



# LEARNING EXPERIENCE COLLABORATIVE

ESC REGION 12 + HUCKABEE

**YEAR IN REVIEW**

**Focused on Student Engagement**

October 2019

# YEAR IN REVIEW

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*Our “Year in Review” compiles the history, findings and future of our research and the LEx Collaborative, with a focus on the 2018-2019 academic year.* In this edition, we are excited to share results from our first phase of research which focused on flexible furniture, professional development and its impact on student engagement and academic outcomes. The findings are promising, and there is much to learn and much more to share!

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**The education research team includes:**

***Baylor University Center for Astrophysics, Space Physics and Engineering Research (CASPER)***  
*Shanna L. Attai, Ph.D., Jorge Carmona Reyes, M.S. and M.S. Ed., Truell W. Hyde, Ph.D. and John L. Davis, Ph. D., University of Utah*

***In partnership with***  
*Huckabee, Education Service Center Region 12 and Midway Independent School District*

# LEARNING EXPERIENCE COLLABORATIVE

## OUR STORY

*A unique group of educators, researchers and architects working together to make authentic advancements in education and to instill a love of learning in all students.*

In 2014, a partnership began between Huckabee, Education Service Center Region 12 and Baylor University to create the Learning Experience Collaborative. The LEx Collaborative, located at the Baylor Research and Innovation Collaborative (BRIC), conducts research at the intersection of professional development and the built environment to determine its impact on student engagement and the learning experience. Additionally, the collaborative seeks to empower all stakeholders through immersive experiences, equipping them with data, research-based knowledge and access to a variety of professional services for increasing student engagement and success.

The collaborative is comprised of three primary focus areas: Learning Experience Laboratories (LEx Labs), Learning Experience Impact (LEx Impact) and Learning Experience Research (LEx Research).



**Baylor Research & Innovation Collaborative**  
Baylor University, Waco, Texas

## OUR FOCUS AREAS



**LEx Labs** is our core research facility. Located at the BRIC, it is designed with students and educators in mind and is filled with flexible furniture, technology and other unique aspects of the built environment. LEx Labs is an incubation space where we research and explore the built environment and learning experiences. It also acts as a “flight simulator” for educators to test modern learning environments and concepts before introducing them to practice.



**LEx Impact** provides change management services focused on student engagement and empowerment. We act as your facilitator to invoke conversations between members of your team and introduce new mindsets, qualities and skills. LEx Impact employs a personalized approach to help you redesign learning experiences; deepen educator and student understanding of those experiences; and foster collaboration, creativity and reflection.

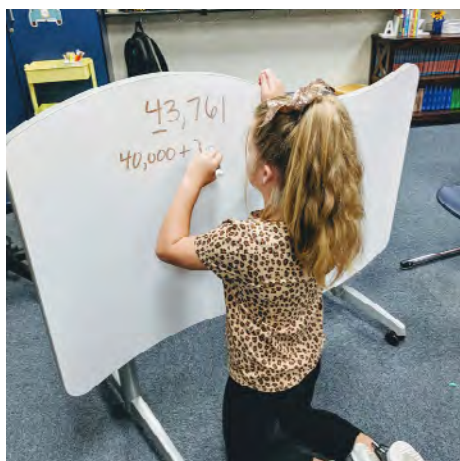


**LEx Research** works with school systems to collect data, evaluate the effectiveness of learning space and give insight into professional development needs for new and evolving learning environments. The research team has completed multiple pilot projects at the elementary level and initiated a longitudinal study focused on flexible learning environments. This research is foundational in establishing methodology and instrumentation that didn't exist prior for this age group in modern learning components. The research team's focus is grounded in the impact the learning environment has on student engagement and in taking the research beyond control conditions to additional environments.

# DEFINING THE RESEARCH



THE LEX COLLABORATIVE IS CONDUCTING RESEARCH ON FLEXIBLE FURNITURE AND ITS IMPACT ON STUDENT ENGAGEMENT AND ACADEMIC OUTCOMES.



## ABOUT

Through the LEx Research initiative, we are working with Texas school districts and researchers from Baylor to collect data to evaluate the effectiveness of flexible learning environments. We have completed two pilots and have embarked on a 9-month longitudinal study.

**Our research is providing insight into how redesigned and evolving learning environments** can impact student engagement and drive student achievement.



## WHY RESEARCH?

Previous research has shown the learning environment can impact student success in the classroom (Cleveland & Fisher 2014; Barrett, Zhang, Moffat, & Kobbacy, 2013). However, a better understanding of how the various components of the learning environment are related to student engagement and academic outcomes is needed. While this data exists for secondary students and adults, there is little available research focused on younger students.

**Our research will enable (and empower) educators to better customize and design learning environments, curriculum and professional development** to best enhance the learning process for elementary students.



## WHY FLEXIBLE CLASSROOMS?

We are curious about the use of flexible furniture in the classroom. We want to discover if flexible learning environments (including the use of flexible furniture) can increase academic achievement through improved student engagement.

The LEx Collaborative also believes the role of educators is essential. **Through our research, we want to explore the impact professional development and change management** have in the success of flexible learning environments.



## THE BIG QUESTION

Our primary research question is:

**Does flexible classroom furniture coupled with appropriate professional development improve student engagement and increase academic achievement in elementary students compared to the outcomes of their peers in traditional classrooms?**

It is hypothesized that training elementary school teachers in the use of flexible furniture and transforming their classrooms into flexible learning environments will have a **significant positive impact on student engagement and academic achievement**.

### TRADITIONAL LEARNING ENVIRONMENTS

Traditional classroom furniture used in most schools today was designed during the industrial economy of the 19th century. Traditional furniture is characterized by rows of stationary desks and chairs (sometimes even bolted in place).

The traditional classroom environment enables teachers to deliver messages to large groups of students and have control of the pace, content and sequence of learning activities. However, traditional desks and chairs do not allow for ample student and teacher movement. Despite changes in pedagogy that lean toward mobility, traditional classroom furniture remains in many 21st century classrooms.



**Figure 1:** Traditional Classroom

### FLEXIBLE LEARNING ENVIRONMENTS

Our researchers define flexible furniture in flexible learning environments as: furniture (work surfaces and seating) that provides and supports student choice of seating, location, comfort and peer interaction, with the intent of fostering collaboration and empowering students to become builders of knowledge.

Students should be able to easily move, reconfigure and partially-condense furniture in a short period of time in comparison to the time of a class period. Teacher space within a flexible classroom should take up to 10 percent or less of the floor space and to the extent possible, be movable or reconfigurable.



**Figure 2:** Flexible Classroom





## CONDUCTING THE RESEARCH

The beginning results of Pilot Study I and extensive literature review and expertise from members of the research team provided the support necessary to create instrumentation designed to measure the variables of interest for Pilot Study II and the Longitudinal Study (detailed on Page 9).

**The instrument development phase identified four measures of student engagement:**

1. Teacher report measure
2. Student self-report
3. An adapted student self-report
4. Classroom observation form

The resulting instruments were designed to allow researchers to analyze elementary student engagement across each of these measures in order to triangulate the data. The teacher report and student report surveys each included a battery of assessments measuring student engagement, perceptions of environment and technology in the classroom.

### 1. TEACHER REPORT MEASURE (FETS)

The **Flexible Environment Teacher Survey (FETS)** is a 44-item survey which uses a 4-point Likert response scale (Never, Sometimes, Often and Almost Always). The survey was completed online by the classroom teacher on five of his/her randomly-selected students. The items were worded so respondents could indicate: “How often a child engages in the specified behavior in the classroom.” The survey takes approximately 20 minutes to complete and allows us to measure student engagement from the teacher’s perspective.

### 2. STUDENT SELF-REPORT

Children develop rapidly at the elementary level physically, cognitively and socially. Due to developmental differences and readability among the age groups participating in the research, **two student self-report surveys were developed:** the FESS and the A-FESS.

#### FESS

The Flexible Environment Student Survey (FESS) was designed for students in 3rd and 4th grade. During Pilot Study II, students completed the survey three times. The FESS is a 54-item scale that uses a 4-point Likert response scale and takes approximately 20 minutes to complete. For consistency of administration, students were required to complete the surveys during their computer class period (Fig. 4).

### 3. ADAPTED STUDENT SELF-REPORT

#### A-FESS

The Adapted-Flexible Environment Student Survey (A-FESS) was designed for students in 2nd grade. The A-FESS provides an optional audio play feature to account for reading ability and developmental differences in students and takes approximately 20 to 25 minutes to complete (Fig. 5).



**Figure 4:** Students completing the FESS online survey



**Figure 5:** Second graders completing the A-FESS



Figure 6: Classroom Observations

## CONDUCTING THE RESEARCH

### 4. CLASSROOM OBSERVATIONS

During Pilot Study I, classrooms were observed every other week from multiple perspectives to build a hypothesis of student engagement for elementary school students and qualitatively understand the impact flexible furniture has on elementary school students. During Pilot Study II, classrooms were observed every other week for the entire fall semester (approx. 16 weeks with eight observations per classroom, Fig. 6). All observers were trained prior to implementing the observation protocol.

During observations, three students were randomly selected per classroom and continuously monitored throughout each observation (for a total of 20 minutes). Over the course of the study, **112 total observations were conducted**.

“

#### TEACHER INSIGHTS

“My best advice is to be open to a total change of thinking about space and learning environments. **You have to be flexible yourself.** Arrangements that work for one group or one class may not work for another. **Let the kids be a part of the decision making** and room arrangements. Use their cues to help you try out new set ups. They will often think of a new way to use furniture or a space. Over-think your organization methods. Being flexible may sometimes look messy, but having organization strategies help a lot. Accept that being flexible can take a little more time at first, but will be so worth it in the end.”

– Susan Mathis, 3rd grade teacher

“The students in your class are going to love flexible furniture! **They will come in with big smiles** on their faces when they see your room”

– Kelly Capron, 4th grade teacher

”



#### ACTIVITY CHECK

During the planned activity check, there were 10, one-minute intervals. During the intervals, the observer tallied the number of students who exhibited off-task and on-task classroom behavior.



#### OBSERVED ENGAGEMENT

During observations, the observer randomly selected three students and recorded their behaviors following a 10-minute observation period. Constructs to be observed included:

autonomy, competence, general environment, participation, sense of belonging, positive relationships and reflection. The use of 4Cs instruction were also observed: communication, collaboration, critical thinking and creativity.



#### GENERAL OBSERVATION

The third part of the observation form required the observer to make observations regarding the general environment of the classroom, including work surface, seating arrangement and furniture choice.

## RESULTS



**Initial results indicate that flexible learning environments have a POSITIVE IMPACT on student engagement.**

Initial data analysis showed **promising results for enhancing the learning environments and the 4Cs**. Pilot Study II results yielded informative findings on flexible learning environments and the impact on student engagement.



# RESEARCH FINDINGS

## KEY THEMES



There appears to be more instances of “modern learning components” in instruction happening in flexible classrooms.

# 4Cs

During classroom observations, teachers in classrooms equipped with flexible furniture provided more opportunities for students to participate and actively engage in **collaboration, communication, creativity and critical thinking (4Cs framework)** compared to peers in classrooms equipped with traditional furniture.

1

### COLLABORATION

Activity provided by teacher  
(53.3%,  $p<.000$ )  
Engages student  
(87.5%,  $p<.149$ )

2

### COMMUNICATION

Activity provided by teacher  
(42.7%,  $p<.000$ )  
Engages student  
(95.3%,  $p<.014$ )

3

### CREATIVITY

Activity provided by teacher  
(10.4%,  $p<.629$ )  
Engages student  
(47.4%,  $p<.001$ )

4

### CRITICAL THINKING

Activity provided by teacher  
(62.5%,  $p<.045$ )  
Engages student  
(95.2%,  $p<.037$ )

Average scores per modern learning component (4Cs) observed

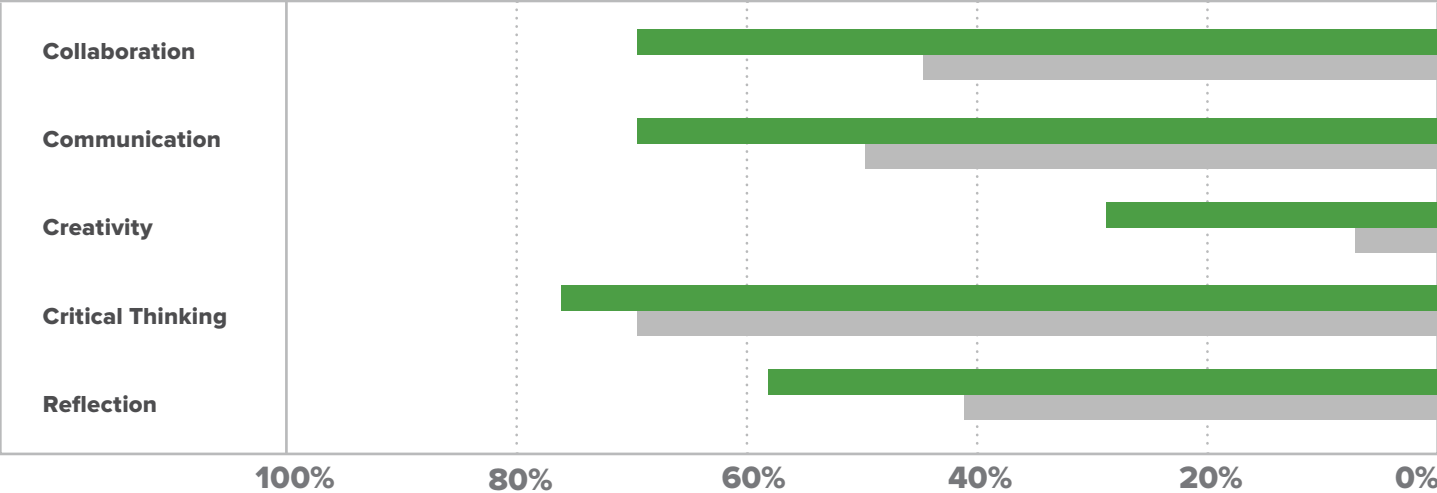


Figure 7: 4Cs data listed to the left is reflective of classrooms with flexible furniture only.

Flexible Furniture      Traditional Furniture

## RESEARCH FINDINGS, CONTINUED

➤ **Students in flexible learning environments score slightly higher on our definition of student engagement (behavioral, cognitive, emotional) overall than students in traditional classrooms.**

For seven of the constructs (autonomy, competence, effort, participation, sense of belonging, positive relationships and general environment) in the self-report measurement, students in flexible learning environments report **higher feelings of engagement** than students in traditional classrooms. Students in traditional classrooms scored higher in the technology construct.

➤ **Additional professional development is required to maximize the benefits associated with flexible furniture and enhance learning.**

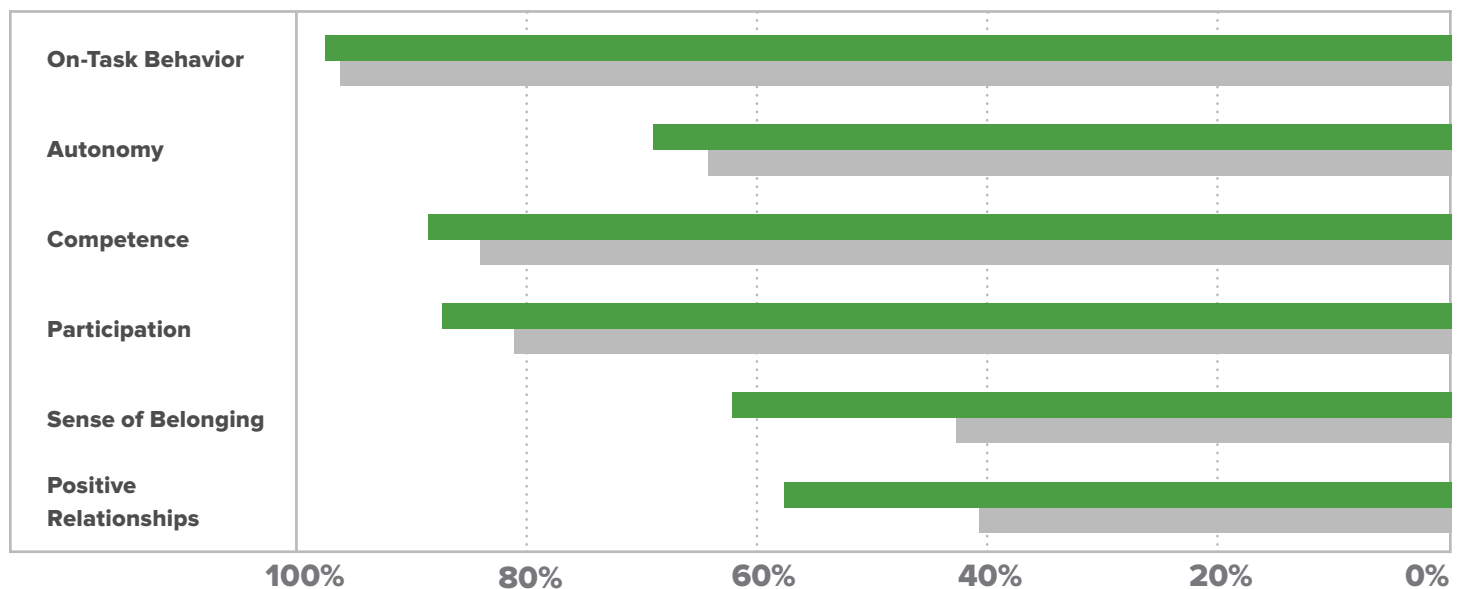
During classroom observations, it was observed that classrooms with flexible furniture allowed movement and student choice 84.4 percent of the observed time. However, the furniture is only reconfigured 9.7 percent of the observed time and condensed only 3.3 percent of the observed time.



➤ **There appears to be an immediate effect on self-reported perception of classroom environment just by having flexible furniture in the classroom.**

Our study shows flexible furniture in the classroom has the potential to create learning environments that influence students' perception of their classroom and feelings toward school environments. Students in intervention classrooms reported an **increase in perception of general classroom environment** after exposure to flexible furniture.

**Average scores per construct of engagement observed**



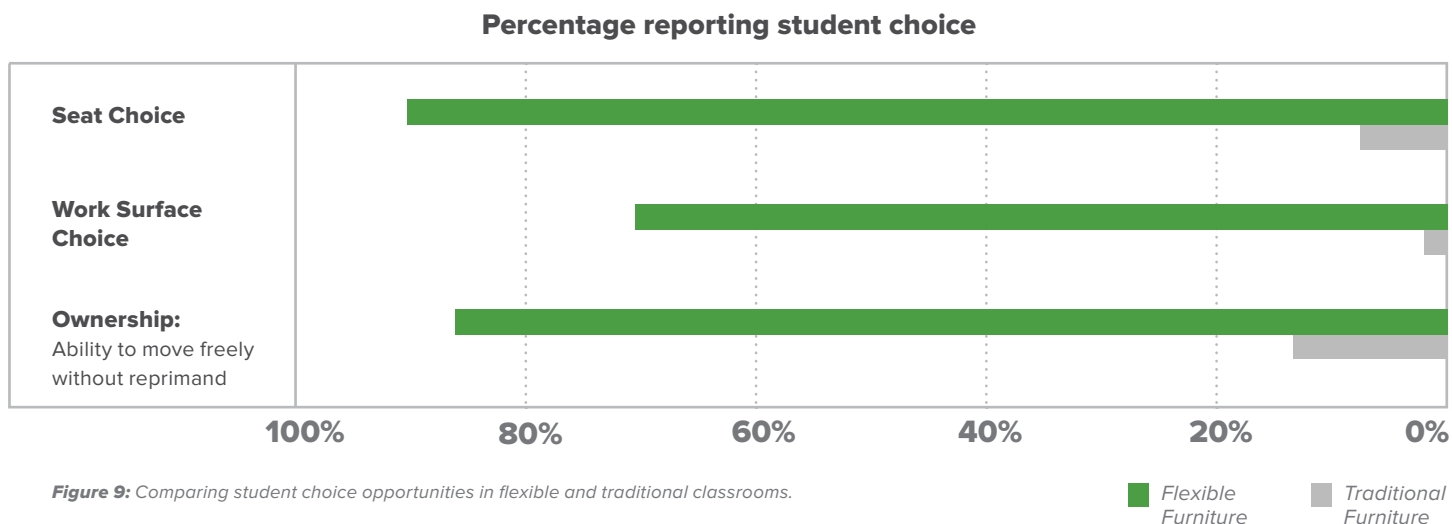
**Figure 8:** 2nd, 3rd and 4th grade combined average scores of classroom observation items

Flexible Furniture Traditional Furniture

## RESEARCH FINDINGS, CONTINUED

### ➤ Flexible learning environments provide more support for student choice than do traditional classrooms.

During classroom observations, students in flexible classrooms were given more opportunities to take ownership of their environment through student choice than peers in traditional classrooms.

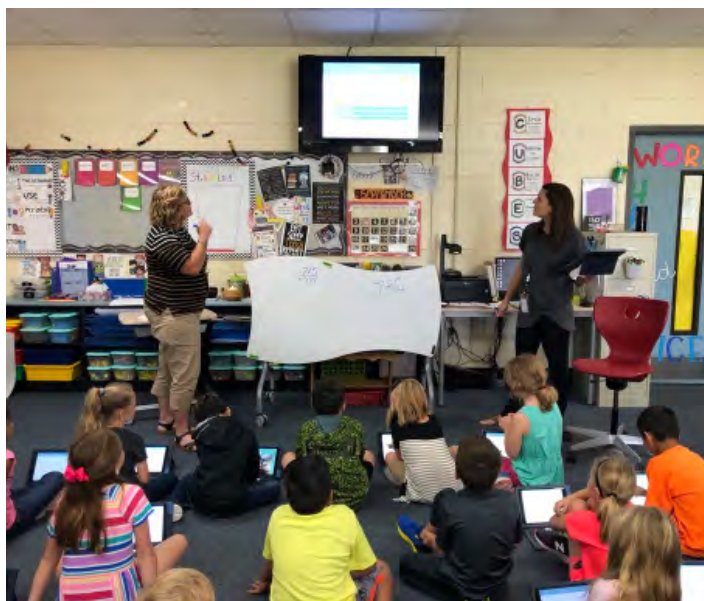


## THE BOTTOM LINE



**Flexible learning environments have the potential to provide more effective teaching and student engagement.**

Pilot Study II showed supportive data that flexible learning environments have the potential to create more effective classrooms and higher student engagement. Additionally, this study **affirmed teacher professional development** is necessary to enhance the impact furniture has on learning and student engagement.





## LONGITUDINAL STUDY

The 2018-2019 academic school year was spent coordinating project milestones with the participating school district (Midway ISD) and the target campuses to fully execute the longitudinal study (LS) during the 2019-2020 academic school year.

An additional participating campus was identified. All 30 classrooms participating in the study (intervention and control) were identified. All 15 classrooms identified for the intervention group and to receive flexible furniture were inventoried. Furniture needs were evaluated. Education Service Center Region 12 developed an overview and outline for the 12-hour professional development course that was to be executed during the longitudinal study (Fig. 10).

In the LS, students are being observed using flexible furniture; their activities are being compared against a control group using traditional furniture for the entire academic year. The LS utilizes a longitudinal quasi-experimental research design in order to identify the association between the variables. Due to the fact that our variables are not directly measurable, structural equation modeling (SEM) is being used to explain how the variables are related to one another and how they predict a sense of engagement in students.

The total sample size consists of approximately 600 elementary-aged students (2nd to 4th grade) and approximately 30 teachers from two participating Midway ISD elementary schools.

## THE LONGITUDINAL STUDY WILL HAVE THE POWER TO MEASURE CHANGES IN STUDENT ENGAGEMENT WHEN EXPOSED TO A FLEXIBLE LEARNING ENVIRONMENT.

These factors will be measured and quantified in relationship to flexible furniture and other contextual facilitators of student engagement (e.g. teaching process, professional development, instructional technologies and classroom management).



**Figure 10:** Professional development course led by ESC Region 12



**Figure 11:** Intervention classrooms

# ABOUT THE AUTHORS

## **Shanna L. Attai, Ph.D.**

Dr. Shanna Attai, Assistant Research Professor/Coordinator for Educational Outreach for CASPER, has a background steeped in education and social science research. She has earned a Ph.D. in educational psychology, M.S. Ed. in curriculum and instruction and B.S. in early childhood education.

## **Jorge A. Carmona Reyes, M.S., M.S. Ed.**

Jorge A. Carmona Reyes, Assistant Director for Educational Research and Outreach for CASPER, holds a M.S. in Physics and a M.S. Ed. in Curriculum and Instruction with a focus on psychometrics and statistics. He has extensive experience in both STEM educational outreach and research design. He has taught physics and works with teachers to develop STEM curriculum, interventions and manipulatives.

## **John L. Davis, Ph.D.**

Dr. John L. Davis, Assistant Professor School Psychology Department of Educational Psychology, University of Utah, has a strong background and focus on effective intervention practices in schools. He is an expert in evaluating the effectiveness and efficacy of school programs and student assessments. He is the primary data analyst regarding assessments on the project.

## **Truell W. Hyde, Ph.D.**

Dr. Truell W. Hyde, Director of CASPER and a tenured professor within the Department of Physics at Baylor University, has a long history with educational research. He was the PI on consecutive GEAR UP grants and PI for over 20 years on multiple NSF Research Experiences for undergraduates and Research Experiences for teacher grants.

## **Kerri Ranney, AIA, Esq., REFP**

Kerri Ranney, Vice President of Educational Practice at Huckabee, focuses on educational planning, educational research and change management. She helps clients shape the learning experience by facilitating conversations on vision, curriculum and space. Kerri is also involved in education and safety / security initiatives that impact school design, including leading the committee to re-write the School Facility Standards for the state of Texas; participating in the committee to create a self-assessment tool for the Texas School Safety Center; and participating in working groups focused on Planning and Facility Hardening for the ICC Building Safety and Security Ad Hoc Committee. Most recently, Kerri co-authored an international book about the role of Career and Technical Education in 21st century learning.

## **Judy York, M.S.**

Judy York, Education Specialist III at Education Service Center Region 12 and Coordinator of Educational Research at LEx Collaborative, leads professional development sessions for teachers. She holds a M.S. in biology/biological sciences and a B.S. in composite science and biology. Additionally, she has 24 years of experience as a teacher and has been an education specialist for 16 years with a focus on STEM education.

## **Rob Altmann, M.A.**

Rob Altmann, President and Owner of A-PsychEd Publication Services, has a vast experience in psychometric work, providing consulting and evaluation services to publishing companies and education agencies. He worked for Pearson in the area of clinical assessment in projects related to large-scale test development. He holds a M.A. in Social-Organizational Psychology with I/O emphasis.

## RECOMMENDED CITATION

Attai, S.L., Reyes, J.C., Davis, J.L., & Hyde, T.W. (2019). How flexible classrooms impact student engagement (Research Report No. 1). Retrieved from the Learning Experience Collaborative website: <https://www.thelexcollaborative.com>

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