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Using Motivation Data to Influence Classroom Practices

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Academic Communities

Theory

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Using Motivation Data to Influence Classroom Practices

Classroom Climate
- Safe
- Trust
- Friends

Personal Values

Peers

Teachers Care

Teachers →

Classroom Practices

Importance

Self Efficacy

Effort/Perseverance

Enjoyment

Motivation by Subject Area

Attendance/Tardy

Behavior

Academic Achievement

College and Career Success

Drop Out

Expectancy-Value Theory
Goal Theory
Values-Affirmation Theory

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Using Motivation Data to Influence Classroom Practices

Competencies needed in the 21st century include noncognitive competencies such as motivation and perseverance (National Research Council 2012).

Current school reform literature has focused on classroom practices, such as cooperative learning, competitive grading practices, unconscious bias, and supportive academic communities (versus completing challenging academics alone).

Current school reform literature has also focused on each student's perception of:

- Subject **relevance, self-efficacy, effort, enjoyment, perseverance;** and

- Positive classroom/school climate - **trusting/caring relationships**

Nationally, there is repeated evidence of decreasing levels of student motivation as students progress through grades 6 to 9.
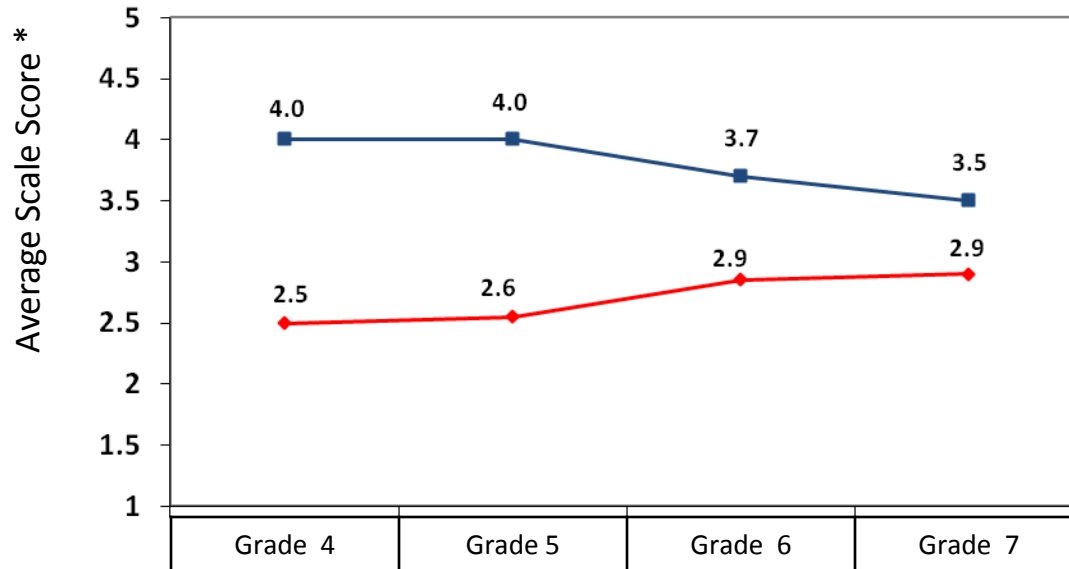
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Review of National Research:
(Eccles, *et al.* 1991, 1993; Wigfield, *et al.* 1997; Skinner, *et al.* 2008).
Decreasing motivation and increasing amotivation

Skinner, Furrer, Marchand, and Kindermann (2008)

Emotional Engagement

Emotional Disaffection:
amotivation
task avoidance

* Average scale score converted to 5 point scale

We need to move beyond isolated studies (*n* = 805) and measure to scale in order to have classrooms discussions that will increase student motivation (Farrington, *et al* 2012). However, there are barriers and issues when going to scale with noncognitive measures (Yeager, *et al* 2013).

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Two barriers are the beliefs and motivations of administrators or teachers who may say:

- "I do motivate my students" or
- "Decreasing student motivation is normal; there's nothing we can do about it!" or
- "Motivation is not part of the state's Accountability System; I don't need anything extra!"

One part of Connecticut's Accountability System is the percent of students at Level 3 or 4 on SBAC. Students need to be motivated when taking challenging tests and also need to have perseverance. Otherwise some students give up and record decreasing scale scores (which should be uncommon).

Percent of Meriden's Students with Decreasing Scale Scores (< -1SEM and not in Levels 3 or 4)
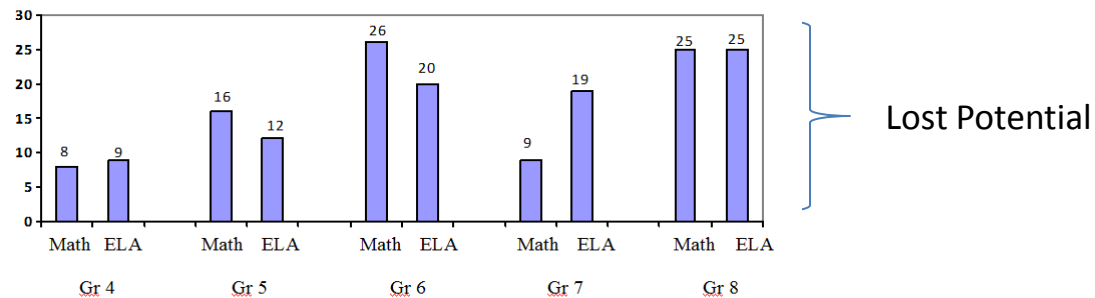
We have students with the capacity to achieve, but lack one or more aspects of motivation:
- This SBAC/task is not important to me (revelance);
- I can't do it (self-efficacy);
- It is too hard (effort);
- When I'm not good at something, I stop trying (amotivation/schoolwork aversion); and
- I hate testing (enjoyment).

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The Confident Teacher ---- One of the **primary** obstacles to increasing student motivation

Think of a teacher in grades 6 - 9 …

This teacher considers him/herself a good teacher … and has received good evaluations …

This teacher strongly feels he/she is not biased and feels that he/she does motivate students …

This teacher feels he/she has high academic expectations (perhaps because this teacher gives hard tests and has relatively few A's) …

However, what if this teacher really does **not** increase student motivation for 60% of his/her students (perhaps you interviewed every student at the end of the year).

1. How do we convince this confident teacher that student motivation is decreasing and he/she can do something about it; and

2. How can we promote/guide **discussions about this teacher's practices** and **school wide practices** that would increase student motivation for more students?
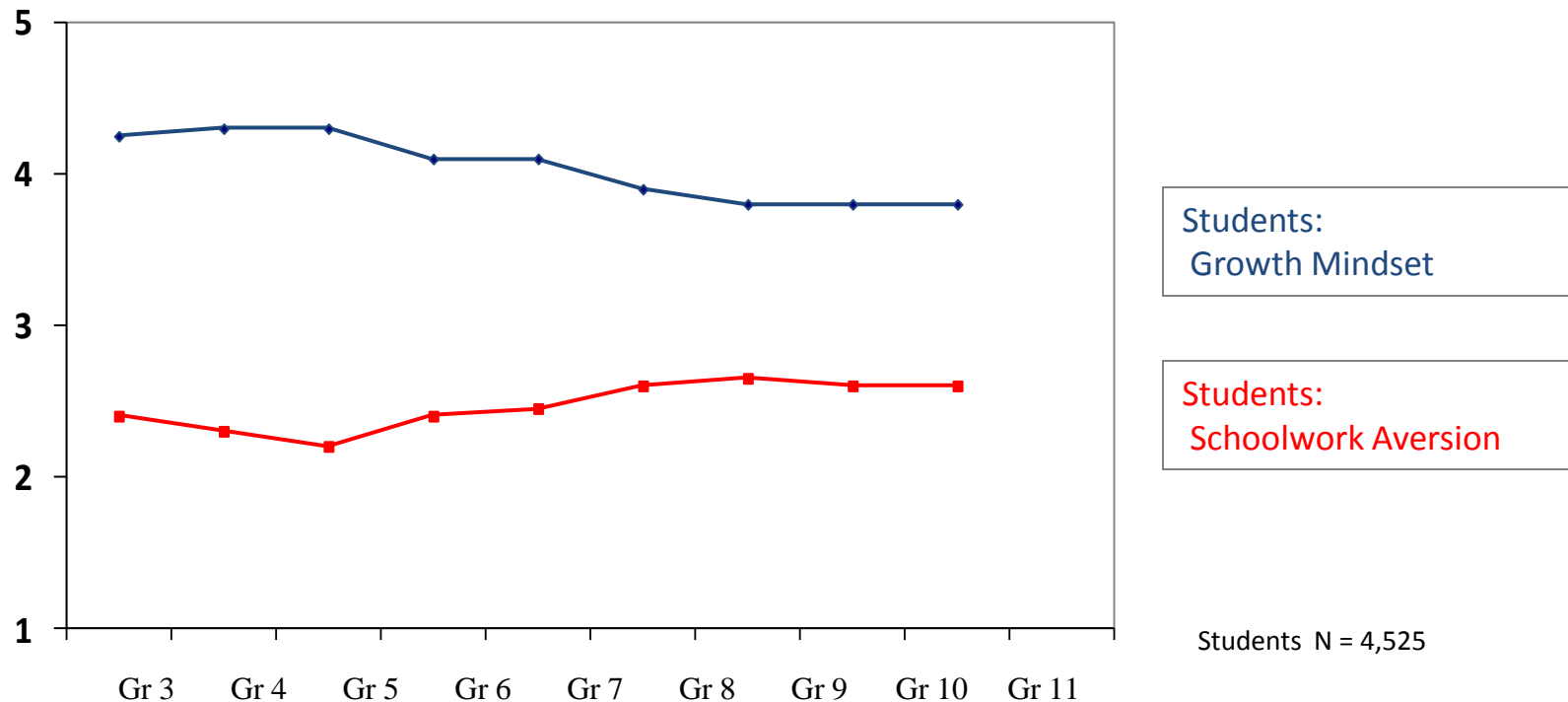
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This is what we have been doing in Meriden over time (7 years):

1) develop a database on student climate (to measure teachers care), and
2) develop a database on student mindset and motivation by subject area, and
3) in mid-August 2017, introduce matched scores by teacher/class for selected subjects.

Building noncognitive measures … to scale every year (beyond isolated studies)

Mindset: Meriden's Getting to Know You Survey (cross sectional data similar to Skinner *et al; not subject specific*)

Students:
Growth Mindset

Students:
Schoolwork Aversion

Students N = 4,525

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Meriden Connecticut Demographics

$\approx$ 8,000 students

71%	Poverty (Free/Reduced Meals)
53 %	Hispanic
14%	Black
30%	White
3%	Other
24%	Speak a Language other than English at home
15%	English Language Learners
21%	Special Education

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Meriden's Getting to Know You Survey

- Is promoted as a way for students to tell next year's teachers something about themselves;

- This survey is administered in late April to early June to Grades 3 to 11;

- Students are told: "next year's teachers want to know about you";

- First 14 questions deal with do you play a sport, have a favorite book, play music; …

- However, the next 59 items ask about specific subjects (math, reading, writing, social studies, science, music, art, physical education and healthy diet):
  - How <u>hard</u> they worked in each subject (effort);
  - How much they <u>liked</u> each subject (enjoyment);
  - How <u>good</u> they were in each subject (self-efficacy);
  - How <u>important</u> is each subject (value/relevance); as well as
  - Questions dealing with <u>perseverance</u> and <u>homework</u> (Growth Mindset and Schoolwork Aversion).

(Items based on Expectancy–Value and Goal Theory)

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Rotated Exploratory Factor Analysis (Traditional Reflective Model)
Correlational: how do all items hang together

| Primary Factor	Factor #2	Factor #3	Factor #4	Factor #5	Factor #6	Factor #7 - 8	Factor #9 - 13
Growth Mindset **& Importance** of each core subject & exercise **School Ethic**	**Effort** in PE Reading Music Math Writing & **Like** PE	**Effort** in PE **Self Efficacy** **Effort** in Science **Like** Music	Fixed Mindset or Schoolwork Aversion	**Like** Visual Arts **Self Efficacy** & **importance**	Music **Self Efficacy** & **importance**	Unhealthy Eating & Healthy Eating	Other Subjects **Self Efficacy** & **Importance**

Primary Aspects of Motivation by subject are:
- Perceived importance or value/relevance of the subject;
- Perceived **self-efficacy** of the subject;
- Self reported **effort** (vulnerable to socially desirable response);
- Enjoyment of subject (influenced by caring/accepting environment); and
- Perseverance when faced with a challenging task.

Primary aspects of motivation load on different factors, so measures of motivation by subject will use a Formative Model (National Research Council, 2012; Edwards & Bagozzi, 2000; Stenner et al. 2008).

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Meriden's Formative Causal Model for Motivation by Subject Area
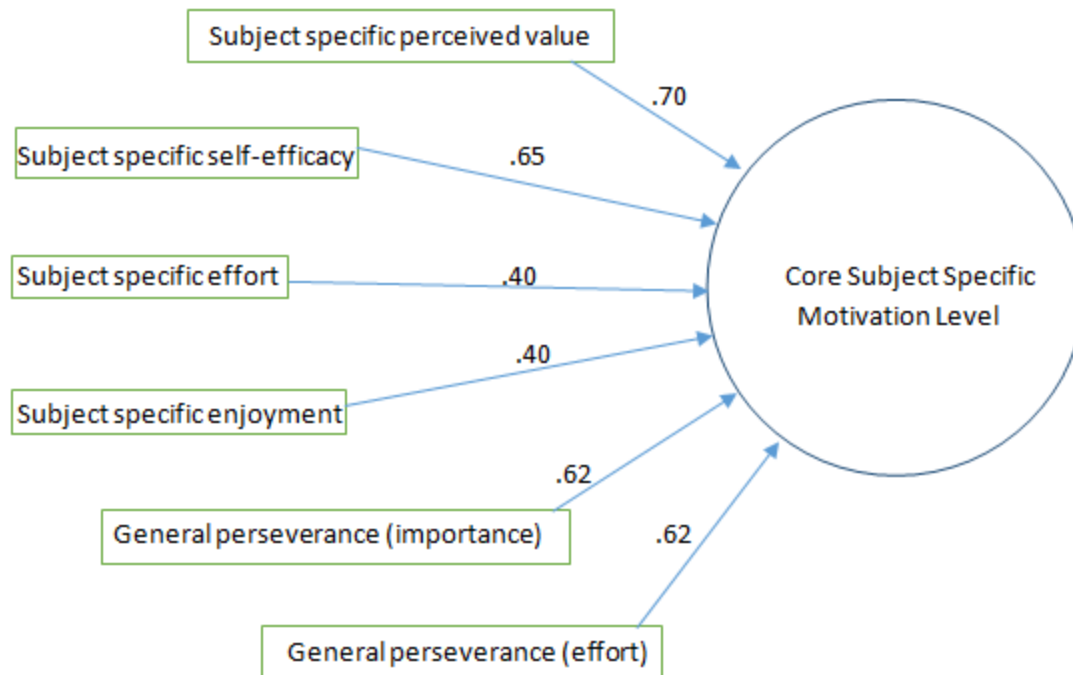
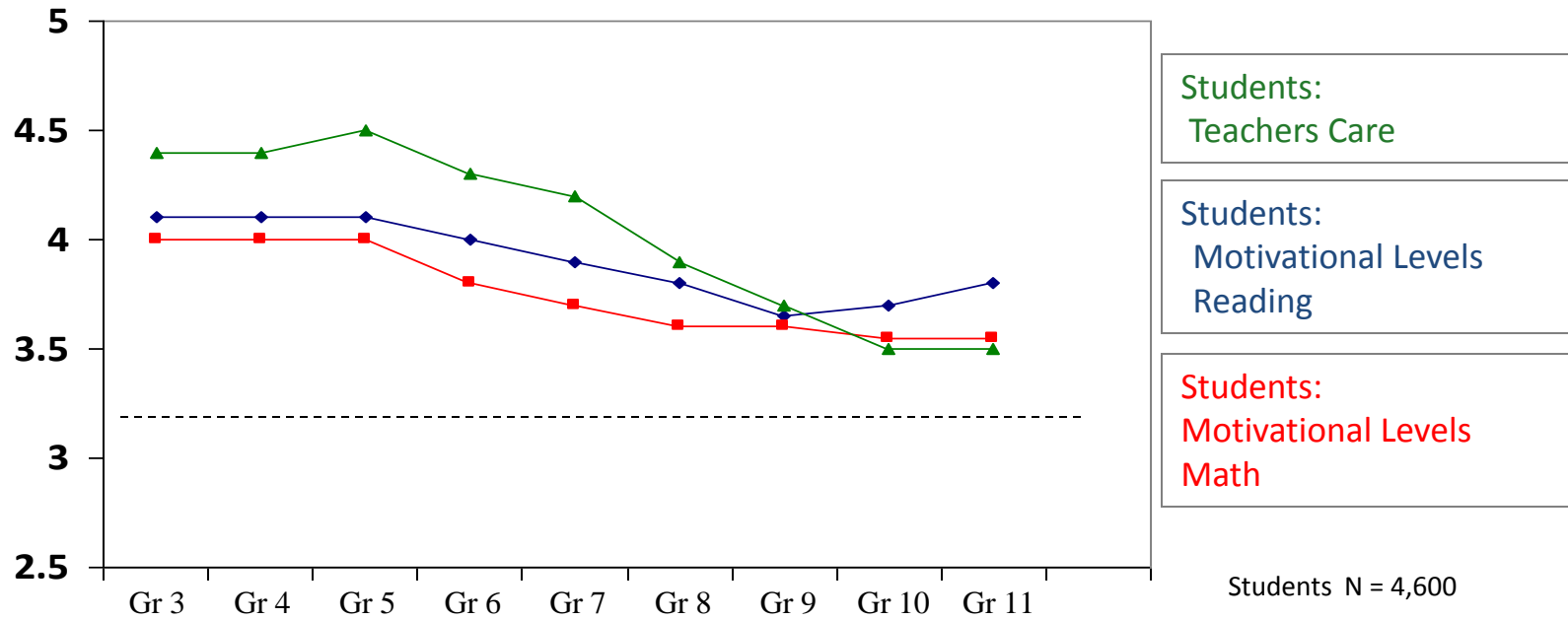| Weighted Aspects of Motivation	→	Scale by Subject

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Meriden's Getting to Know You Reading & Math Motivation (motivation by subject area or context)
and School Climate Survey: Teachers Care

Students:
 Teachers Care

Students:
 Motivational Levels
 Reading

Students:
Motivational Levels
Math

Students N = 4,600

Below 3.2 students are considered to be disengaging from the subject
- especially math, also reading and music (Eccles *et al,* Wigfield *et al*, 1983, 1989, 1991, 1997, 2000, 2012).
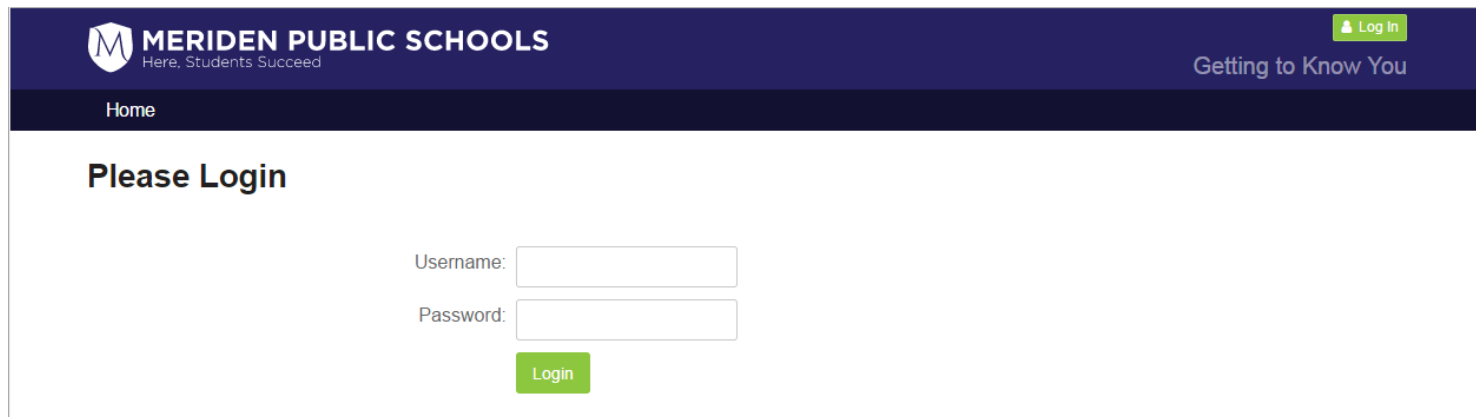
(angry and alone)

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How can teachers view their new students before the start of school: Getting to Know You Survey

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Getting to Know You

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Home

Teacher Instructional Video

Welcome to the Getting to Know You Database and Classroom Resources for Teachers

Part 1 of the Getting to Know You (GTKU) survey deals with student interests and aspirations. Part 2 and 3 of the survey focuses on each student's self-perceptions of motivation by subject area and mindsets.

The (GTKU) survey results are comprised of student comments, student responses to questions (usually a 1 to 5 rubric), and scales. Each scale is a combination of values from selected questions. All of the eight (8) motivational scales (see Classroom Resource #1 for a list of these questions) and two (2) mindset scales (see Classroom Resource #2 for a list of these questions) range from 1.0 to 5.0; the higher the scale the more the student is engaged (green) and the lower the scale the more disengaged (red), except for Fixed Mindset which is reversed; the lower the Fixed Mindset scale the better (green).

All Getting to Know You Scales (except for fixed mindset)						The Fixed Mindset Scale					
1.0	2.0	3.2	3.6	4.0	5.0	1.0	2.0	3.2	3.6	4.0	5.0
Red	Red	Black	Green	Green		Green	Green	Black	Red	Red	

Warning: Teachers' expectations about their students affect students' opportunities to learn, their motivation and achievement. These data from the GTKU Survey, especially "low" data (red) from this survey, are not meant to set teacher expectations. These data are intended to help guide teacher interactions and support for each student, as well as an opportunity to improve student self-perceptions.

Challenge: Being student-centered requires adjusting instructional tasks to meet the needs of students at different levels of achievement and motivation. Teachers have the difficult task of "taking students where they are", and delivering a differentiated curriculum where each student will experience "success with effort"; increasing both achievement and motivation (see Classroom Resource #1 and Classroom Resource #3).

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As a teacher, how can I use these data?

When you log into your GTKU, select (1) Reports, (2) Class Reports, (3) Subject Scale and hit (4) Submit. Your class report will appear: student name, related questions (Q1 to Q6), the motivational scale and mindset scales. These scales are color coded (green is engaging and red is disengaging). Mindset scales are also displayed.

Please click on this link for a brief instructional video demonstration.

Sample Writing Class Report

Name	Q1	Q2	Q3	Q4	Subject Scale	Growth mindset	Fixed mindset
Kim	4	3	3	3	3.3	4.4	2.2
Jose	3	3	4	5	3.8	4.2	3.2
Chris	5	4	5	4	4.5	4.6	2.6
Kyle	2	3	3	2	2.5	3.3	3.6
Josh	1	2	1	2	1.5	2.8	3.8
Angel	4	5	5	4	4.5	4.2	2.4
Taylor	5	5	5	5	5.0	4.8	3.0

Sample Analysis of the Writing Class

Students Kyle and Josh are disengaging from writing. However, these student perceptions are not permanent and are amenable by good differentiated instruction. You, as a teacher can nurture these disengaging students by assigning appropriate, challenging tasks (for them), and with support from you, they can begin to experience "success with effort". Kyle and Josh are especially vulnerable; how you interact and relate to them during the first days of class, will either begin to foster a positive change in their perceived ability in writing, or set them up for continued disengagement from writing. You, as a teacher, do not have an easy task. To help engage your students, learn about their interests to promote their engagement in your class. Learn about Kyle and Josh's personal interests by clicking on each student's name to see his/her responses to the GTKU survey. Try to get to know your students before the first day of school.

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Teacher's View: Summary of Student Responses

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Class Reports

Survey	Course	Subject Scale	
Getting to Know You 2017-2018 ▼	ELA Writing 8 (MS8052) - 803? ▼	Writing ▼	Submit

Student ⬍	Grade ⬍	Q1 ⬍	Q2 ⬍	Q3 ⬍	Q4 ⬍	Q5 ⬍	Q6 ⬍	Weighted Score ⬍	Growth Mindset ⬍	Schoolwork Aversion Fixed Mindset ⬍
eron	8	3	3	3	3	4	4	3.28	3.00	3.00
andon	8	3	3	3	3	1	1	2.45	3.34	3.75
kenzie	8	4	4	4	3	4	3	3.69	3.90	2.42
aore	8	3	5	-	3	3	4	3.63	4.17	2.63
Anthony	8	4	5	5	4	4	3	4.23	4.60	2.98
n, Kameron	8	4	5	4	4	4	4	4.18	4.71	2.39
, Geremy	8	1	3	3	2	3	3	2.47	2.98	3.28
ijajuan	8	4	3	3	3	5	5	3.73	4.10	3.34
Zariah	8	4	4	4	-	4	3	3.83	4.00	2.72
udra	8	4	4	5	3	4	4	4.03	3.81	2.57
illiam	8	5	5	5	2	4	3	4.08	4.47	1.79
Matthew	8	4	-	4	3	4	4	3.80	3.42	4.00
Maria	8	5	5	5	2	4	3	4.08	5.00	2.21
endez, Darwin	8	3	3	3	3	3	3	3.00	3.19	3.48
Jamilette	8	4	4	4	3	4	4	3.83	4.09	2.45

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Teacher's View: Drilling Down to a Particular Student

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Getting to Know You 2017-2018

(#24880) completed on 4/20/2017 8:16:00 AM

Factor: Writing

Question	Topic	Answer	Score	Weight	Weighted Score
Even with a difficult task, I keep trying and don't give up.		3	3	0.62	1.86
If something is important to me, I'll keep working to get to it, no matter how hard it may be.	Importance	3	3	0.62	1.86
For me, it is important to be able to write well.	Importance	3	3	0.67	2.01
I am a very good writer.	Self Efficacy	3	3	0.57	1.71
During this past school year, how carefully and thoughtfully did you write your assigned writing tasks in Language Arts (ILA) class?	Effort	1	1	0.46	0.46
During this past school year, how much did you like your Language Arts (ILA) writing?"	Like	1	1	0.49	0.49
				3.43	8.39

Average Weighted Score: 2.45

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For additional classroom support, Classroom Resources listed below:

#1 How are we Measuring Motivation?

#2 How are we Measuring Mindset?

#3 Top 20 Principles from Psychology for PreK-12 Teaching and Learning

#4 Grabbing Students; American Psychological Association

#5 Motivate Students; Summary from Edutopia

#6 How Can Teachers Develop Students' Motivation -- and Success; Education World Interview with Carol Dweck

#7 Is Homework a Necessary Evil?

#8 Tying Education to Future Goals May Boost Grades More Than Helping with Homework, Research Finds

#9 Teacher's Quote

#10 http://serc.carleton.edu/NAGTWorkshops/affective/motivation.html
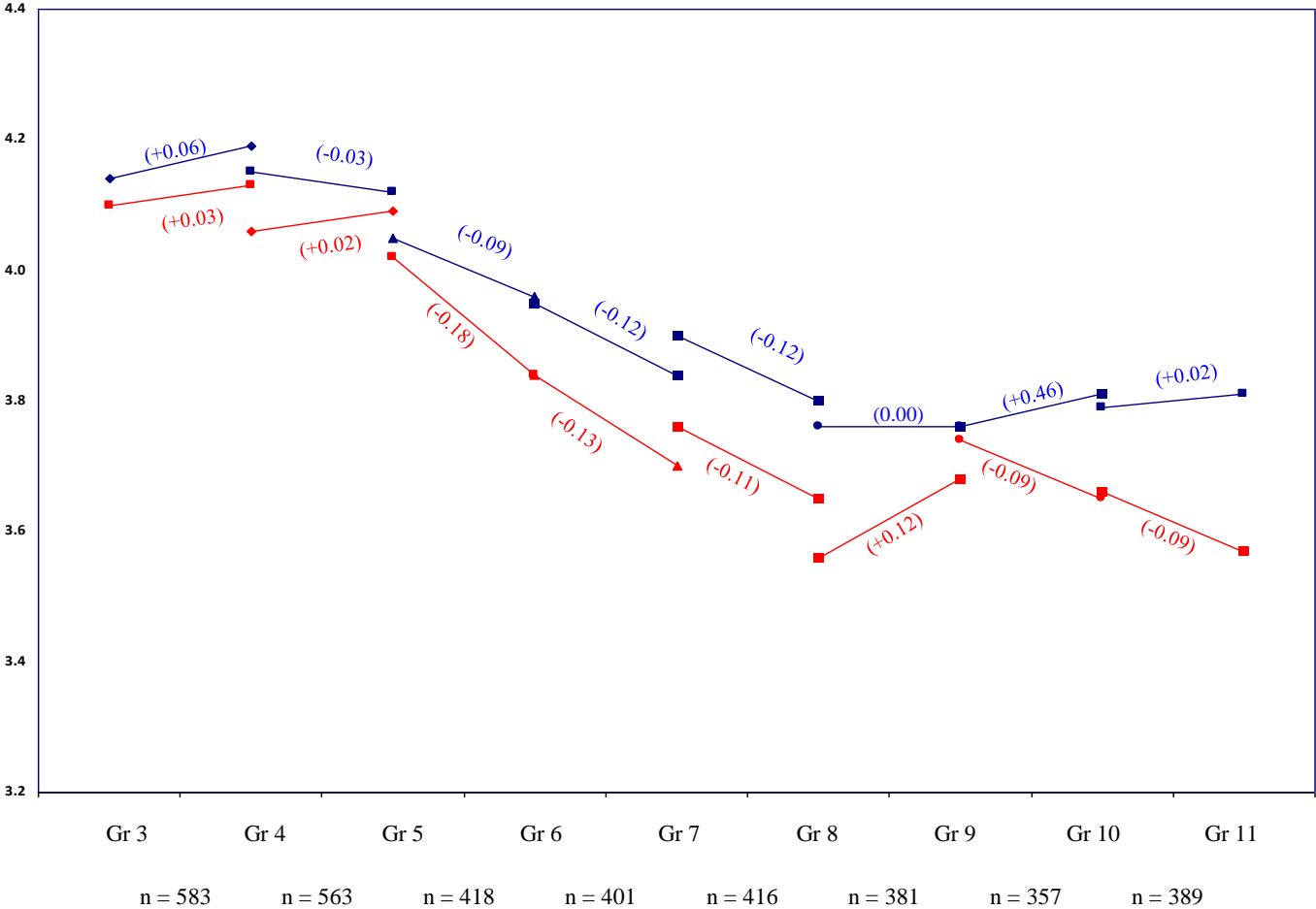
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Matched Motivation Scale Scores by Year and Grade with Change
Reading and Math
Spring 2016 to Spring 2017 (8 cohorts)

Motivation Scale

| Gr 3 | Gr 4 | Gr 5 | Gr 6 | Gr 7 | Gr 8 | Gr 9 | Gr 10 | Gr 11 |

n = 583   n = 563   n = 418   n = 401   n = 416   n = 381   n = 357   n = 389

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Introduce Matched Scores by Teacher/Class

Selected Grade 7 Reading and Math Teachers (they are confident teachers)

Reading Motivation				Math Motivation			
Teacher - Classroom	**2016**	**2017**	**Change**	**Teacher - Classroom**	**2016**	**2017**	**Change**
C.S. 1-1	4.17	4.21	+0.04	M.C. 1-1	4.12	4.14	+0.18
C.S. 1-2	4.35	4.29	-0.06	M.C. 1-2	4.19	4.22	+0.03
C.S. 2-1	3.96	3.84	-0.12	M.C. 2-1	3.85	3.59	-0.26
C.S. 2-2	4.01	3.63	-0.38	M.C. 2-2	3.64	3.62	-0.02
C.S. 2-3	4.15	4.21	+0.06	M.C. 2-3	4.15	4.03	-0.12
W.T. 1-1	4.14	4.07	-0.07	S.L. 1-1	4.02	3.86	-0.16
W.T 1-2	4.19	3.97	-0.22	S.L. 1-2	3.98	3.81	-0.17
W.T. 2-1	3.92	3.43	-0.49	S.L. 2-1	3.84	3.56	-0.28
W.T. 2-2	3.84	3.61	-0.23	S.L. 2-2	3.66	3.34	-0.32
W.T 2-3	3.77	3.58	-0.19	S.L. 2-3	3.70	3.41	-0.29
District Gr 7	3.96	3.84	-0.12	District Gr 7	3.83	3.70	-0.13

Variance by Teacher and Classroom

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How can we promote changes in **this teacher's classroom practice** that would increase student motivation for more students? How do we structure **classroom discussions** about motivation (Farrington, et al 2012)?

	Average Motivation of this Class		Classroom	District
Teacher/Class	2015 – 2016	2016 – 2017	Change	Change (Grade/Subject)
W.T. 2-3	3.77	3.58	- 0.19	- 0.12

Discussion points:

How should we present changes in motivation from the Getting to Know You Survey?

Will teachers and administrators see a change of -0.19 as meaningful?

To be meaningful, teachers need actionable, diagnostic data.

Diagnostic, matched score teacher reports are being developed in the summer 2017.

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What would teachers and administrators discuss that would be meaningful and helpful?

Teacher-Class	2017 Motivation	Reading Motivation Change	Important	Self-efficacy	Effort	Enjoyment	Perseverance Difficulty	Perseverance Importance	Growth Mindset	Schoolwork Aversion	SBAC ELA Growth	% of Students Decreasing ELA SBAC Scale Scores < 0-1SEM
Aspects of Motivation with Growth Mindset, Schoolwork Aversion and Academic Growth												
C.S. 1-1	4.21	+0.04	-0.15	+0.05	+0.10	-0.60	+0.20	+0.31	-0.05	-0.13	35.6	11%
C.S. 1-2	4.29	-0.06	0.00	-0.05	+0.24	-0.53	-0.12	+0.06	-0.06	-0.12	36.7	17%
C.S. 2-1	3.84	-0.12	-0.47	+0.06	+0.33	-0.35	-0.40	+0.21	-0.22	-0.09	18.9	27%
C.S. 2-2	3.63	-0.38	-0.53	-0.41	+0.50	-0.75	-0.56	-0.31	+0.12	-0.12	25.1	19%
C.S. 2-3	4.21	+0.06	+0.09	+0.09	-0.18	-0.45	+0.36	+0.18	+0.14	-0.25	34.8	18%
W.T. 1-1	4.07	-0.07	0.00	+0.05	-0.53	+0.15	-0.05	-0.22	-0.14	+0.14	21.6	15%
W.T 1-2	3.97	-0.22	-0.11	-0.16	-0.41	+0.11	-0.44	-0.33	-0.33	+0.48	17.1	6%
W.T. 2-1	3.43	-0.49	-0.58	-0.33	-0.74	+0.16	-0.65	-0.75	-0.43	-0.19	11.1	20%
W.T. 2-2	3.61	-0.23	-0.63	-0.29	0.00	+0.31	-0.31	+0.00	-0.31	+0.15	21.8	13%
W.T. 2-3	3.58	-0.19	-0.67	-0.19	-0.24	0.00	-0.05	-0.28	-0.31	+0.08	9.4	26%
District Gr 7	3.84	-0.12	-0.20	-0.14	+0.04	-0.05	-0.15	-0.16	-0.18	+0.07	16.8	18%

During the 2017-2018 school year, after classroom observations, these average changes and aspects of motivation may be referenced to **foster discussions about what classroom practices increase student motivation**. Such as:

- Positive classroom/school climate (**trusting/caring relationships**)
- Classroom practices:
    - balance between teacher control versus student choice;
    - cooperative learning, competitive grading and unconscious bias;
    - minimize Schoolwork Aversion;
    - creating academic communities; and
- Implement variations of latent psychological interventions (motivation does affect accountability measures).

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What are Latent Psychological Interventions and academic communities?

Based on current theory, psychological interventions are designed to change individual attributions, perseverance, effort and perceived subject/task relevance. They are often guised as a short typical writing assignment. Some research-based psychological interventions are:

- Make subject matter more relevant (Hulleman and Harackiewicz, 2009)
    - o   Classroom activities connect course materials to student lives;

- Future selves and future goals (Oyserman, *et al*, 2006)

    - o   Students are asked to plan their "possible selves";

- Attribution interventions (Cohen, 2007, 2011)
    - o   Narrow racial academic achievement gap by changing personal attributions;

- Values-affirmation (Cohen, *et al*, 2006)
    - o   Affirming important values can buffer the effects of stereotype threat.

Example: Meriden's Transitions (interventions designed for entering grade 6 and grade 9 students)

Academic communities are student networks (*e.g.* homework), fostered by teachers, to help students succeed in school (Slavin, 1990, Farrington, 2002).

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How we Measure Growth Mindset, Schoolwork Aversion and Healthy Diet

Growth Mindset (r = .903)

If a person works harder, he/she can do better.

A person can change if they really want to and they work hard.

Getting something wrong makes me want to understand why and do better next time.

I am determined to learn even the most difficult school work.

I want to do better in school than I did last year.

When class work gets hard, I just work harder.

It's OK to make mistakes in class, as long as you're learning.

I like to learn new things.

Even with a difficult task, I keep trying and don't give up (perseverance shared).

If something is important to me, I'll keep working to get it, no matter how hard it may be (perseverance shared).

Schoolwork Aversion (r = .732)

I give up when schoolwork starts getting too difficult.

I do as little studying as possible, extra studying is not worth it.

If I'm not good at something, I stop trying.

Last year, homework was either just too hard or I didn't have time to do it.

It doesn't matter how hard you work in school, it has a lot to do with luck.

Healthy Diet (r = .710)

For me, it is important to eat a healthy diet.

I usually drink 3 or more bottles/glasses (36 ounces or more) of unflavored water .

I usually drink 3 or more bottles/glasses (36 ounces or more) of some type of soda or sweetened drink (Coke, Pepsi, Sprite, Gatorade, lemonade, sweet ice tea).

I usually eat breakfast .

I usually eat fruits and/or vegetables .

I usually eat sweets such as cake, donuts, candy, cookies or brownies .

I usually eat foods like french fries, hamburgers, chicken nuggets or fried chicken.

I usually have 3 or more servings of dairy products (milk or yogurt or cheese).

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Reliability Table

Weighted Scale Name	Number of Items	Cronbach Alpha
Growth Mindset	10	.90
Fixed Mindset (Schoolwork Aversion)	5	.73
Math Motivation	6	.79
Reading Motivation	6	.76
Writing Motivation	6	.76
Social Studies Motivation	6	.75
Science Motivation	6	.75
Music Motivation	6	.73
Art Motivation	4	.84
Physical Education	8	.81
Health Diet	11	.71

The Health Diet scale is a measure of eating habits of students in grades 3-11. It is not necessarily considered a motivation measure, although it may take motivation to try to maintain a healthy diet.