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Contemporary Furniture Design to Create ADHD- Friendly Space for Elementary Classrooms

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Title of Paper:

Contemporary Furniture Design to Create ADHD-Friendly Space for Elementary Classrooms

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Paper ID: 146



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1. Introduction:

Overview:

- An average of **8.4%** of children worldwide is estimated to be diagnosed with Attention Deficit Hyperactivity Disorder (**ADHD**).
- The classroom environment is an important factor that affects the **learning experience, educational progress, and child health and well-being**, especially in elementary schools.
- This study **aims** to identify the **criteria for furniture and space design** that increases the performance and attitude of students with ADHD.

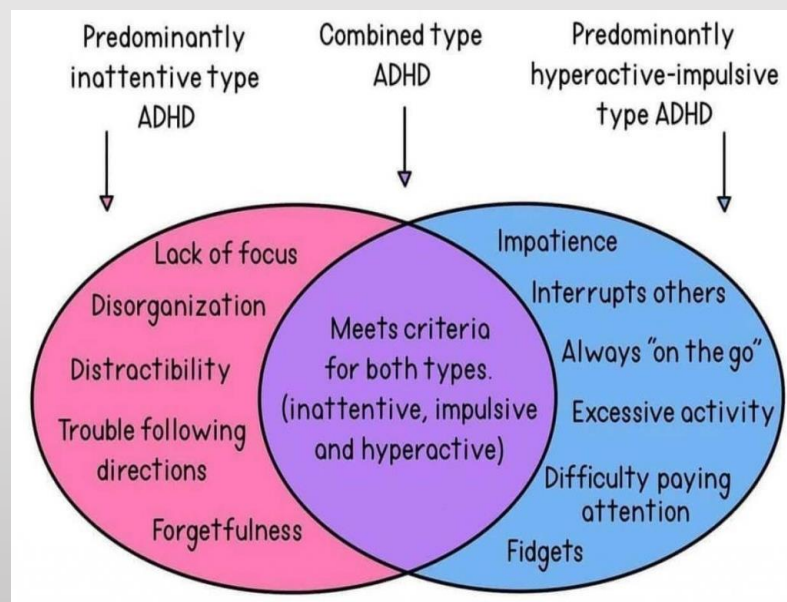
1. Introduction:

Symptoms of ADHD:

(a) Inattention (not being able to keep focus)

(b) Hyperactivity (excess movement that is not fitting to the setting), and **Impulsivity** (hasty acts that occur at the moment without thought)

(c) combined Inattention and Hyperactivity / Impulsivity





1. Introduction:

1.1 ADHD Friendly- Classroom design:

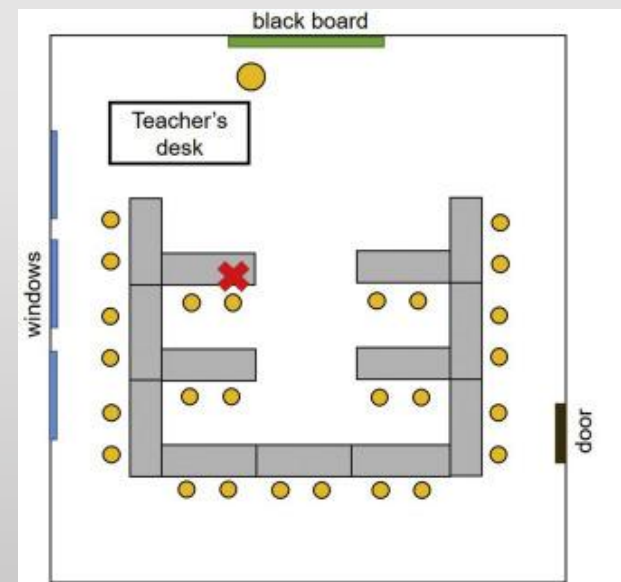
- ADHD students face a range of **learning difficulties** in the school environment. The **interior environment** may affect the different **behavioral patterns** in children with ADHD.
- The design of **ceilings**, **walls**, and **floors** contributes to the formation of a space that has a great impact on the disease's treatment.
- Students in **elementary** schools may be **fidgety** and **squirm** in their seats or play with their chairs and desks

1. Introduction:

1.1 ADHD Friendly- Classroom design:

■ Classroom Layout:

- Children with ADHD work better with **single seats.**
- Sit them next to the **teacher's desk**
- Away from windows or open doorways if possible.
- Sit them close to **other students** who are attentive and well-behaved

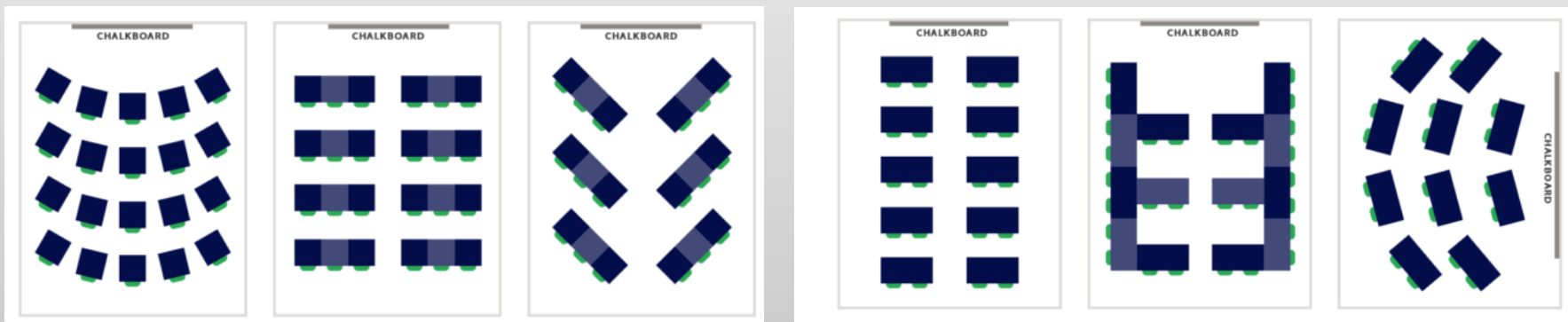


1. Introduction:

1.1 ADHD Friendly- Classroom design:

▪ Classroom Layout:

- The best method for desk placements if there is a **mix of students** with and without ADHD



Room arrangement with individual desks

Room arrangement with small tables

1. Introduction:

1.1 ADHD Friendly- Classroom design:

Isolated Area:

- Create an isolated area as a stimuli reduced area in the **back** of the room so as to prevent **overload**, it helps **the fidgety student** complete his/her assigned task.



1. Introduction:

1.1 ADHD Friendly- Classroom design:

Isolated Area:

- A square-shaped area surrounded on three sides by bookcases (books facing outward to prevent distractions)



1. Introduction:

1.1 ADHD Friendly- Classroom design:

Isolated Area:

- Can include some **plush chairs** and **pillows** to provide the student with a safe, comfortable place in which to focus



1. Introduction:

1.1 ADHD Friendly- Classroom design:

Stations:

- Students can move from one section of the room to another, students can finish short segments to complete longer assignment



1. Introduction:

1.1 ADHD Friendly- Classroom design:

- **Materials:**
 - A sense of **unity** is preferred that can be achieved by using the **same material and color** in the ceiling, walls, and floor, with the same lines, **durability, degree of isolation, and level of sound absorption.**
 - Using **sustainable materials** has a direct impact on the health



1. Introduction:

1.1 ADHD Friendly- Classroom design:

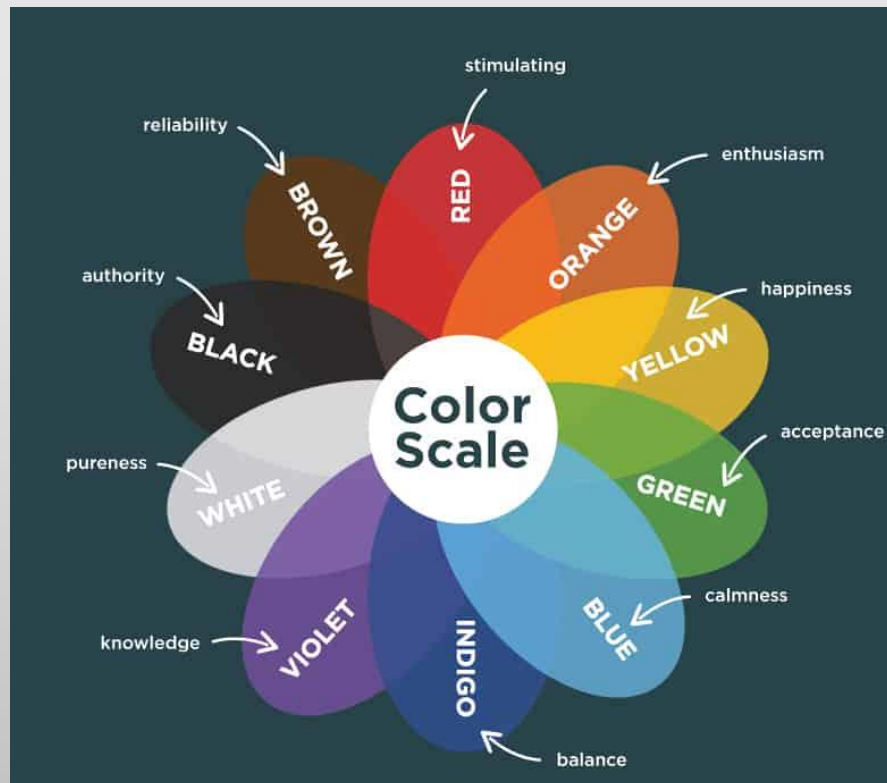
- **Colors:**
 - Classrooms should have **minimal visual distractions** (wall drawings and decorations).
 - Stick with **muted or pastel shades**.
 - Use **light and natural colors**
 - **Avoid primary colors.**



1. Introduction:

1.1 ADHD Friendly- Classroom design:

- Colors:





1. Introduction:

1.1 ADHD Friendly- Classroom design:

- **Lighting:**
 - **Natural lighting** is one of the important elements that achieve adequate lighting in classrooms to raise morale
 - For artificial lighting, **avoid fluorescent lamps** and **use soft and indirect** lighting.
 - When choosing a bulb hue, always go with the **warmer yellow or orange** shades and stay **away from white or blue tones**.

1. Introduction:

1.2 Furniture Design for ADHD Students:

- Classrooms provide a combination of **chairs, desks, or tables** made of wood, steel, or plastic.
- When ADHD students sit on those **inflexible surfaces**, the result is physical **discomfort** that distracts them from **concentrating** then they need to get out of that chair.
- **Boys** are more hyperactive in class than **girls**.





1. Introduction:

1.2 Furniture Design for ADHD Students:

1. Dynamic seating:

- Interactive fidget-friendly classroom furniture focused on helping ADHD students to make some **simple moves without disturbing** others.
- Dynamic seats can be distinguished according to the movement of students to find a balance between **allowing movement** and **ensuring stability**.

1. Introduction:

1.2 Furniture Design for ADHD Students:

1. Dynamic seating:



Standing desk



Wobbel chair



Theraby ball



Ergo Ergo



Pedal desk

1. Introduction:

1.2 Furniture Design for ADHD Students:

2. Rock On chair:

Rock On is a special **rocking chair** for the students who are not being taught, for the moment by the teacher while waiting for their turn





1. Introduction:

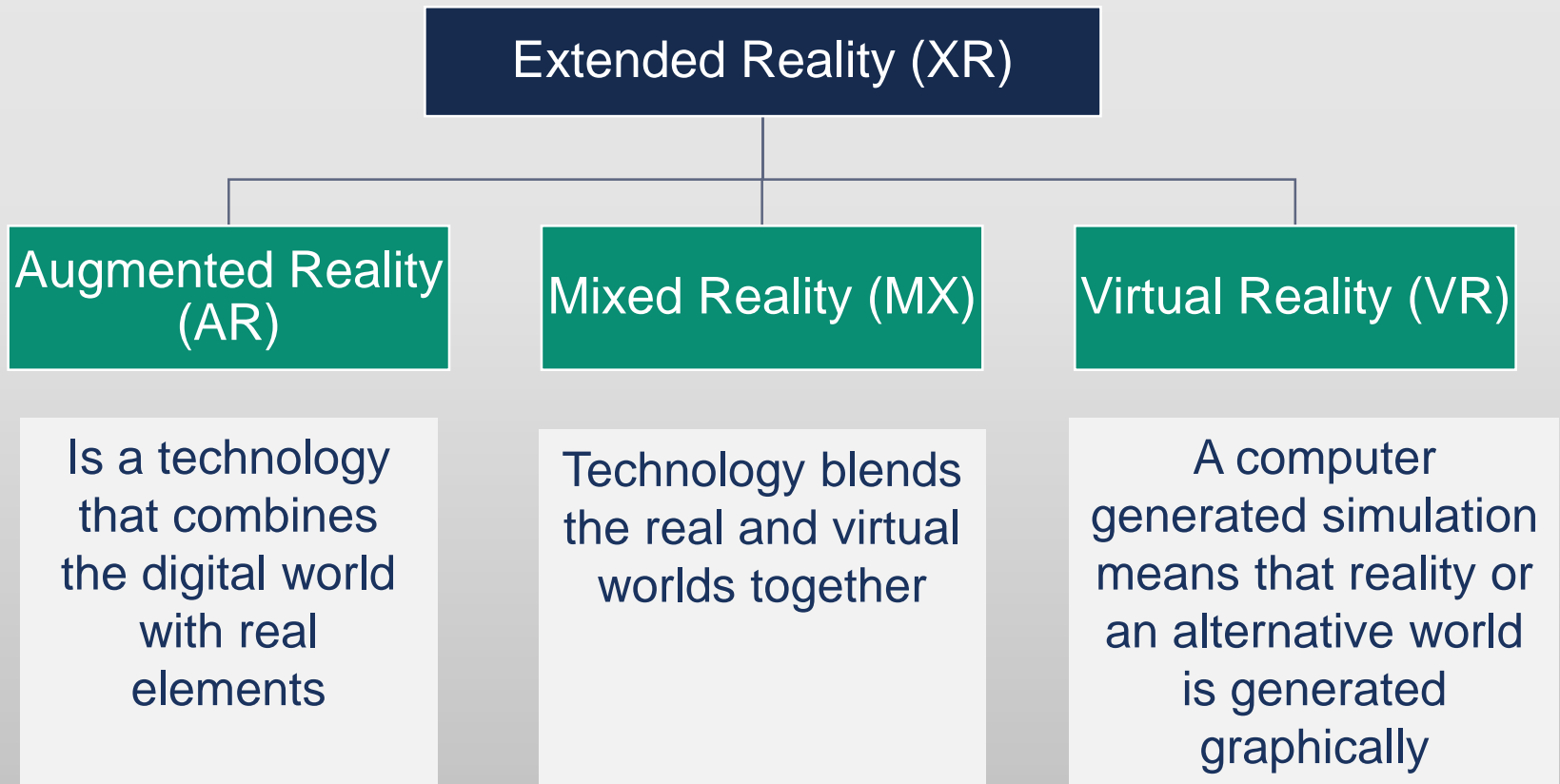
1.3 Technology-based learning approaches:

- **Teaching students** the traditional method where there is only one way of communication is **no longer effective**.
- The term "interactive" is used in two separate parts of the discourse on educational research, one on **pedagogy** and the other on **new technologies** in education.
- Technology-based Learning is where students learn and observe information through devices such as watching a **short video** to **understand a science experiment**.



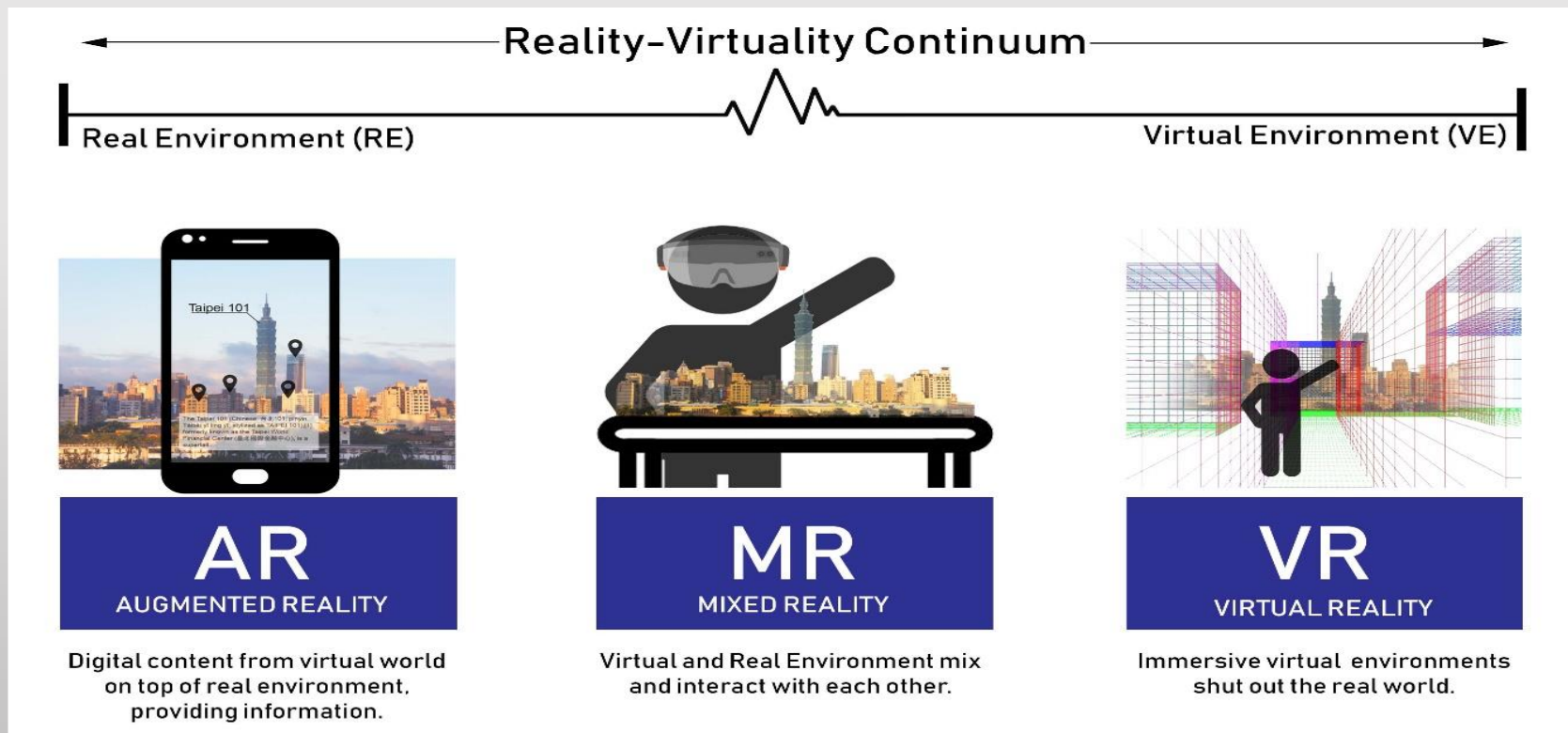
1. Introduction:

1.4 Extended Reality Immersive technologies application:



1. Introduction:

1.4 Extended Reality Immersive technologies application:





2. Purpose of the study:

What are the **furniture** and **classroom design** criteria needed to solve the learning problems of ADHD Children inside the educational environment?



How **technology** can be impeded by contemporary furniture design?

3. Methodology:

1

- **Literature study** to understand the characteristics and behavior of ADHA students in the classroom. Moreover, ways to use technology in classroom activities and the environment were discussed.

2

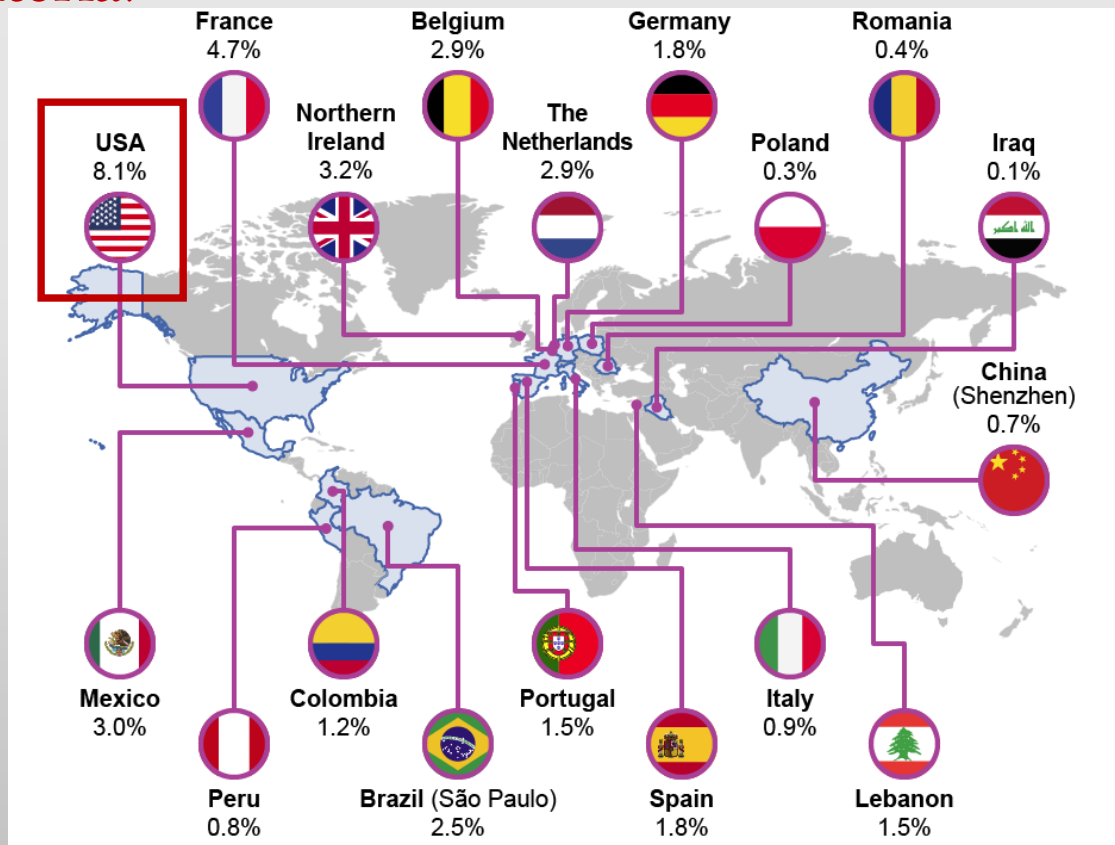
- Data collecting about the classroom furniture was conducted from **4 schools for ADHA children in the USA**; Willow Hill School, Tampa Day School, Brehm Preparatory School, and Josiah Haynes Elementary School.

3

- As a result of the previous steps, collected data were analyzed through **a set of parameters or design criteria** (materials, colors, lighting and function) that were predefined by the authors based on information needed to answer the research questions.

4. ADHD School Case Studies:

Selection Criteria:



4. ADHD School Case Studies:

1. Willow Hill School:

1.1 Classroom interior environment:

- Students have a **one-to-one** experience with the teacher
- WHS paint their classroom in peaceful earthy colors like **pale yellow or beige**.
- have **warm lighting** instead of the regular fluorescent light that causes anxiety and stress to the children.



4. ADHD School Case Studies:

1. Willow Hill School:

1.2 Classroom Furniture:

- The school provides different kinds of options starting from the use of an **exercise ball chair**, the **cozy wooden chair**, and the additional **piece of Exercise Band Footsie**.



4. ADHD School Case Studies:

1. Willow Hill School:

1.3 Technology application inside the Classroom:

- Each student is provided their **own laptop computer**.
- Each classroom is equipped with a **Mimeo Media System** and a **wireless network** for every student to facilitate the development of skills across the curriculum. Technology can also be accessed through our computer lab and our library



2. Tampa Day School:

1.1 Classroom interior environment:

- At Tampa Day School, existing classrooms support children with ADHD.
- Tampa Day School aims to provide a **small class-size** learning experience and support **cooperative learning** through different activities.



4. ADHD School Case Studies:

2. Tampa Day School:

1.2 Classroom Furniture:

- Tampa Day School was so determined to deliver the best experience to its students regarding the furniture inside of the classroom and increase the number of students.
- Each student has her/ his **own fixed desk** and **4 legs chairs**.



4. ADHD School Case Studies:

2. Tampa Day School:

1.3 Technology application inside the Classroom:

- All students utilize **1-1 devices** (IPADS) for daily instruction to develop technology literacy skills and engage and support academic instructions through research, publishing, communicating ideas, and creating mind maps



4. ADHD School Case Studies:

3. Brehm Preparatory School:

1.1 Classroom interior environment & Furniture :

- Have individualized classrooms where students may **have one-on-one** time with the lecturer
- In terms of the space's interior, the technology employed, or even the development of learning within the classroom, or how the instructor speaks and explains to the students.



4. ADHD School Case Studies:

3. Brehm Preparatory School:

1.2 Technology application inside the Classroom:

- Each Brehm student is issued a **laptop computer** loaded with a suite of the latest tools and assistive software in their **one-to-one program**.



4. ADHD School Case Studies:

4. Josiah Haynes Elementary School:

1.1 Classroom interior environment:

- As a **non-ADHD-friendly school**, the setting of its classroom can be quite different from the previous case studies regarding the interior of its rooms or the furniture of its spaces.
- However, this does not make the school less functional in any case, but it does make it a less **ADHD-friendly school**.



4. ADHD School Case Studies:

4. Josiah Haynes Elementary School:

1.2 Classroom Furniture:

- Furniture selection has been made to regulate the **average needs** of the students attending this kind of school without any consideration of any special needs or concerns for each individual.
- Normal furniture is provided in each school ranging from **Stackable chairs** and **movable tables and desks**.



5. Findings:

School name	Arrangement	Decorations	Paint Colors	Lighting	Furniture type	Technology application
Willow Hill School	<ul style="list-style-type: none"> - Arrange desks far from doors, windows or furniture - Lined up in the middle - Students closer to teacher's desk - Children sit at a single desk or 2 students 	Plain walls free of any distractions and simply decorated	pale yellow or beige	<ul style="list-style-type: none"> - Natural lighting - Warm artificial lighting instead of the regular fluorescent light 	<ul style="list-style-type: none"> -Exercise ball chair - cozy wooden chair with an exercise band footsie 	Own laptop, Mimeo Media System and a wireless network
Tampa Day School	Small class-size (10-12 students)	Plain walls full of walls drawings and decorations	White	<ul style="list-style-type: none"> - Natural Lighting - Regular fluorescent light - Potable lamps warm light 	4 legs chairs and tables	IPAD for each student and Online access
Brehm Preparatory School	Small class size (5 students)	Plain walls free of any distractions and simply decorated	beige	<ul style="list-style-type: none"> - Natural Lighting - Warm artificial lighting 	4 legs chairs and tables	a laptop for each student
Josiah Haynes Elementary School	Children sit at a single desk and tables for cooperative activities	Walls filled with learning decorations, colored notes and floor with patterned carpets	White	<ul style="list-style-type: none"> - Natural Lighting - Cool artificial lighting 	Stackable chairs and movable tables and desks	--



5. Findings:

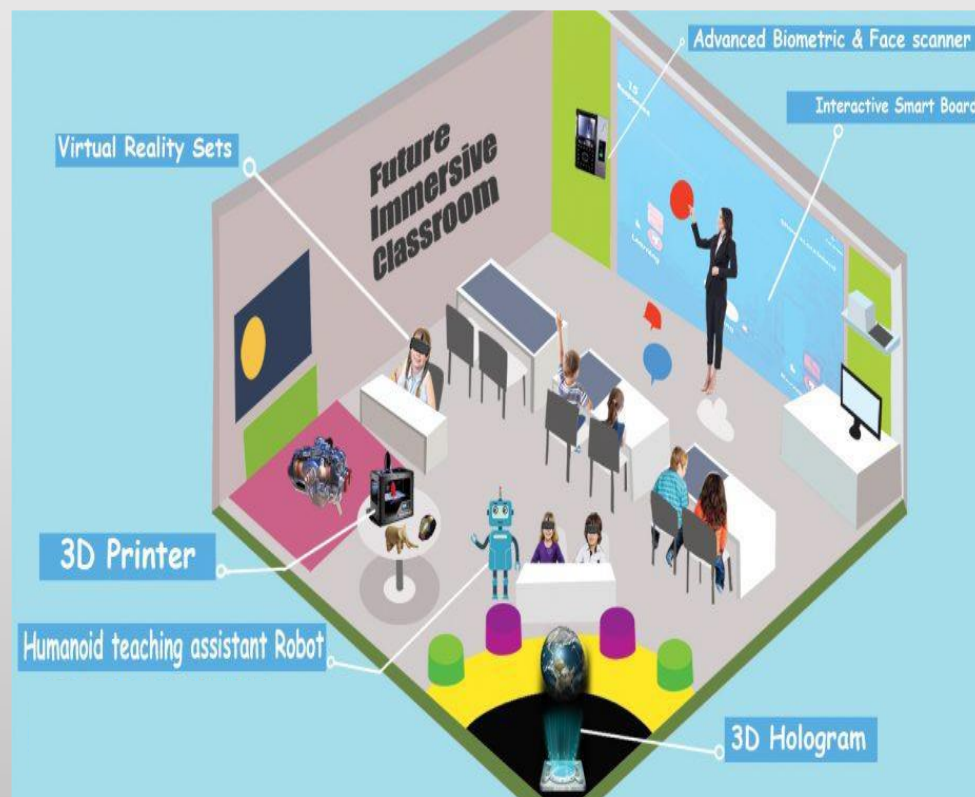
- **Education** is an essential priority for all children, whether they have any medical condition or not.
- There were **limited schools** which are accredited and specialized for students with ADHD. Some schools have learning programs that support ADHD students, other schools teach the same material as traditional schools, but with small class sizes, a personalized approach, and specialized programs.
- Using **ADHD-friendly furniture** such as dynamic seats, therapy balls, rock on chair, ergoergo, pedal desk, and standing desk for the whole class eliminating the individual differences can decrease the gap among children with ADHD and the rest of the children.

5. Findings:

	Summary of Results
Desks arrangement	<ul style="list-style-type: none"> - Arrange desks far from doors, windows or obstacle - Arrange students closer to teacher's desk - A mix of students with and without ADHD - Multiple seating options, such as standing desks, clusters for small-group learning,
Space paint	<ul style="list-style-type: none"> - Simple color gradation connecting the color of the walls, floor, and ceiling - Minimal visual distractions (walls drawings and decorations) to avoid stress and anxiety - Use muted or pastel shades paint, and avoid primary colors to enhance productivity
Lighting	<ul style="list-style-type: none"> - Use natural lighting - For artificial lighting, avoid fluorescent lamps - Use soft and indirect artificial lighting - For bulb hue, always go with the warmer yellow or orange shades and stay away from white or blue tones
Materials	<ul style="list-style-type: none"> - Use sustainable materials for health impact

5. Findings:

- **Multifunctional furniture** is preferable in the ADHD classroom environment.
- Smart Learning Space Design that includes **multiple seating options**, clusters for **small-group learning**, **soft seating**, and **traditional desks and chairs** accommodates different learning preferences for all students and makes classrooms more inclusive.





5. Findings:

- Using Extended Reality technologies to create an **immersive classroom** for children with ADHD such as VR aims to provide an environment capable of supporting the development of the different attentional components.
- These technologies provide a **virtual environment** (Three-Dimensional) that allows students to **experience various situations** that may be **difficult** or even impossible to deal with in reality and develop different skills.



6. Discussions & Conclusion:

- **Furniture pieces** used in the classroom can affect the **ADHD learning experience** as well as the classmates around them.
- ADHD-Friendly furniture has specific characteristics varying from **soft and flexible materials**, and **multifunctional** pieces to having **light and calming colors** to reduce anxiety and stress most ADHD students go through on a daily basis. The **materials** can be natural or synthetic, virgin or recycled, simple or high-tech, local or exotic.
- **Technology** presence in the ADHD-Friendly furniture was missing. Although, incorporating technology into the classroom leads to better and more **effective communication** between students and teachers, as well as students and classmates, as well as parents and teachers



Thank You
Questions