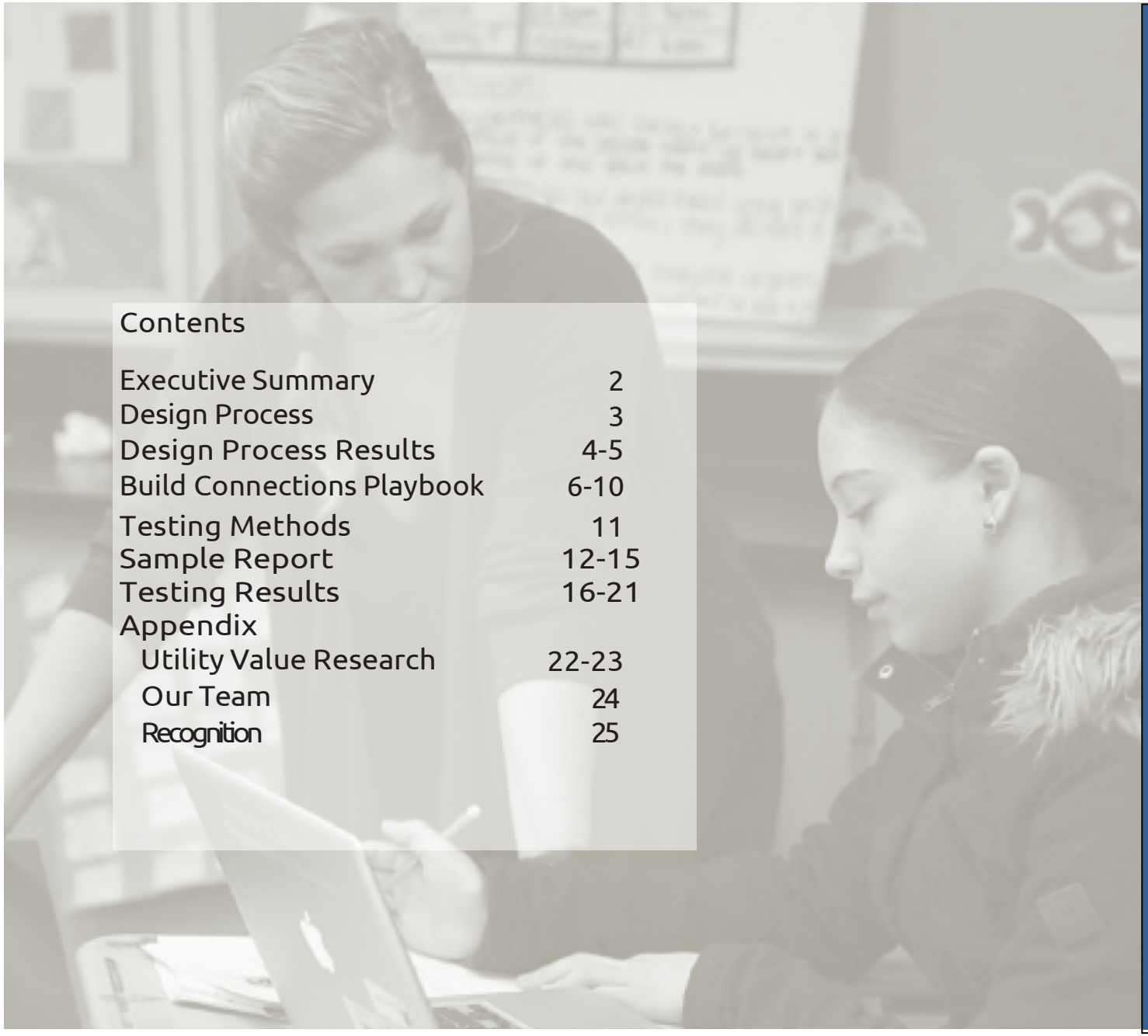
BUILD CONNECTIONS:

A Collaboration to Improve a Teacher Led Utility Value Intervention

Motivate Lab

Character LAB



Contents

Motivate Lab collaborated with Character Lab to create an effective protocol that supports a teacher's implementation of a Utility Value classroom activity.

This document summarizes our design based process.

Executive Summary

About Build Connections

Build Connections was created to help students understand how their existing interests relate to the content they learn in school. An initial prototype, called "Making Connections," was developed based on a decade of research on utility value by Dr. Chris Hulleman and colleagues. Four core components of the intervention were identified: **1) Students reflect on their lives, 2) Students review classroom content, 3) Students brainstorm possible connections, and 4) Students strengthen one of those connections.**

Our Challenges

Although the protocol was colorful and engaging, we encountered three main design challenges when we tested the implementation:

1. Teachers said it expensive and time consuming to print the protocol.
2. Some of the directions were confusing to students and teachers.
3. Students' written connections were vague and unclear.

Our Question

Our team of researchers, educators, and designers used the design thinking process to address these challenges and answer this question:

> **How do we redesign the activity to make it easier to use, help scaffold students to make higher quality connections, and still produce positive student outcomes?**

We worked with students, teachers and administrators to understand their needs, co-create prototypes of our ideas, iterate ideas, and continually test ideas to improve the protocol.

Our Design Process

Empathize

Observe teachers and students as they interact with the activity.

Ask questions.

Look for ease of use, level of engagement, points of confusion, quality of student responses.

Ideate

Brainstorm different methods to address the weaknesses of the initial version.

Consider supports that can be added to enhance suggested solutions, such as: graphic design, supplemental materials, and training.

Prototype

Build and iterate new interventions using guidelines from researchers and insights from observations.

Schedule regular feedback sessions to innovate and iterate.

Test

Collect and analyze pre and post measures to test the efficacy of the activity.

Use with a diverse group of students and schools.

Continue to solicit feedback from teachers and students.

Design Process Results

Empathize

Problems identified:

Printing in full color too expensive

Too many pages

Too much preparation required

Not enough scaffolding for student writing

Confusing directions

Ideate

Solutions identified:

Black and white

One page

Video and supporting materials online to help with teacher questions

Sentence Framing

Simplified directions that are numbered and intuitive

Prototype

37 Teachers
High School
Middle School

584 Students
Science
Math
Social Studies
Language Arts

11 Schools
7 Public
2 Private
2 Independent

Test

6 Teachers
High School
Middle School

301 Students
Science
Math

2 Schools
Minnesota
Virginia

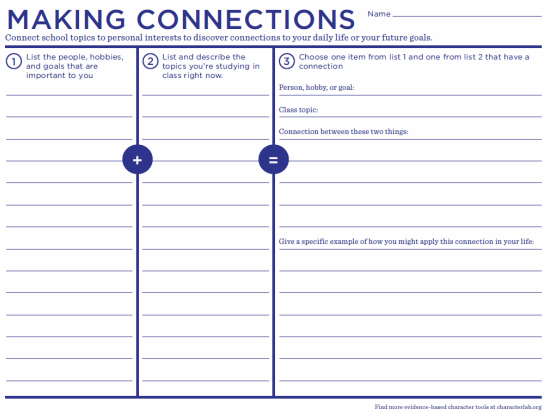
Design Process Results

Making Connections 1.0

The initial prototype was a full color, 18-page document that needed to be cut into circles.

Making Connections 2.0

With help from graphic designers, we were able to create a one page document with clear and concise directions



MAKING CONNECTIONS Name _____

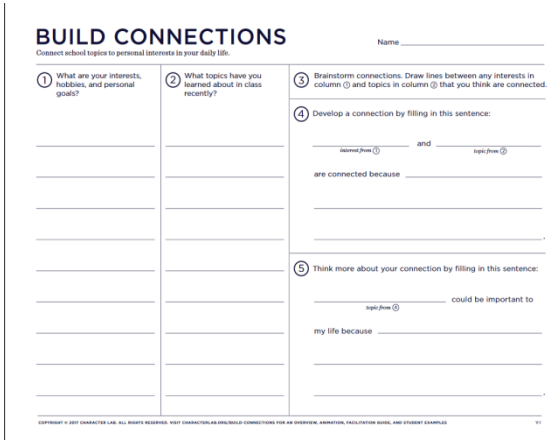
Connect school topics to personal interests to discover connections to your daily life or your future goals.

① List the people, hobbies, and goals that are important to you	② List and describe the topics you're studying in class right now.	③ Choose one item from list 1 and one from list 2 that have a connection
		Person, hobby, or goal:
		Class topic:
		Connection between these two things:
		Give a specific example of how you might apply this connection in your life:

Find more evidence-based character tools at characterlab.org

Build Connections

Feedback from teachers led to more scaffolding for student writing using sentence framing and a playbook to support teacher implementation.



BUILD CONNECTIONS Name _____

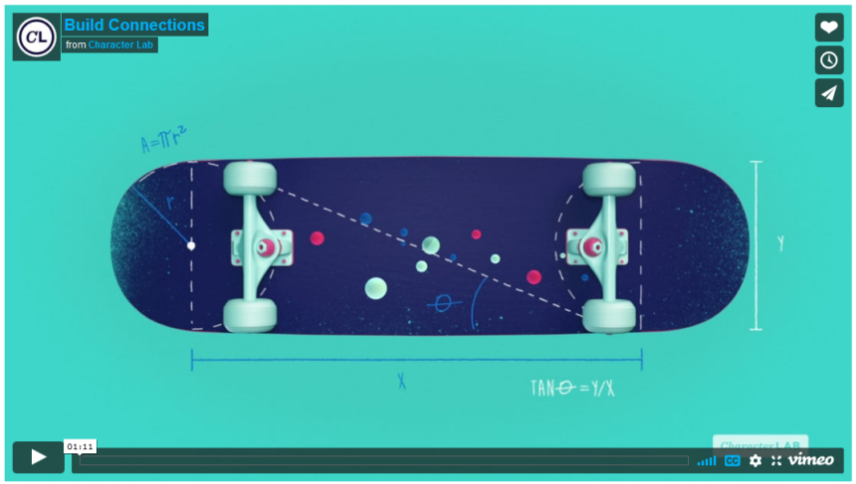
Connect school topics to personal interests in your daily life.

① What are your interests, hobbies, and personal goals?	② What topics have you learned about in class recently?	③ Brainstorm connections. Draw lines between any interests in column ① and topics in column ② that you think are connected.
		④ Develop a connection by filling in this sentence: _____ (interest from ①) and _____ (topic from ②) are connected because _____
		⑤ Think more about your connection by filling in this sentence: _____ (topic from ②) could be important to my life because _____

Build Connections Playbook

Published online in 2017, a suite of free online tools including a teacher protocol, implementation guide, and video, was created to support teachers' implementation of Build Connections.

Watch the 1-minute overview



View individual Playbook elements:

Overview | Facilitation Guide | Student Activity | Prep Activity

Examples | Give Feedback

Build Connections translations:

Spanish / Español | French / Français | Chinese / 中文 | Japanese / 日本語

BUILD CONNECTIONS Overview

Character LAB
WWW.CHARACTERLAB.ORG

CURIOSITY

WHAT IS BUILD CONNECTIONS?

Build Connections is an activity that helps students understand how their existing interests relate to the content they learn in school.

In other words, Build Connections taps into students' intrinsic curiosity. What's more, it encourages that curiosity to flourish in class.

The benefits of this 30-minute activity are manifold. Day to day, students engage more in school. And in the long term, students who build connections take more challenging classes in the subject and pursue related careers.

WHEN CAN I USE IT?

You can introduce Build Connections after covering the first major topic of your course. It shouldn't be the very first activity, though; students first need to understand enough content to create meaningful connections.

The frequency will depend on your content and pacing. There isn't a "best" number of times to use Build Connections in a year, but many teachers use it once per unit. For instance, you could have students Build Connections to review before a unit exam, or you could use it to consolidate new learning after the unit performance task.

Keep in mind that it's possible to overdo it. Build Connections loses effectiveness if it becomes rote.

WHO SHOULD USE IT?

Build Connections is flexible enough to use with any subject. So far this activity has only been tested in core subjects, but we hope educators use it to support learning and engagement in non-academic classes and even outside of school.

One of the most exciting findings is that the students who benefit most are those student who don't expect to succeed. For students who see little value in school and often struggle to engage, Build Connections is particularly potent.

WHY IS IT EFFECTIVE?

To make content relevant, many teachers use news stories, hooks, and real-life examples. But in these cases, it's usually the teacher doing the thinking, and no single example applies to every student.

Build Connections is different because it's student-centered. It creates an opportunity for students to make meaning on their own terms.

WHAT'S THE SCIENCE?

Build Connections was developed at the University of Virginia by Dr. Chris Hulleman. In randomized, controlled field experiments, Dr. Hulleman and colleagues have shown that this personal connections can help students see how what they're learning is something that matters to them.

HOW LONG WILL IT TAKE TO WORK?

Like any skill, Build Connections takes time to learn and teach well. At first, it might seem like students aren't making effective connections, but evidence shows that simply being encouraged to connect life with school improves student outcomes. So be patient when introducing it to students, and try, try again.

RESOURCES:

FACILITATION GUIDE | STUDENT ACTIVITY | PREP ACTIVITY

STUDENT EXAMPLE | ANNOTATED EXEMPLAR

V.1

BUILD CONNECTIONS Facilitation Guide

Character LAB
WWW.CHARACTERLAB.ORG

HOW TO USE

Before using Build Connections, students should understand the *purpose* and unpack examples. We recommend this sequence:

1. Prep Activity
   Includes student stories, or you could develop your own.
2. Animation
   www.characterlab.org/build-connections
3. Examples (Student + Teacher)
4. Student Activity

FAQ

HOW SHOULD I PREPARE TO LEAD THIS ACTIVITY?

Before you lead it with students, try the activity yourself. While you practice, reflect on your own process and the type of thinking you use. This will help you model the activity and coach students.

WHAT HELPS STUDENTS BUILD THE STRONGEST CONNECTIONS?

Students will grow from practice. But if they seem stuck, keep in mind these tips:

1. Students might feel "locked in" to the first connection they make. Encourage them to branch out and be creative.
2. Connections can start with personal interests OR class content. Encourage students to approach it from both sides.
3. Connections might be important now or in the future. Consider both when brainstorming.

WHAT SHOULD I DO AFTER THE ACTIVITY?

Reviewing student responses is a great opportunity to learn more about students and to see what content is meaningful for them.

If you give feedback on their connections, focus on helping students elaborate or clarify.

Going forward, you could use student connections in lesson openers and examples.

HOW CAN THIS ACTIVITY BE EXTENDED?

These student connections are great starting points for individual research and project-based learning. Encourage students to pursue and deepen their connections.

You can also deepen connections by having students write a letter to someone else who would benefit from the connection.

WHAT IS MOST IMPORTANT AS I ADAPT THIS FOR MY CLASSROOM?

The core of Build Connections is making space for students to reflect on how school can connect to their own passions. Details might change, but at the end of the day, if students make school meaningful on a personal level—or even just start this process—this activity will be a success.

Not every student will make a connection every time, but just offering the activity can benefit students.

SAMPLE SCRIPT

Try saying something like this to the class. Give sufficient wait time between steps.

1. *First, we'll brainstorm things that are important and interesting to you. List them in section ① . Think about what* you *do for fun, what* you *like to learn about, or what* you *want to do in the future.*
2. *Now we're going to think about the things you've learned in this [unit/lesson]. In section ② , list major topics you remember. Include specific vocabulary and details.*
3. *Next we'll think about POSSIBLE connections. This section can be challenging at first, so be patient. Looking at columns ① and ② , think about how parts of your life in the first section might connect to the content in the second section. Draw a line when you think of a possible connection and try to think of more.*
4. *Review the connections you brainstormed and pick one that feels significant to you. Summarize it in section ④ . The more specific you can be, the better.*
5. *Now, think more about your connection and how it's important to you. It could be important now or in the future. In section ⑤ , summarize why it's important .*
6. (Optional, recommended) *Now we're going to share our connections with each other. This is a chance to learn about each other and think more about the content we're learning.* (Use discussion structures that make the most sense for your classroom.)

BUILD CONNECTIONS Prep Activity

Name _____

1. Sometimes we don't realize how school content is helpful until later in life. Read the following stories from recent graduates about things they learned in school. **Circle the one you relate to most.**

> *Growing up, my mother had her own business. I was always excited when she'd get the merchandise she ordered. She'd always know how much she paid for it, which determined how much she'd need to sell it for in order to make a profit. From the second she ordered the merchandise she was calculating her potential income. Now I realize that if she made a mistake in her math, then she could lose a lot of money!"* —KAI

> *During August of last year, I had an eye injury. If I didn't go to the doctor, I would have lost my vision. After my surgery, my parents and I went to many doctor visits. Having learned about vision and the anatomy of the eye helped me a lot. I was able to better understand what the doctor was saying, and how the surgery would help me. I was even able to explain to my parents what exactly happened. They seemed really confused, and it felt good to be able to help them understand!"* —JOSH

> *Air pollution is a significant problem in my city. It causes lots of people to have asthma and other respiratory problems. We learned in class that things like burning fossil fuels cause pollution, but we can offset this impact by using alternative energy sources, like wind and solar power, or just reducing energy consumption. This is good to know so we can make better choices about what types and how much energy we use. This information helps me understand the government's role in energy regulation, and how it's changing."* —RAMONE

> *I had an internship this summer at a company and was totally surprised at how often I had to write and present. The lessons I had learned about writing in my English classes were really important. I had to be able to make arguments or explain things clearly in order to communicate with people in the company and their clients. My teacher always talked about communication skills being important but it really hit me at that job."* —ALEXIS

2. Explain what you found interesting about the story you circled.

BUILD CONNECTIONS

Annotated Exemplar: Math

Connect school topics to personal interests in your daily life.

① What are your interests, hobbies, and personal goals?

- Basketball
- Video Games
- Texting
- Hang out with/team
- Dogs
- Sneakers
- Basketball Scholarship
- Design my own shoes
- Be in a video game

Brainstorms multiple possible connections

Complete/robust range of interests

② What topics have you learned about in class recently?

Topic + details

- Functions describe relationships b/w quantities
- Inverse - one decreases as other increases
- Example: Higher altitude -> lower temperature
- Linear - both variables increase at constant rate

Defines key terms

Shows understanding of selected content

Includes content vocabulary

③ Brainstorm connections. Draw lines between any interests in column ① and topics in column ② that you think are connected.

④ Develop a connection by filling in this sentence:

Video games (interest from ①) and linear functions (topic from ②) are connected because I can use a function to decide if I should rent a video game (linear function) or buy it (fixed cost) based on how much I will use it.

Describes connection clearly & precisely

⑤ Think more about your connection by filling in this sentence:

Linear functions (topic from ④) could be important to my life because I can use them to compare different options in the future, like buying or paying a monthly fee for my phone.

Importance is personal & actionable

V.1

Testing Methods

Once the playbook was complete, Motivate Lab worked with seven teachers at two schools to implement Build Connections with 301 students in the Spring of 2018. Students completed the activity twice in one semester. We collected pre/post measures, including grades, to gauge the efficacy of the activity. We also collected teacher feedback on ease of use and understanding.

Before Build Connections Activity

Student pre-survey: https://tinyurl.com/BCstudent1
Teacher pre-survey: https://tinyurl.com/BC1teacher

Completed Time 1 Build Connections Activity

Motivate Lab categorizes student responses to section 1 and codes responses for sections 4 & 5.

After Time 1 Activity

Teacher Feedback Form: https://tinyurl.com/BCteacherfeedback

Completed Time 2 Build Connections Activity

Motivate Lab categorizes student responses to section 1 and codes responses for sections 4 & 5.

After Time 2 Activity

Student post-survey: https://tinyurl.com/BCstudent2
Teacher post-survey: https://tinyurl.com/BC2teacher
Teacher Feedback form: https://tinyurl.com/BCteacherfeedback
Student data: Collected via Schoology or Powerschool

Sample Report: Page 1

Motivate Lab staff met with teachers to discuss the results of their class's pre-survey responses after the completion of Activity 1. Here's a sample report for one of the teachers.

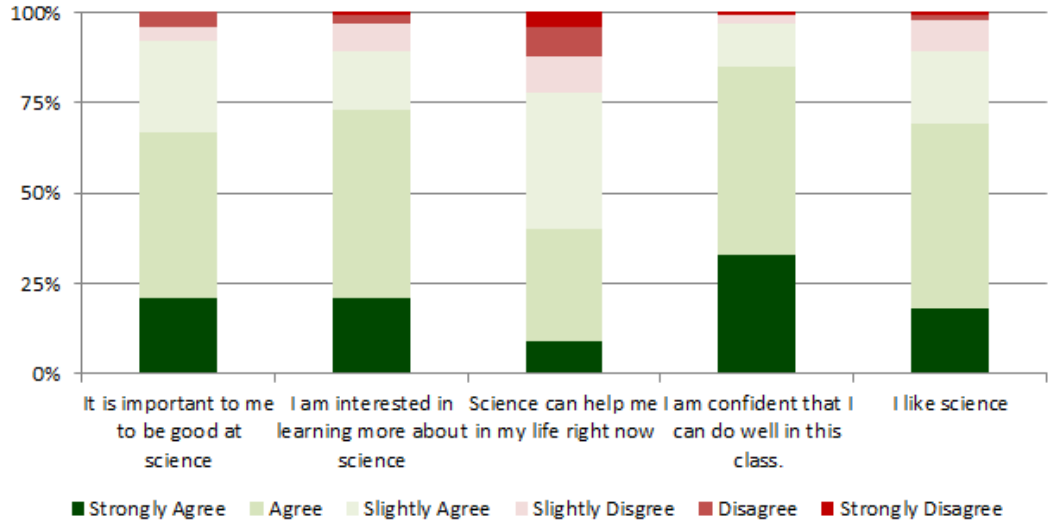
Build Connections

Motivate Lab

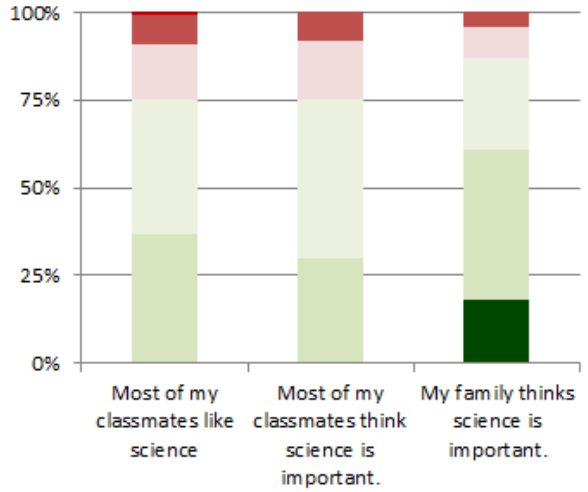
Pre-Survey Results

Caution: Students filled surveys out with the understanding that it was anonymous and would not be used against them in any way. These results are for informational purposes only.

Student Value and Expectancy for Science



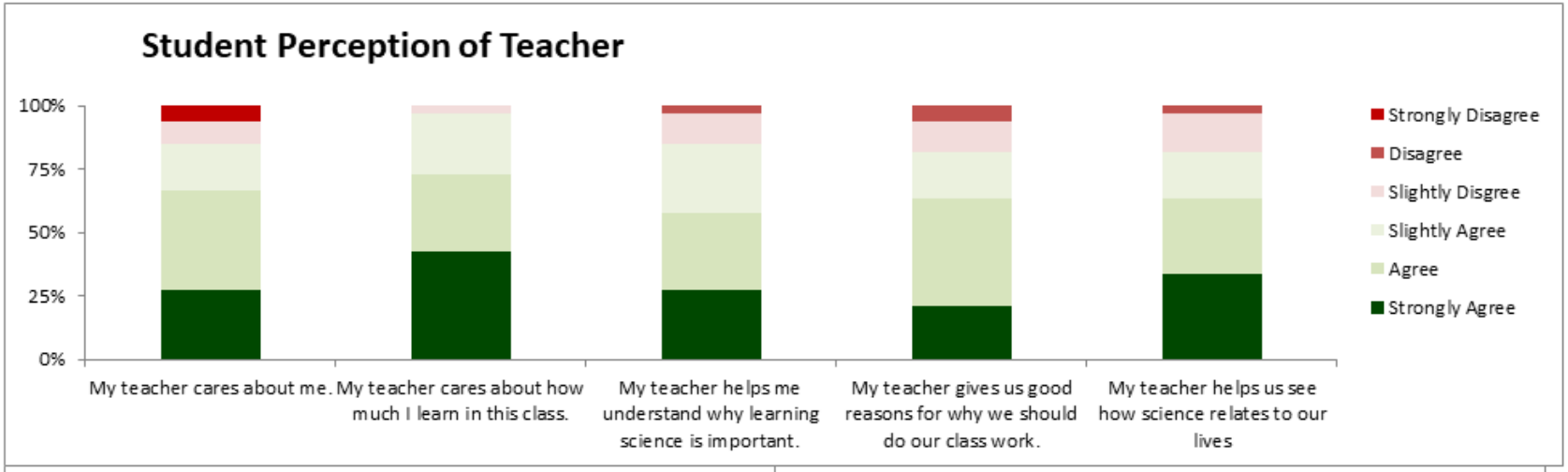
Perceptions of other's Value for Math

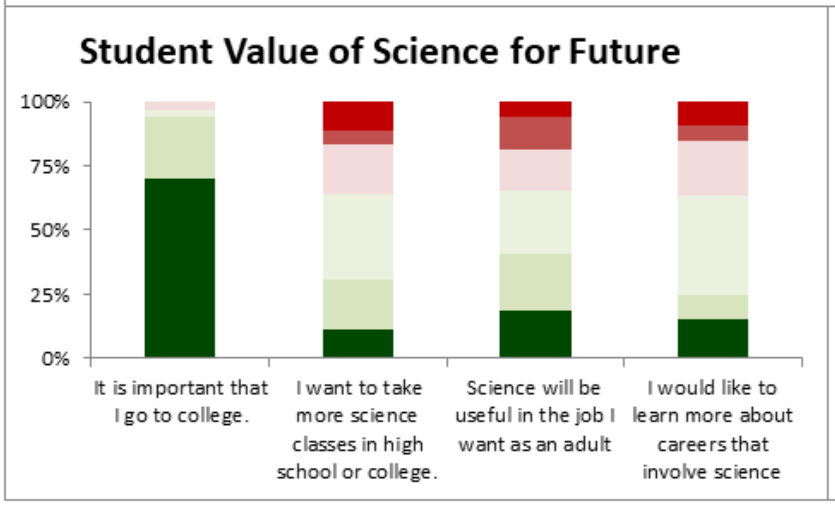


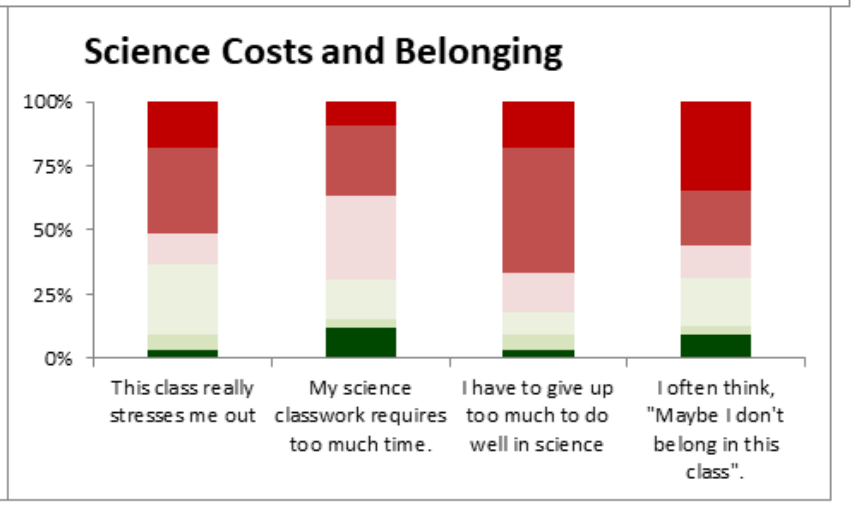
Sample Report: Page 2

Build Connections: Student Pre-Survey

Motivate Lab







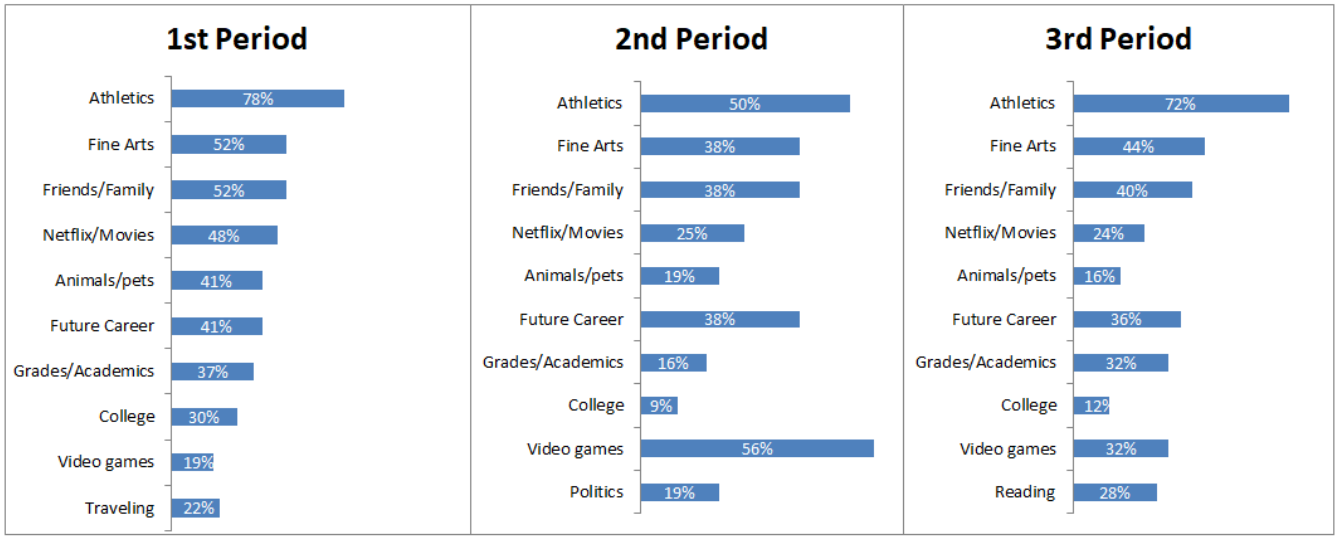
Sample Report: Page 3

Responses from Section 1 of the Build Connections activity (i.e., "*What are your interests, hobbies, and personal goals?*") were categorized into themes to help teachers understand student interests. Teachers could use this information to create connections between classroom content and students' lives.

Build Connections:

Motivate Lab

Themes from Hobbies, Interests, Goals:



Athletics: basketball, soccer, volleyball, swimming, running, baseball, ice skating, hockey, golf, tennis, lacrosse, badmiton

Fine Arts: drawing, singing, dancing, art, listening to music, photography, playing an instrument, acting

Future Career: doctor, nurse, scientist, interior designer, musician, pilot, engineer, computer programmer, surgeon, lawyer

Grades/Academics: high GPA, pass AP classes, honors, pass all my tests

College: AZ state, Madison, Duke, Georgetown, U of M, Ivy league college, get scholarships, make it into college

Sample Report: Page 4

Responses from Section 4 and 5 of the Build Connections activity, which asked students to make a connection between what they were studying and their lives, were coded to: 1) determine how personal and specific the connection was, and 2) evaluate comprehension of the subject. Each teacher was provided with example quotes from her/his students.

Exemplary Quote

It is ***personal*** and ***specific*** and shows ***comprehension***.

"Playing hockey and friction are connected because in hockey while passing or shooting the puck it slides on the ice which causes friction, slowing down the puck."

"Friction could be important to my life because I can better understand how much force I need to get the puck to move with the friction moving against it."

Personal: A personal pronoun is used reference something specific to the student's interest, hobbies, or goals.

Specific: Discusses how friction impacts a specific action in hockey.

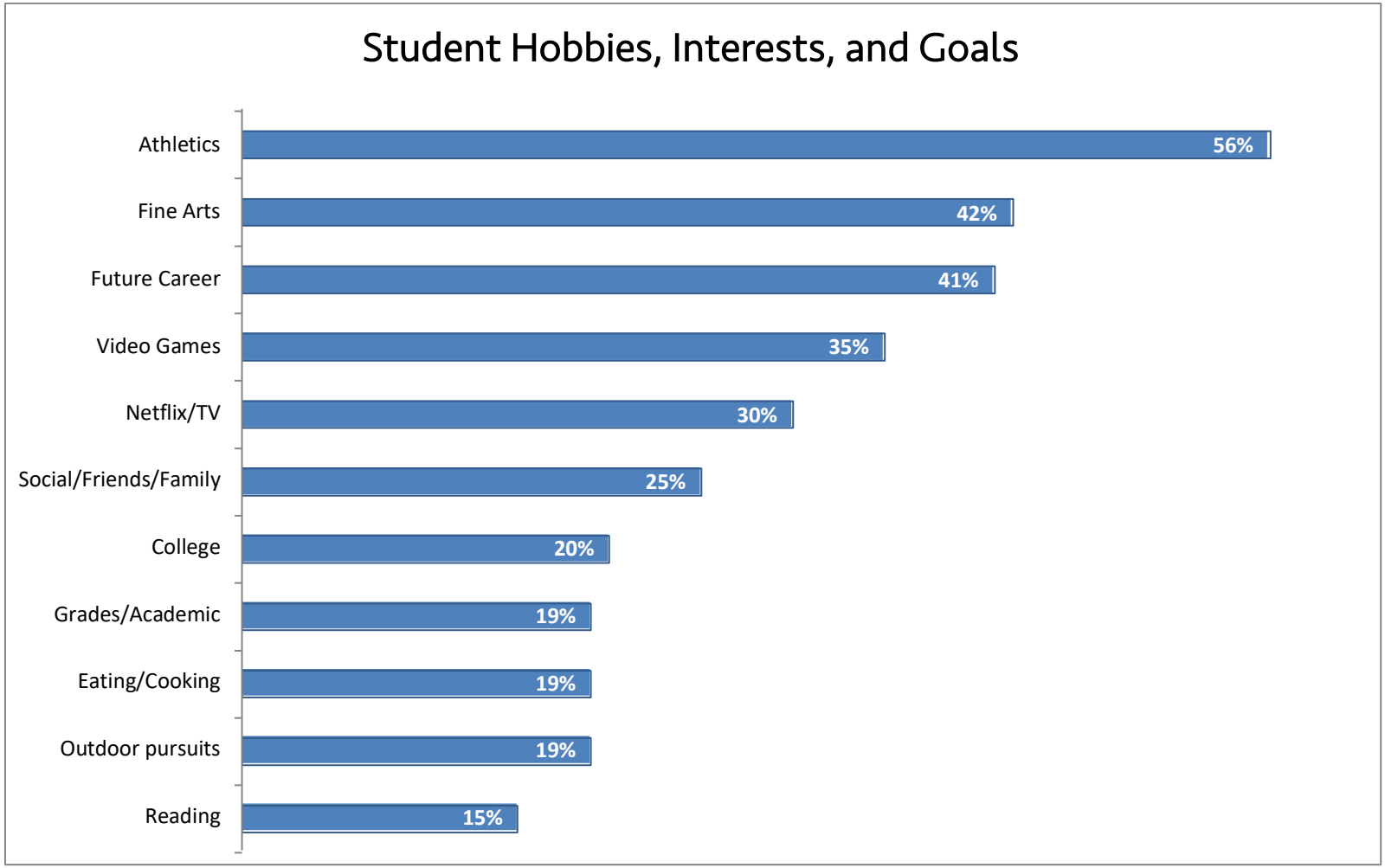
Comprehension: Indicates comprehension of the cause (ice) and effect (slowing down) of friction.

Quality Quote

Newtons 2nd law and inertia could be important to my life because next time I shoot the ball in a soccer practice I need to apply a force to change its inertia from still to moving.

Testing Results: Hobbies, Interests, and Goals

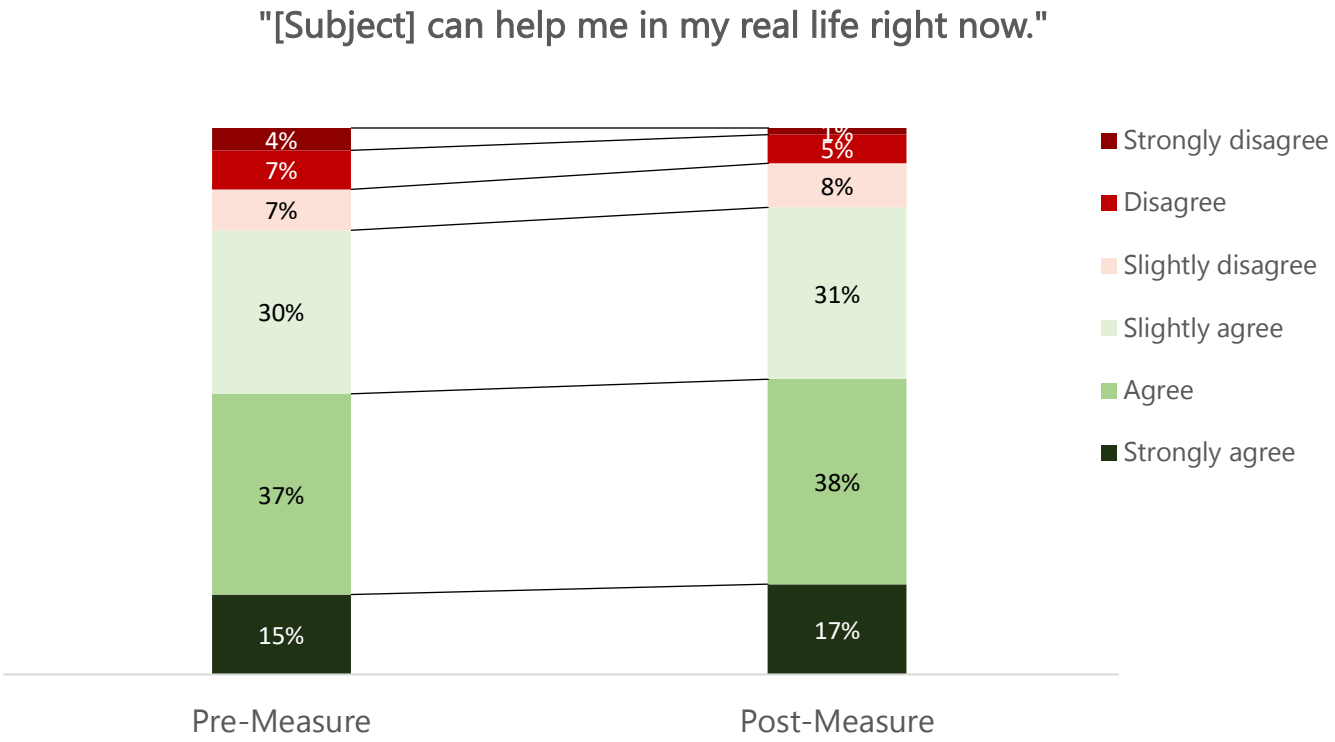
At the completion of the Spring 2018 testing cycle, all responses to Section 1 of the Build Connections activity were categorized into themes. Here are the results from 285 students who completed the activity at Time 1:



Testing Results: Initial Analyses

To gauge the impact of Build Connections, we collected measures of student motivation before completing Build Connections and at the end of the school year. Of the 301 students who completed the Build Connections activity, 244 completed both pre and post student motivation measures. Our initial results, which are presented on the next two pages, demonstrated that students increased in how much they valued the subject, how valuable they perceived their peers to find the subject, and how much their teacher helps them make connections between the subject in their lives.

Students Perceived More Personal Value in their Subject.

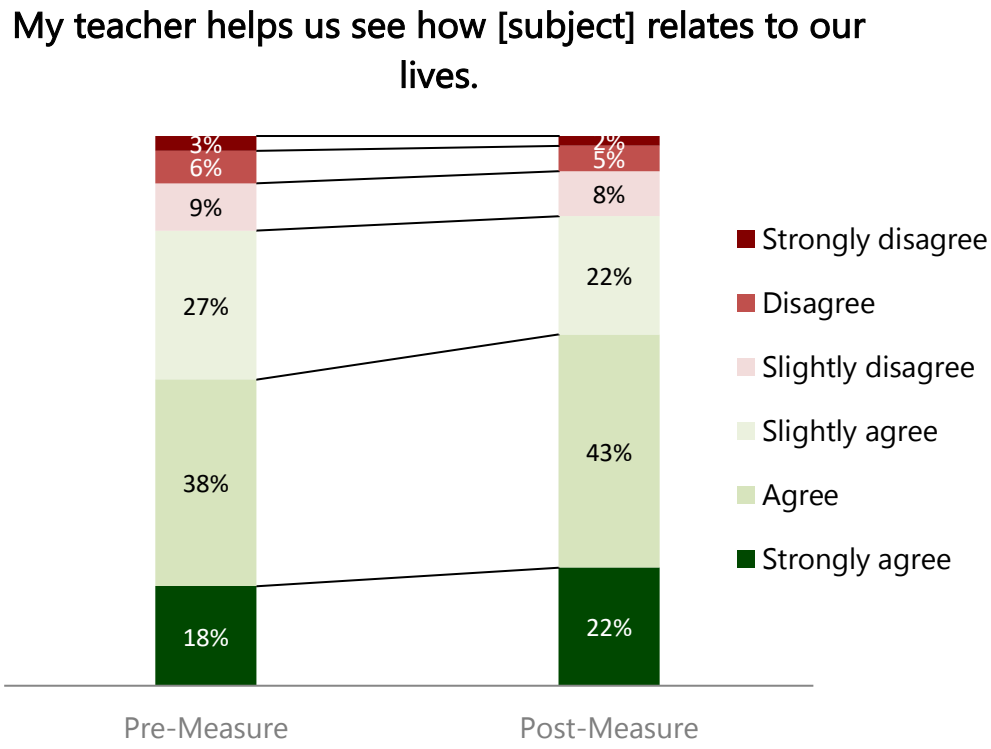


After completing the activity:

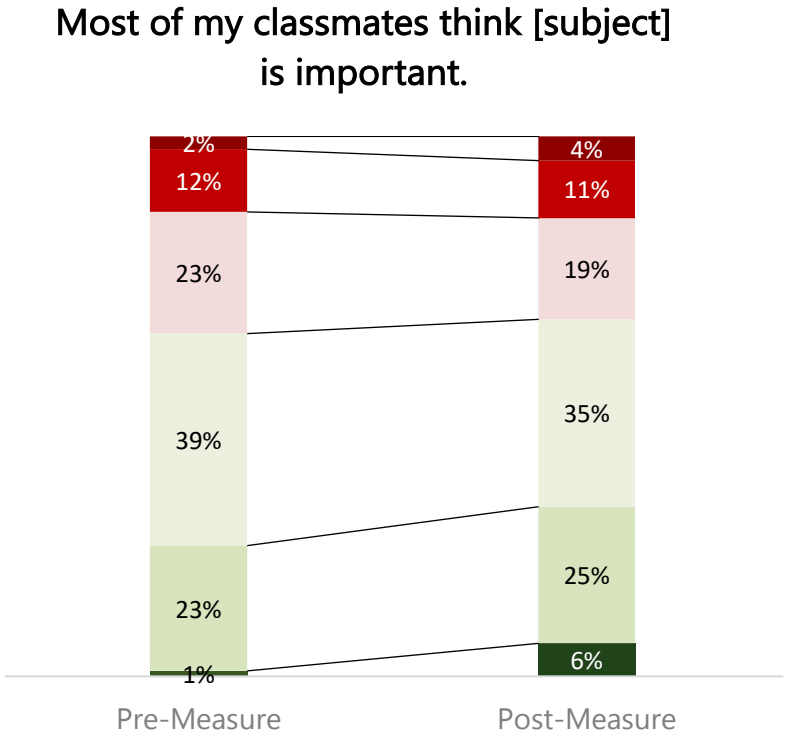
- The percentage of students who **agreed** that the subject could help their life ***increased*** from 83% to 86%.
- The percentage of students who **disagreed** that the subject could help their life ***decreased*** from 18% to 14%.

Students Perceived Teachers Making More Connections and Saw Other Students as Perceiving More Value for the Subject.

After completing Build Connections, students also reported that their teacher helped them see how school relates to their everyday lives. Students reported that their classmates saw significantly more value in their class subject.



The percentage of students who **agreed** or **strongly agreed** that the subject could help their life *increased* from 56% to 64%.



The percentage of students who **agreed** or **strongly agreed** that their classmates thought the subject was important *increased* from 24% to 30%.

Testing Results: Teacher Feedback

One of our main goals was to make Build Connections easier for students and teachers to use. During the spring 2018 testing cycle, Motivate Lab staff met with teachers to solicit feedback on the activity and help with implementation. Teachers reported that:

Build Connections Helped Teachers Make More Meaningful Connections

"*I think I acknowledge more mathematical connections in my everyday life and in turn discuss these connections with my students. Additionally I do not just discuss connections at the beginning or end of a unit. I try to incorporate connections throughout each unit and then spiral back to these connections throughout the year.*" - 7th grade math teacher

"*Prior to this, I did try to point out connections to the students' lives, but I wasn't trying to get them to make the connection. Now, I like to ask them about what they are interested in, or what new show they are watching, or new game they are playing, etc. and see if there is a connection. Some topics are way harder than others to find something they can personally relate to, and sometimes I have to do a little research of my own to learn about what the kids are doing to help them find a connection.*" - 7th grade science teacher

Build Connections Helped Teachers Understand Their Students' Interests

"*I was surprised about some of the interests of my students and things that they are involved in. Seeing the things they are involved in helped me form more conversations and interests with students*." - 7th grade science teacher

"*I usually connect skills of reading and writing to what they'll be doing in future EDUCATION classes. This is a good reminder to link it to things they're interested in and will do for the rest of their life*." - 9th grade civics teacher

Build Connections Helped Teachers Brainstorm Ways to Highlight Value in their Classrooms

"*My teaching has changed in that I am more intentional in looking for the opportunities to draw connections with content materials and its real life implication. There are times in which the content materials have pretty clear real life relevance. There are other times when I feel myself struggling to find real-life connections.*" - Middle school resource teacher

Testing Results: On-Going Analyses

We are currently conducting on-going analyses to further explore the data and answer additional questions.

Questions We Are Still Exploring

Did sentence framing for questions 4 & 5 lead to high quality connections?

Did the activity affect student outcomes (i.e., grades, attendance, homework completion rates)?

Do changes in student motivation vary based on how many times students completed Build Connections?

Did the varying time between activities affect student outcomes?

Do higher quality connections lead to better student outcomes?

Data We Are Still Analyzing

Final grades

Attendance

Standardized test scores

Homework completion and grades

Teacher feedback forms

Coding rubric for question 4 & 5: Rated for specificity, use of personal pronouns, and comprehension of topic

Testing Results: Limitations

Further study is required to determine best practices for teacher implementation of Build Connections and to ensure that the activity is effective for a variety of students.

Design Limitations

There was no control group.

There was variability in when surveys were given and when teachers implemented the activity.

Most classrooms had a large percentage of students who already found value in the subject.

Some students moved out of the district and several were absent during time 1 and/or time 2 activities.

Only students in 7th-9th grade participated in the study.

Teachers received little training on best implementation practices.

Questions Not Considered in This Study

How can teachers expand and build on the activity to continue to encourage connections?

What is the best way and time for teachers to integrate the activity into their curriculum?

How frequently should the activity be implemented?

How does teacher framing impact student outcomes?

Research indicates there is a normal motivational decline for students as they get older. Does Build Connections help stem that decline?

Appendix: Utility Value Research

Multiple studies have found that when students see value in a school subject, they earn higher grades in those courses, choose to take more classes in the subject, and score better on standardized tests. In the long term, activities that help students see relevance in school content make them more likely to major in those subjects in college and pursue related careers. For example:

Promoting Interest and Performance in High School Science Classes

Results from a randomized controlled trial in which a utility value intervention raised interest in science and course grades for high school science students.

Hulleman, C. S., & Harackiewicz, J. M. (2009)
Science 326, 1410

Making Connections: Replicating and Extending the Utility Value Intervention in the Classroom

Overview of utility value interventions and background on expectancy- value motivation. Presents results from a study that replicates and extends prior research on utility value by discussing how these interventions raise college students' interest and exam grades and testing the frequency in which the intervention was implemented in a semester.

Hulleman, C. S., Kosovich, J.J., Barron, K. E., Daniel, D. B. (2016)
Journal of Educational Psychology, 109(3), 387-404.

Enhancing interest and performance with a utility value intervention

Presents results from two randomized experiments: one in a college classroom, another in a lab. Focuses on the mechanism (i.e., how the intervention is able to manipulate the perception of utility value) and why that increases interest and performance.

Hulleman, C.S., Godes, O., Hendricks, B., & Harackiewicz, J. M. (2010) *Journal of Educational Psychology*, v102 n4 p880-895

Teach It, Don't Preach It: The Differential Effects of Directly-communicated and Self-generated Utility Value Information

A set of experiments examining two communication strategies for promoting interest and performance in the classroom– directly-communicated utility value information and self-generated utility value information. Identifies how utility value is best communicated for individuals with different levels of confidence.

Canning, E. A., Harackiewicz, J. M. (2015)
Motiv Sci. 2015 Mar 1; 1(1): 47–71

Appendix: Utility Value Research

Closing Achievement Gaps with a Utility-Value Intervention: Disentangling Race and Social Class

A double-blind randomized experiment examining the effects of race and social class as moderators of a utility value intervention.

Harackiewicz, J. M., Canning, E. A, Tibbetts, Y., Priniski, S. J., Hyde, J.S. (2016) *J Pers Soc Psychol. 2016 Nov; 111(5): 745–765*

Improving Performance and Retention in Introductory Biology With a Utility-Value Intervention

Tested dosage and timing of a utility value intervention in a college biology course. Discusses recommendations for practice.

Canning, E. A., Harackiewicz, J. M., Priniski, S. J., Hecht, C. A., Tibbetts, Y., & Hyde, J. S. (2018)
Journal of Educational Psychology, 110(6), 834-849.

From bench to bedside: A communal utility value intervention to enhance students' biomedical science motivation.
Examines the impact of a utility value intervention on student's perceptions of biomedical science. Includes recommendations for those trying to broaden participation in science.

Brown, Elizabeth R.,Smith, Jessi L.,Thoman, Dustin B.,Allen, Jill M.,Muragishi, Gregg
Journal of Educational Psychology, Vol 107(4), Nov 2015, 1116-1135

Teacher Perceptions of Student Motivational Challenges and Best Strategies to Enhance Motivation
Theoretical underpinnings of an integrated interest intervention
Hulleman, C.S., Barron, K.E. (2013)

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