangements and techniques in the science classroom.

**Privacy:**

The researcher will not use your personal information for any purposes outside of this research project. Data will be kept for a period of at least 5 years, as required by Milligan College.

**Contacts and Questions:**

If you have any questions you may contact the researcher by phone, (423)-342-7356 or email, [mryoung@my.milligan.edu](mailto:mryoung@my.milligan.edu). If you want more information about your rights as a participant, you may contact the Milligan College Institutional Review Board at [IRB@milligan.edu](mailto:IRB@milligan.edu). You will be supplied you with two copies of this form, one for your records and one for my records.

**Statement of Consent:**

I have read the above information and I understand the study well enough to make a decision about my involvement.

By signing below, I understand that I am agreeing to the terms described above.

Printed Name of Participant \_\_\_\_\_

Signature of participant \_\_\_\_\_

Date of consent \_\_\_\_\_

Researcher's Signature \_\_\_\_\_

*Appendix B*

Interview Guide

Interview Guide

In the classroom, educators must determine the best way to seat their students to achieve different goals. In some instances, an educator may want to assign seats to students and place them in areas of the class where they are less likely to talk and disrupt class. Other times, the educator will allow students to choose where they sit organically, which can give the student agency in their own learning.

How student's desks or tables are arranged is another important variable that an educator must consider. The traditional high school classroom exhibited desks orderly arranged in rows and columns where students face the front of the class. More recently, desks are being arranged in groups of three or four to encourage student interaction and group work. All of these desk arrangements have positive attributes and shortcomings associated with them. With all the ways it is possible to sit students in a classroom the question must be asked, is there a superior form of seating that encourages student performance and discipline?

Questions

The intention of this interview and the subsequent research project is to answer the following questions with regards to middle school and secondary science teachers' opinions regarding seating.

- Does assigned seating improve behavior and or performance in a science classroom? Why?
- There are various seating arrangements that teachers utilize within the classroom; row, cluster, circular, and grouping. Is there one seating arrangement that is preferred in the science classroom that works best from a discipline or performance standpoint? Why?

Process

- The interviewer will meet with the interviewee at their convenience, most likely after work at the school that they teach, to conduct the interview.
- With permission from the interviewee, the interviewer will audio record the interview utilizing an iPhone and back up that recording with a second recording device.
- Focus questions will be asked and follow up questions will be administered based off the initial responses given to the focus question.
- Following the interview, the interviewer will write up notes in a summary form as soon as possible after each interview.
- Interviewer will have all forms, tapes, and materials marked with a code for that interview for data analysis organization.
- Interviewer will give interviewee a transcript of their interview, and a copy of the final research report for their approval to ensure that their meaning was conveyed correctly.

Closing comments

The goal of this research and interview guide is to gather information regarding the perception of the effectiveness of various classroom seating arrangements within the middle and secondary science classroom as non-invasively as possible.