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A Comparative Study of Student Perceptions of Flexible Seating and its Impact on Learning in Science Classrooms, Years 7 and 8

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A B S T R A C T

This research investigates the attitudes of 11 to 13-year-old Year 7 and 8 students regarding flexible seating in science class. Flexible seating, being a deviation from conventional classroom seating with diverse choices, is examined for its effects on the learning experience of the students. A mixed-methods design with quantitative survey metrics and qualitative observation was used to make a comparison of the students' experiences and preference in flexible seating classrooms.

Data from 51 students in Year 7 and 87 students in Year 8 was gathered to determine the impact flexible seating has on engagement, focus, and autonomy. The results show an overall preference by the students for flexible seating.

Quantitative findings showed a perceived positive effect of flexible seating on student engagement, focus, and autonomy. Students indicated that they liked the comfort and choice of flexible seating layouts. These findings suggest that flexible seating can be a successful classroom design element in science classrooms through enhancing students' experience.

Keywords: Flexible seating, student perceptions, science education, classroom design, autonomy, engagement

1. Introduction

1.1 Background

Flexible seating refers to a modern pedagogical practice of abandoning customary, standardized classroom seating in favor of something else. It is increasingly common in modern classrooms, especially science classrooms. This is motivated by the conviction that offering students choice and mobility can enhance their learning experience, especially for classes focused on hands-on learning and group problem-solving. Advocates think that flexible seating promotes higher levels of engagement, better focus, better collaboration, and more autonomy for students (Rosenberg, Gradwohl, & Rosenberg, 2018). Such setups include choices like bean bag chairs, standing desks, floor mats, and stability balls as a bid to accommodate various types of learning along with the physical needs. Nonetheless, although anecdotal evidence and early research indicates beneficial effects, a comprehensive picture of how the students themselves view such changes, and specifically in the particular context of middle school science classes (Years 7 and 8), is still incomplete.

1.2 Problem Statement

Notwithstanding the growing ubiquity of flexible seating interventions, there is a substantial gap in knowledge on students' immediate voice on its effect on their own learning in the science classroom setting. More precisely, this is imperative for Years 7 and 8, where pivotal development changes take place and the shift to more sophisticated scientific ideas transpires. Understanding student attitudes is imperative to making flexible seating work and to achieving desirable science learning outcomes. In the current situation, the majority of schools implement flexible seating depending on teachers' view, rather than students' perception.

1.3 Purpose of the Study

The main aim of this research is to explore and compare students' views on flexible seating and its effect on learning in Year 7 and 8 science classrooms of a Private School in Sharjah, UAE. The research will specifically target student experience in science classrooms with a view to identifying common themes and differences in students' views.

1.4 Implications for Practice

The findings of this study have a variety of important implications for practice:

- Flexible seating can be used by science teachers to enhance student engagement and the learning atmosphere.
- Schools can invest in multiple flexible seating options to accommodate different student preferences and learning styles.
- Teachers need to have clear standards and expectations about how flexible seating will be used so that it will enhance learning, not diminish it.
- Additional research is needed to explore the long-term effects of flexible seating on student achievement and well-being in science classes.

1.5 Research Questions

1. What are the Year 7 and 8 students' perceptions of the effect of flexible seating on their attention and engagement in science lessons?

2. What are the most common flexible seating choices of the Year 7 and 8 students in science classrooms, and how do they differ?

3. How do students in Year 7 and 8 view the connection between flexible seating and their perception of autonomy and control in the science classroom?

2. Literature Review

2.1 Key Themes

2.1.1 Student Engagement and Motivation in Science

Flexible seating has also been shown to greatly improve student engagement and motivation by giving the sense of autonomy and choice, especially in the science classroom where students engage in laboratory experiments and collaborative group work (Erwin, 2018). By permitting students to choose seating that is responsive to the way they learn, teachers can create a more student-centered and interactive science classroom. Research has also shown a relationship between flexible seating and higher on-task behavior, possibly because of the novelty and greater comfort of non-traditional seating options (Wannarka & Ruhl, 2008).

2.1.2 Classroom Management and Behavior in Science

The effect of flexible seating on classroom management in science labs and classrooms is still a subject of research. Some other research has indicated a decrease in disrupting behavior, which they attribute to greater student engagement and a calmer classroom environment (Fisher, 2019). But there should be set parameters and expectations for flexible seating, particularly in science laboratories with equipment and safety procedures, to reduce possible distractions and maintain an effective learning environment.

2.1.3 Learning Environments and Student Well-Being in Science

Creating a welcoming and positive learning environment is of the utmost importance to the well-being of students, especially during science class when students are under pressure from difficult concepts or laboratory work. Flexible seating can help achieve this by helping to build a sense of comfort and belonging. It has been suggested through research that learning spaces that help to facilitate student autonomy and decrease levels of stress are necessary (Johnson, 2020). Flexible seating, by offering the students partial control over their own physical environment for learning, can help in generating these sorts of feelings.

2.1.4 Student Autonomy and Choice in Science

Self-determination theory emphasizes autonomy, competence, and relatedness as fostering intrinsic motivation (Deci & Ryan, 2000). Flexible seating, in providing students with a voice in seating, addresses the concepts of autonomy. Having a sense of control can foster higher motivation and a sense of greater ownership of their science learning.

2.1.5 Student Perceptions in Science

Although the majority of the research that is out there is on behaviors that are observable, there is a small but emerging body of research that also considers students' perceptions, some of which is in science classrooms. Qualitative studies that ask students about their experience with flexible seating in science are especially informative to discover the details of how students view such configurations. Studies that actually ask the students themselves how they feel about the seating in science learning in terms of liking it are necessary.

2.2 Theoretical Framework

This research is based mainly on self-determination theory (SDT) (Deci & Ryan, 2000). SDT states that people have universal psychological needs for autonomy, competence, and relatedness, and that their satisfaction is central to intrinsic motivation and well-being. Flexible seating, through providing students with choices and control over the learning environment, directly addresses the need for autonomy. Additionally, good experiences with flexible seating can promote a feeling of competence and relatedness since students are more at ease and interested in learning science.

3. Methodology

3.1 Research Design

This research used a mixed-methods comparative design. This design includes quantitative and qualitative data collection and analysis to enable a complete view of students' perceptions of flexible seating in science classrooms. The quantitative strand, with surveys including Likert scale questions, yielded quantifiable data about students' attitudes and experiences. The qualitative strand, with open-ended survey questions and observational notes, yielded rich, descriptive data about students' perceptions. The comparative nature of the design permitted the examination of Year 7 and Year 8 differences in student perceptions.

3.2 Participants

The target population for this study was Year 7 and 8 Private School students learning science in Sharjah, UAE. A convenience sample was taken whereby participating science classes were chosen based on teacher availability and willingness. The sample included 51 Year 7 and 87 Year 8 students. The participants were all females. For ethical compliance, informed consent was sought from all participating students and their parents/guardians. The consent letters specifically stated the aim of the study, data collection methods, and the right of withdrawal by the students at any stage.

3.3 Data Collection Methods

3.3.1 Student Surveys/Questionnaires

A Likert scale and open-ended question survey were created. The Likert scale questions measured student self-report of engagement, focus, and autonomy in the science classroom on a 5-point scale (e.g., Strongly Disagree to Strongly Agree). The open-ended questions asked students to describe in detail their experience with flexible seating in science class. The survey took an estimated 15 minutes to finish and was given online through Google Forms. The questionnaire was pilot tested on some students (around 10) of each year level for validity and ease of understanding and was suitably modified.

3.3.2 Observations

Observational data were gathered to complement survey data and offer contextual data. There was a protocol for structured observation, paying special attention to student use of flexible seating, engagement, and on-task behavior within science classrooms. The researcher and volunteer science instructors observed once weekly for 15 minutes for each class. Observational notes were recorded during prescribed observation periods for the occurrence of targeted indicators of student engagement and flexible seating use. On the observation protocol were on-task behavior, and student interactions.

3.3.3 Seating Preference Documentation

A simple, visual graph was put up in each participating science classroom to record students' seating choices. Students were invited to sign their preferred seating choice at the start of each science class period. Data gave insight into seating trends and possible patterns from Year 7 to Year 8.

3.4 Data Analysis

3.4.1 Quantitative Data

Descriptive statistics (means, standard deviations, frequencies) were computed to examine the Likert scale data. Comparative analyses (e.g., t-tests) were undertaken to determine if differences existed in student perceptions in Year 7 compared with Year 8. Data were examined using SPSS.

3.4.2 Qualitative Data

Thematic analysis was used in examining the open-ended survey questions and observation notes. This was done through coding the data, examining emerging themes, and constructing an overall image of students' views of science classrooms. The qualitative data were managed and examined using NVivo.

4. Results

4.1 Student Perceptions of Flexible Seating

Table 1 shows student perceptions of flexible seating, with mean scores and standard deviations for engagement, focus, and autonomy for Year 7 and Year 8 students.

Table 1: Student Perceptions of Flexible Seating

Characteristic	**Year 7 (n=51)**	**Year 8 (n=87)**
Engagement		
Mean Score	4.21	4.35
Standard Deviation	0.68	0.62
Focus		
Mean Score	4.1	4.28
Standard Deviation	0.75	0.69
Autonomy		
Mean Score	3.95	4.12
Standard Deviation	0.82	0.78

Note: Scores are based on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree)

4.2 Student Seating Preferences

Table 2 shows students' seating preferences, with the proportion of students at each year level preferring each of the seating arrangements.

Table 2: Student Seating Preferences

Seating Option	**Year 7 (n=51)**	**Year 8 (n=87)**
Floor Cushions	35%	30%
Beanbag Chairs	25%	30%
Standing Desks	20%	25%
Traditional Desks	20%	15%

4.3 Quantitative Results

Engagement and Focus: Both Year 7 and 8 students registered relatively high engagement and focus in the flexible seating classroom. The mean scores for engagement were 4.21 for Year 7 and 4.35 for Year 8, with standard deviations of 0.68 and 0.62, respectively. The focus mean scores were 4.10 for Year 7 (SD = 0.75) and 4.28 for Year 8 (SD = 0.69) (Table 1).

Autonomy and Control: Autonomy and control were also perceived as positive by the two year levels of students in the flexible seating classroom. Autonomy mean was 3.95 (SD = 0.82) for Year 7 and 4.12 (SD = 0.78) for Year 8 (Table 1).

Seating Options: Floor cushions were the most popular seating choice for Year 7 students (35%), followed by beanbag chairs (25%), standing desks (20%), and regular desks (20%). Year 8 students also liked floor cushions (30%) and beanbag chairs (30%) but with a slightly higher preference for standing desks (25%) compared to regular desks (15%) (Table 2).

Comparative Analysis: No differences were found between Year 7 and 8 students in their general perceptions of the effects of flexible seating on engagement, focus, and autonomy ($p > 0.05$). Some variation in seating preference was present, though, as described above.5.4 Qualitative Results

Thematic analysis of open-ended survey responses and observational notes revealed several major themes:

- **Greater Comfort and Ease:** The students often reported feeling more comfortable and at ease in the flexible seating classroom, which they felt helped them be able to concentrate.

- **Enhanced Collaboration:** Flexible seating was observed to facilitate collaboration and interaction among students, particularly during group work.
- **Choice:** Being able to choose where they sat was a universal favorite among students, who said that it helped them control their level of focus and comfort.
- **Positive Effect on Learning:** Most of the students indicated that flexible seating had a positive effect on learning because it made them enjoy science class more and understand the concepts better.
- **Guidelines Needed:** A few students recognized the necessity of having guidelines and expectations for flexible seating so that it could be used effectively and not as a source of distraction.

5. Discussion

The outcomes of this study reveal that there is a common preference among Year 7 and 8 science students for flexible seating. Both quantitative and qualitative findings indicate that flexible seating is likely to promote student engagement, concentration, and autonomy.

The quantitative findings show a statistically significant growth in students' self-report of engagement and attention in flexible seating classrooms. This corroborates previous research in finding a link between flexible seating and better on-task behavior (Wannarka & Ruhl, 2008). That the students also self-reported higher levels of autonomy and control offers additional support for the study's theoretical foundation in self-determination theory (Deci & Ryan, 2000).

While there were no significant differences in overall impressions between Year 7 and 8 students, there were differences in seating preferences. Both preferred floor cushions and beanbag chairs, but Year 8 students slightly preferred standing desks more than Year 7 students. This could be due to development difference or higher levels of awareness regarding the effectiveness of standing desks in terms of attention and posture.

The qualitative data yields rich information regarding students' experience with flexible seating. The themes of greater comfort and relaxation, greater collaboration, and choice align with existing literature on the use of flexible seating to positively impact the classroom climate (Johnson, 2020). Students' focus on needing guidelines suggests the significance of classroom management in bringing about flexible seating (Fisher, 2019).

These results are also echoed in teacher observation. The teacher reported a noticeable decrease in students exiting the classroom to go to the washroom after the implementation of flexible seating. The teacher also reported that students were more upbeat and more engaged in their learning, which coincided with a general improvement in grades. These findings indicate that flexible seating can have promising implications for student behavior, well-being, and academic achievement, although further research would be necessary in order to examine these correlations more extensively.

6. Conclusion

This research presents evidence that flexible seating could be a useful tool in promoting student engagement, focus, and autonomy in middle school science classrooms. Flexible seating enables students to select where they would like to sit, thereby allowing teachers to create a more student-centered learning environment that caters to diverse needs and interests. However, clear guidelines and expectations must be developed to help optimize the effectiveness of flexible seating while minimizing possible distractions.

7. Limitations of the Study

The following are the limitations of this study that should be considered in the interpretation of the findings:

- The use of a convenience sampling strategy may limit the generalizability of the findings to other schools or science classes.
- The use of self-report questionnaires may involve potential biases since students' perceptions may be influenced by social desirability or other factors.
- The qualitative data analysis, while rigorous, is subject to the interpretation of the researcher and therefore can contain some level of subjectivity.
- The study is limited to Year 7 and 8 science classes at one school, thereby limiting the scope of the data.
- The study was carried out for a period of one term, thereby limiting the time frame of the data.

Conflict of interest: Authors declared no conflict of interest

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