

## **An Administrative Team - Student Partnership Centered Student Survey Project**

*By Kevin W. Reese*

*“I signed up for the class because I needed another math credit. I originally was going to drop it, but then I actually went to the class and really liked it. It was something that I never learned about. I was always taught when growing up to learn something new every day and with this class, I did exactly that. I feel that others should take this course in the future because, in all our math classes that we take in twelve years, we barely learned statistics. Before taking this class, I knew almost nothing about statistics, and this course I knew so much that in my other math class when we took MAP testing, I could actually answer the questions that had to do with statistics. I felt so proud of myself and was grateful I didn’t drop the class.*

*- Female Introduction to Stats Student*

In December of 2020, my department was asked by district administration to create a new math course that would help our most credit-deficient students engage in meaningful mathematics en route to fulfilling their state-required three credits of math. The students we were concerned about were most likely to not have a positive experience in Algebra 2 as their third and potential final math credit.

During my time serving on the [State of Wisconsin’s Math Standards](#) Review Committee, there were many conversations surrounding committee member intrigue of the State of Oregon’s [2+1 model](#) for math course selection. In that model, all students experience the same first two years of math in high school—an integrated 9th-grade and 10th-grade experience. After taking their first two courses in Oregon, students would then get to choose a pertinent-to-their-future, rigorous, standards aligned math course that doesn’t have to be a traditional Algebra 2 course.

Currently, in my district, 9th graders take Algebra 1, and 10th graders take Geometry with the intention that 11th graders will take Algebra 2. My colleagues decided we needed an alternative option for our students, and we decided it was best for our most credit-deficient students to create an Introduction to Statistics course.

When it came time to determine staffing, fingers pointed at me to teach the class, as I have been our district’s only AP Statistics teacher since 2009. I accepted the challenge of creating a new course, but knew this course needed to be anything but the Advanced Placement (AP) version of statistics for the type of student being recruited. Given a blank canvas, I had permission to create a one-semester course from scratch. I knew these students would most likely be those who had a negative math experience prior to the Introduction to Statistics course. A pathway paved most heavily with reteaching pre-algebra-specific topics they hadn’t mastered already. With such a focus on preparation for traditional Algebra 1 success in high school, these students were the least likely to have experienced the 6–8 grade and high school [Common Core State Standards](#) statistics standards in my district. Challenging circumstances were compounded for these students by abundant snow days in the spring of 2019, along with the ever-changing methods of instruction caused by the pandemic.

I set out to develop a course that would teach my students to use the [GAISE framework](#) steps. To share my ideas while creating the course, I leaned on a mentor of mine, Henry Kranendonk. I

worked with Henry on the statistics subcommittee of state standards review. Given a copy of a book Henry co-authored, [Focus on Statistics](#), I tried to anchor each course unit with an end-of-unit investigation from the book. From there, I created sequences of lessons I thought would help students have the necessary background to be ready for each investigation.

My original course vision had been a bit ambitious. I ended up not having the time to get to the “Making Inferences & Justifying Conclusions” domain standards of the Common Core State Standards. I was hoping to informally introduce the concept of inference with some simulation activities, but I simply did not pace accordingly. In the end, the course had units on 1-variable statistics (categorical, quantitative, and comparing two groups of quantitative), units on 2-variable statistics (scatter plots and association with bivariate categorical data), and one unit on survey design. I anchored my first unit with *Focus on Statistics*’ “Could You Be an Olympic Swimmer?” investigation (39). My second unit was anchored with “Are Baseball Games Taking Longer?” (49). The Linear Regression Unit was anchored with “How Long to Topple Dominoes?” lesson (111), and my bivariate categorical unit ended with “Is There an Association?” (127). The pacing met the needs of my students, and giving them enough time to do their press conference survey project was more important to me than using that time for informal inference. Now that I have gained confidence, next year I hope to condense a few days to get to those inference standards as well as give more time for the semester project.

The first year of the course ended up primarily using lessons leading up to the unit ending investigation that were pulled from the 6th-grade Algebra 1 statistics lessons from [Illustrative Mathematics](#). Many other activities were selected from [Stats Medic](#) (whose trademarked “Experience First - Formalized Later” lesson approach I have used to supplement many lessons in my dual credit college Elementary Stats course) and from the “Grades 9–12 Statistics and Probability for All High School Mathematics Teachers Professional Development Module Guide for Participants” from a summer institute professional development I attended by the Mathematics Institute of Wisconsin. My school is one:one with every student having a Chromebook, so I had students using the [Stapplet](#) website throughout the course activities to calculate statistics and make the necessary graphs. Throughout our conversations, Henry had been insistent on me having my students end their experience in this new course with his “Press-Conference” project that he had himself used with success earlier in his teaching career. My idea to slightly change his project was to involve adult school district stakeholders who would collaborate with my students on their projects. The partnership would work to create statistical questions that the students would try to answer with survey responses gathered from their schoolmates at Clintonville High School. I put my own twist on Henry’s project idea, and with this end in mind, I set out teaching the course for the first time during the 2021–2022 school year.

As the only teacher certified in my district to teach our dual credit college math courses, it was a refreshing challenge to work with our more reluctant math learners. Early and often throughout the course it was encouraging to hear students remarking that this course is the first math class they felt they would use in their real life. I viewed such statements as evidence that the course design was reaching its goals of improving the mathematics identity of its targeted students. As the first semester neared its end, I was able to fulfill my promise to Henry and set out to help the students prepare for their course ending press conference project.

*“I signed up for this course because I knew it would be a different form of learning where it would be more discussion-based. I would recommend taking this class because of how different it is from the traditional classroom. There isn’t a teacher trying to forcibly put an equation in your memory. It’s an overall positive experience. Prior to the course, my knowledge of statistics was knowing how to identify mean, median, and mode. After this course, my knowledge has grown immensely. I’ve learned how to interpret the rate of change in a line as well as how to collect representative data. To just name a few. I feel these skills will be valuable later in life.” - Male Introduction to Stats Student*

### **Background Information on the End of Semester/Course Project**

*“What a great way for students to understand educational practices and how to improve them! Kevin Reese and his Mathematics classes were able to collect and extrapolate data for district administrators and board members. By surveying students on various topics, it allows not only for them to reflect, but help us better understand our student body.” - Troy Kuhn Clintonville Public School District Superintendent*

I work in a rural northeast Wisconsin school district, with a high school student enrollment of just over 400. Our district has one high school, one middle school, and one elementary school in its current format. My twist on the press conference project was to involve adults from our school district to give each student project a reason and a life. I reached out to our seven board of education members and 10 of the administrators within our school district. In the end I was able to recruit five adult district stakeholders to work with my students. My goal was to have my students meet with an adult stakeholder, learn about the adult’s role within the district, how they use statistics in their line of work, and inquire what questions and concerns the stakeholders have that the students could help them answer with a survey. Each administrator adopted a pairing of students to work with and spent a class period working with the students to develop statistical questions. My instructions to the students were that they needed to, at minimum, collect and display one comparison of two variable categorical data to determine an association while additionally collect and display at least one comparison of quantitative data with parallel plots (while also collecting anything else requested of them by their adult partners beyond that). Mind you, these are not my college credit/AP stats students. I didn’t expect confidence intervals. I didn’t expect  $p$ -values. What I did expect were parallel boxplots and segmented bar graphs. The students had worked with each of these types of displays, making and drawing conclusions multiple times throughout the semester.

I devoted nine class periods of work time ahead of the press conference date. The first was to meet with their adult partner and come up with the questions they could research. At the next class meeting, I met with each group and made sure they had a vision for their project and had them work on the wording of their survey questions. On day three, while students worked on identifying their random sample of students from lists of the names in the student body, I met with each group to approve their survey questions. During the next class meeting, the students put their approved survey questions into Google Forms and sent out their surveys via email to the students they had randomly selected. To end the class, I modeled my expectation for a presentation by walking them through a fictitious project with the student council adviser (who is me by the way) about his concerns regarding Homecoming Week activities. While students

awaited their survey responses for days five and six (which also included a weekend) I expected them to finish their cover slide, create a biography slide introducing their adult stakeholder, and prepare slides with appropriate titles that awaited their data, graphs, and analysis. Getting their cover slide done, have them include a biography slide introducing their adult stakeholder, and having them have slides set up with titles that awaited their data, graphs, and analysis. Day seven required them to end their survey response collection and get their graphs made and inserted into their slide show. Day eight allowed them time to fine tune their presentation and practice it with their partner. Day nine had them presenting their projects during our final exam day modified schedule. In hindsight nine days was not quite enough time, and it would have been nice to allow a few more days for more surveys to be completed or to follow up on ones that had not been returned.

I had administrative permission (another perk of involving them!) for my students to give and collect surveys from a random sample of students from the high school student body. I had students attempt to survey at least 90 randomly selected students, with a goal of getting at least 40 responses back. I wanted students to demonstrate they could appropriately select a random sample and to have the experience of carefully wording survey questions. I also wanted them to have the full feel of a non-response bias. Some good lessons were learned, not only in being more empathetic and likely to respond to future surveys themselves, but also in how data was collected. Some groups didn't allow responders to type in numerical responses, such as the number of hours spent at an after-school job per week. I wanted the students to wrestle with data that didn't arrive as predicted, and to have premeditated this for them would have been a disservice. I also felt it was important for students to have this real data collecting experience instead of just finding a data set via an internet search. With such a short turnaround from sending surveys to presenting their press conferences, students didn't get a chance to recruit more responses. Additionally, most originally sent anonymous response surveys feeling it would encourage more student body responses, so they did not have a way to know who to resend a survey to that had not responded yet. All groups ended up having about 50 respondents to their survey. My students believe their peers to be innate skeptics in providing anyone, even anonymously for a fellow classmate, with survey responses. Furthermore, my students were not convinced that email correspondence was the best way to communicate with their peers.

After collecting the data, students put together presentations to be given in our conference room during our final exam testing periods on the last day of our fall semester. All adults stakeholders and special guest, Henry, joined the Intro to Statistics classmates as the audience for the press conferences. My hope is that the adult stakeholders would take the findings and share them at administrative team meetings and school board meetings, or even invite the kids to present a polished version at a meeting.

*"I participated in this project for a couple of reasons: 1.) I am a huge proponent of authentic learning and students doing this project gave them a tangible, authentic audience, not only to watch and comment on their presentations, but also to springboard the students with an idea they could investigate where we as the adults could potentially make changes based on that data. 2.) Students need to see their education and learning is important and valued, so we as adults coming into their classroom, as well as to their presentations, hopefully give those students an understanding there are adults here who want to help them, guide them, and see them succeed.*

*Seeing adults comment and question the data and presentations shows students we take their work seriously, and we have plans of taking that data and, at the very least, having conversations and asking, "Are there changes that need to be made in our school?"*  
- Brett Strahota

### **Reflections on the Press Conference**

*"I enjoyed the day - your students (and you) did great. I think this will be something they will remember for a long time. Also enjoyed visiting with the administrators, the school board member, and others. I hope you are proud of how this turned out. The students demonstrated genuine statistical thinking and data analysis."* - Henry Kranendonk

Did the students hit every talking point from the semester? No. There were mistakes and omissions. Yes. Did my students meaningfully talk about statistics and make sense of data? Absolutely! The most impressive portion of the presentations was how the adults in the room interacted and engaged with my students. The adults were asking students to go back a few slides and show them a graph again. The adults in the room looked as if they were playing an air guitar, but instead were gesturing in the air to make sense of graphs. It was a delightful scene of students and adults together drawing conclusions from statistical summaries. Adults were turning and talking about how this information could be used at their next meeting or to drive their next decisions. Kids, who were reluctant to learn math, who had negative experiences throughout their math education, were ending their semester with a meaningful experience that had life beyond their report card, that for a moment helped them be true researchers and benefit their own school district.

Below I will share the good, the bad and the indifferent. I do this not to make my students nor my teaching look bad, but I feel strongly that sharing some of their misconceptions will help others attempting this project in the future. Henry adds, "I want to compliment you and your colleagues on implementing what I think was an outstanding, student-centered and school-centered project. Your unique twist of including 'invested' adults into the process made this more than just an exercise in developing and analyzing a survey. Due to the rather school-centered issues explored, I think my comments are simply 'well done.'"

### **Group 1: Why Do Students Fail Courses?**

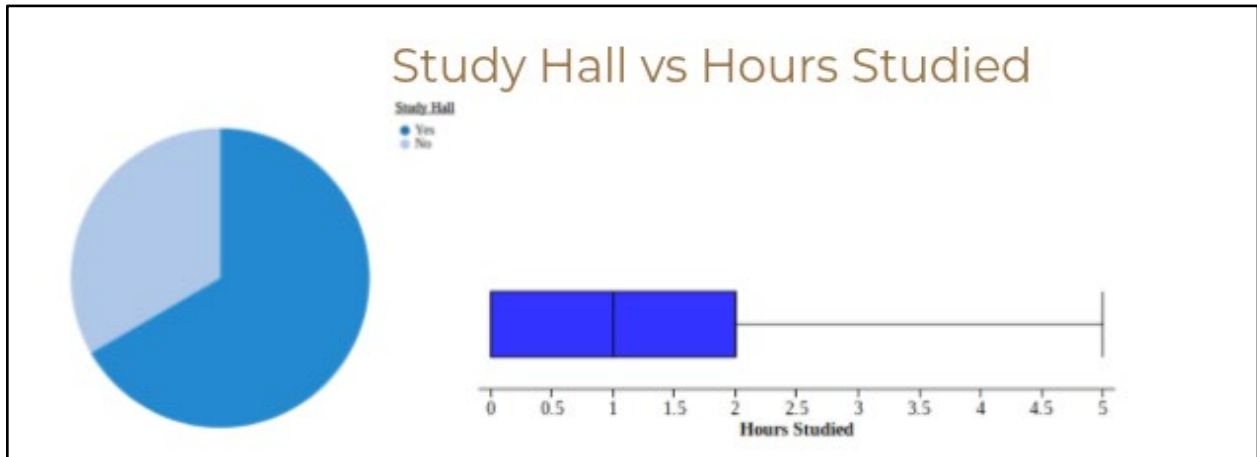
Assigned Adult: Clintonville Public School District Superintendent of Schools

*"The data received not only gave a hint as to why students fail classes, but also allowed us to make assumptions of what other factors are important and consume students' lives."*  
- Troy Kuhn

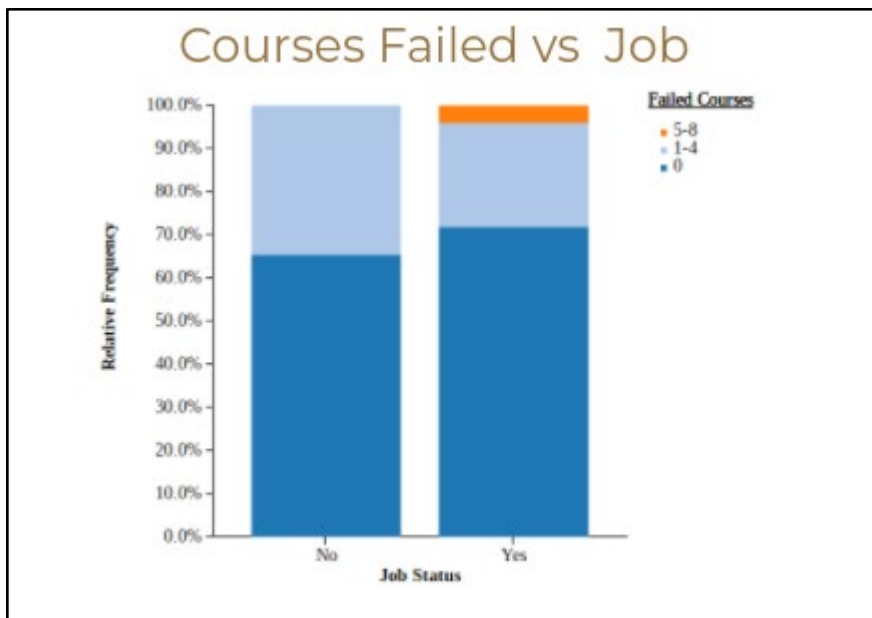
Our Superintendent, Troy Kuhn, wanted to investigate the reasons why some students fail courses. He was wondering if there was an association between certain decisions, such as having a job or how many (if any) study halls a student schedules. Commenting on the project, Mr. Kuhn reflected "the various conclusions were both resourceful and eye opening."

The group also surveyed to find out how much time students spent outside of school studying. After my check-in meeting with this group, I was anticipating parallel boxplots divided over the

various study hall statuses. Below is the way the students came up with communicating this information. I noticed that they still did communicate how many students had a study hall in their schedule and how many hours students spend studying outside of school. Adults in the audience immediately began discussing this information, correctly pointing out that 25% study zero hours outside of school and 50% less than an hour (but wondering out loud if those 25% had a study hall).



Mr. Kuhn had often heard community comments about how many students want jobs, need jobs, quit sports to work, leave campus for study hall to work. He wanted to know if working was impacting whether or not students were passing their courses. The biggest adult reaction during this presentation was the changing of adult minds of the assumption that kids are working too much as being a reason for failing courses. The students were able to correctly point out that a larger percentage of students with jobs were failing zero classes.



One of the students from this group commented, “The press conference project was a little hard for me, I will admit that. I have social anxiety so standing up in front of people and talking is not my strong suit. Having the press conference count as a semester exam was scary, it was such a big project in so little time and then having to present it to adults. I thought my heart would beat out of my chest, but it was fine, it went smoothly, and wasn’t as bad as I thought. When the adults were taking interest in the data we had collected, it felt so good. I felt like I was at work up in front of a big table with important people telling them the statistics.”

## **Group 2: What Factors Are Contributing to Student GPAs?**

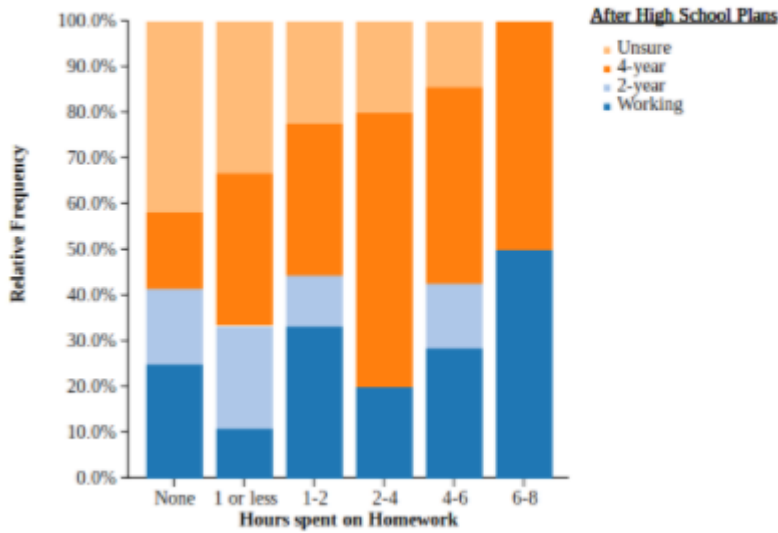
Assigned Adult: Clintonville Public School District Director of Curriculum

*“This process has made me aware of some areas to focus our efforts as a district. I also have more questions that will lead to more investigations and root cause analyses throughout our continuous improvement process. I applaud all the students for helping out their district in our efforts of improvement.” - Peg Mischler*

Our Curriculum Director, Peg Mischler, wanted to know what factors beyond academics were contributing to a student’s GPA. Her list of ideas included, but was not limited to, asking about a student’s after-graduation plans, hours per day spent studying, hours per day spent working a job, whether or not they have a study hall in their schedule, and the number of hours of sleep per night a student gets.

An interesting learning opportunity happened with this group during the data collection phase. They didn’t collect student responses for the number of hours spent on homework each day as a number but instead gave multiple choice options for ranges of time to choose from on the survey. A student working on this project sought me out for help with his five-number summary, asking if he should use six or eight for the maximum. During our conversation, he soon realized his information had been collected as categorical and asked if he could make a segmented bar graph instead of a boxplots. I applauded his intuition and found it better to have had this learning moment than to have interfered early in the survey writing process. The graph shown below shows the display they adjusted for not collecting it as quantitative. When this graph was presented, I noticed that most adults were flipping their hands in the air, gesturing in unison to silently ask each other if the axis should have been interchanged. I enjoy watching kids make the adults think statistically and this led to follow up questions on if afterschool plans indicated how much students study, or if how much a student studies predicts their afterschool plans.

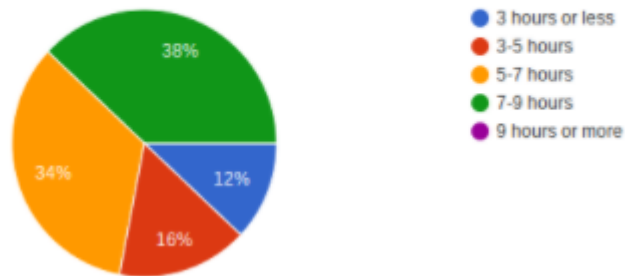
## Homework v.s. Students after-high school plans



I would love to say all students went above and beyond the minimum of my scoring rubric and went the extra mile to help their assigned adult. That was not always the case. This group did another graph like the one above with hours of homework predicting self-reported GPA. With their survey, they collected much more information, but having the minimum number of graphs they just dumped the rest of their findings into their presentation without much analysis such as the following graph. While adults still found his information useful, namely observing about a third were getting low amounts of sleep, the audience was left a bit unsatisfied with the presentation due to wanting to see sleep versus honor roll or GPA.

## How much sleep (on average) do you get a night?

50 responses



### Group 3: Why Is Student Participation in Extracurricular Activities Declining?

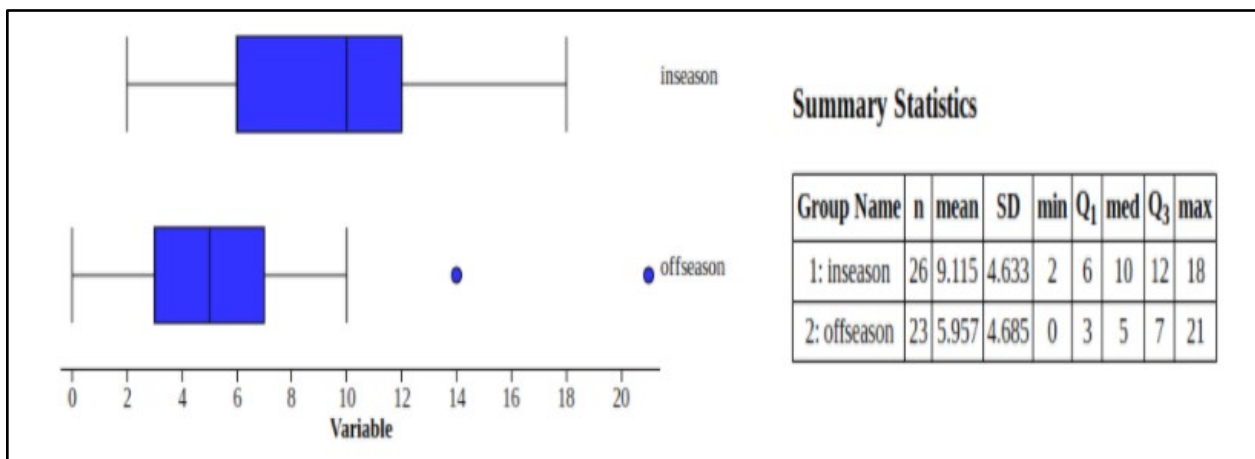
Assigned Adult: Clintonville High School Athletic Director

*"I was looking to get more insight on the reasons there are declining participation numbers among high school students. Based on the results, there doesn't seem to be one reason in particular behind the declining participation numbers. Overall, the presentation went well. I*

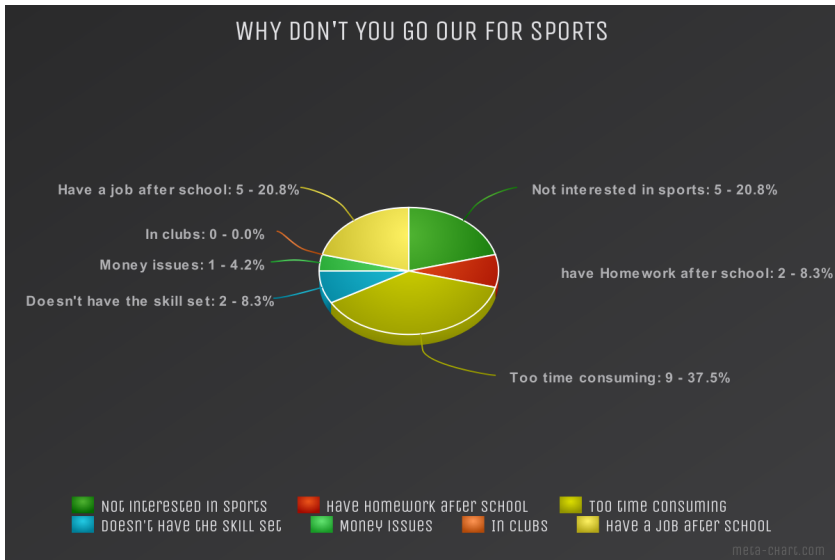


wish we had a bit more time to do some follow up questions with the group, but it was a great experience.” - Shaun Liesch

Our Athletic Director, Shaun Liesch, had concerns about declining enrollment in our athletic programs, other extracurriculars, and a perceived shrinking in attendance in the student section at events. Resulting from discussions with their administrator, the students suggested a reason may be the time commitment required to be on a sports team. As a result, the students in this group asked how much time (hours per week) students dedicate (lifting weights, conditioning, drill work) to their sports both in season (outside of designated practice time) and out of the season. Their graphical displays and statistical summaries are shown below. Though one reaction was confusion of why there was a different number of responses, the students were able to correctly note that 50% of athletes train longer in season than all but the two outlier off-season athletes. This group also could have improved their presentation with better labels and titles.



As I suggested earlier, sometimes students seemed to let their guard down when providing additional information for their adult once that request was beyond my minimum requirements. Again, these are reluctant math learners, and I was pleased in general with their effort towards my minimum requirements. The athletic director had asked them to determine the top reasons for not participating in sports. Below is a pie chart that provides this information with eye-catching fonts and color schemes, but it was the statistical summary that they included with it that highlighted some major misconceptions among the members in this group.



Group Name	n	mean	SD	min	Q <sub>1</sub>	med	Q <sub>3</sub>	max
1: Not interested in sports	1	5	NaN	5	NaN	5	5	5
2: have home work after school	1	2	NaN	2	NaN	2	2	2
3: too time consuming	1	9	NaN	9	NaN	9	9	9
4: doesn't have the skill	1	2	NaN	2	NaN	2	2	2
5: money issues	1	1	NaN	1	NaN	1	1	1
6: in clubs	1	0	NaN	0	NaN	0	0	0
7: have a job after school	1	5	NaN	5	NaN	5	5	5

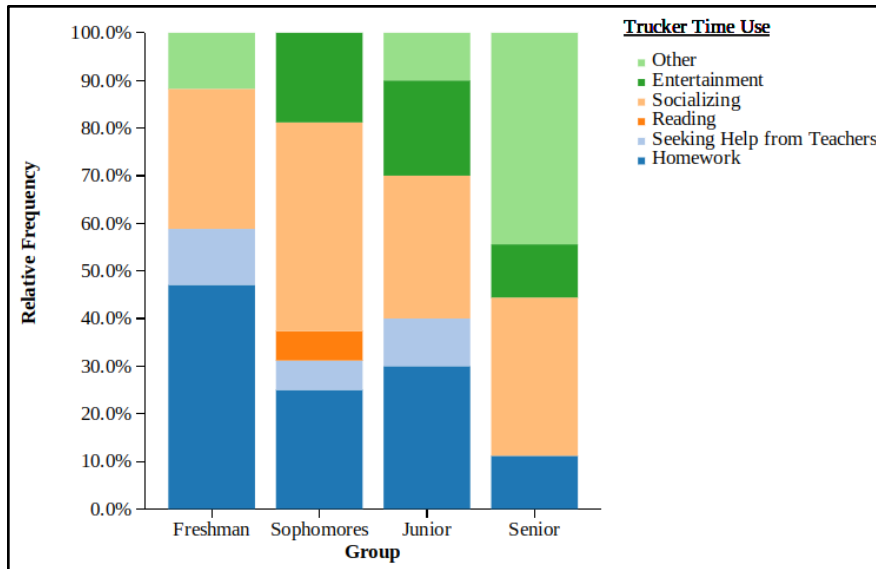
#### Group 4: How Are Students Using Trucker Time?

Assigned Adult: Clintonville High School Associate Principal

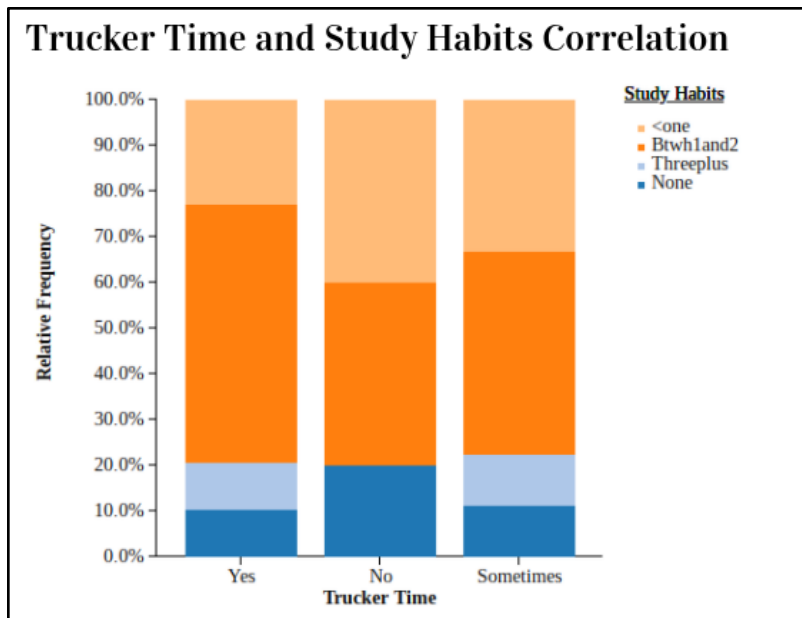
*“From the administrative side, my group looking at how utilizing Trucker Time (RtI time) and supplying data they gathered from the student body is a valuable piece of information for us to help determine what our schedule could look like moving forward, and if any serious considerations to the schedule need to be made.” - Brett Strahota*

The last 30 minutes of our school day is known as “Trucker Time” (our mascot is the Clintonville Trucker). This time is reserved each day for students to be able to seek help from their teachers and time for teachers to seek out students they feel could use some reteaching or enrichment. Students who are not requested by nor requesting to see a teacher are to be using that time with an assigned teacher as a guided study hall. Administrators have been in discussions about the best placement of time in the school day that Trucker Time could/should be. The staff leadership team committee that I sit on has had discussions in its meetings about how students are (or are not) using this time. Our Associate Principal, Brett Strahota, decided to take the question to the student body through his assigned student project group.

The graph that created the most discussion of any during the press conferences is shown below. In the presentation room, students and adults alike reacted strongly as they digested that most students, regardless of grade level, responding to this survey are not using this resource time as it is intended. In addition to pointing out how little it appears Trucker Time is being utilized, students were also able to identify an association between grade level and how time was used. This group also masterfully ironed out that juniors and seniors, who have met district criteria, are allowed to leave campus during Trucker Time as a way of explaining some of the trends seen in the graphs as students age through grade levels.



As shown below, even the most discussion provoking group can moments later make a stats teacher cringe with disappointment with what teachers find to be “important”. Below the misuse of the word correlation happened despite being a topic during the semester. I blushed with a sense of embarrassment and resisted the urge to correct them as they read this slide. Even with the concern, I still share this example to highlight how this group of students had to compensate for how their data was collected. They had asked upperclassmen if they stayed on campus for Trucker time, allowing them to answer “Yes, No, Sometimes.” They then asked students how many hours outside of school students study. They were attempting to have data that would allow them to make the parallel boxplots to show how much more time students were studying if they left campus for Trucker Time versus those who stayed here to get help or get their work done during Trucker Time. I really wrestled with jumping in and saving them before sending the questions to make sure they got numerical data. In the end, I felt that more learning took place by letting it happen and having them find a way to work with the data that wasn’t delivered in the manner they had hoped. This group as a result fell short of my goal of having them compare the shape, center, and spread of quantitative data, but learned more by realizing they had no such data, than many groups did who conveniently had the right data I believe it was the right move to have them need to navigate the reality of the data they got. That being said, there is a time to jump in, and I did to stop them from resending the surveys on the last workday before press conferences to try to chase points on my rubric.

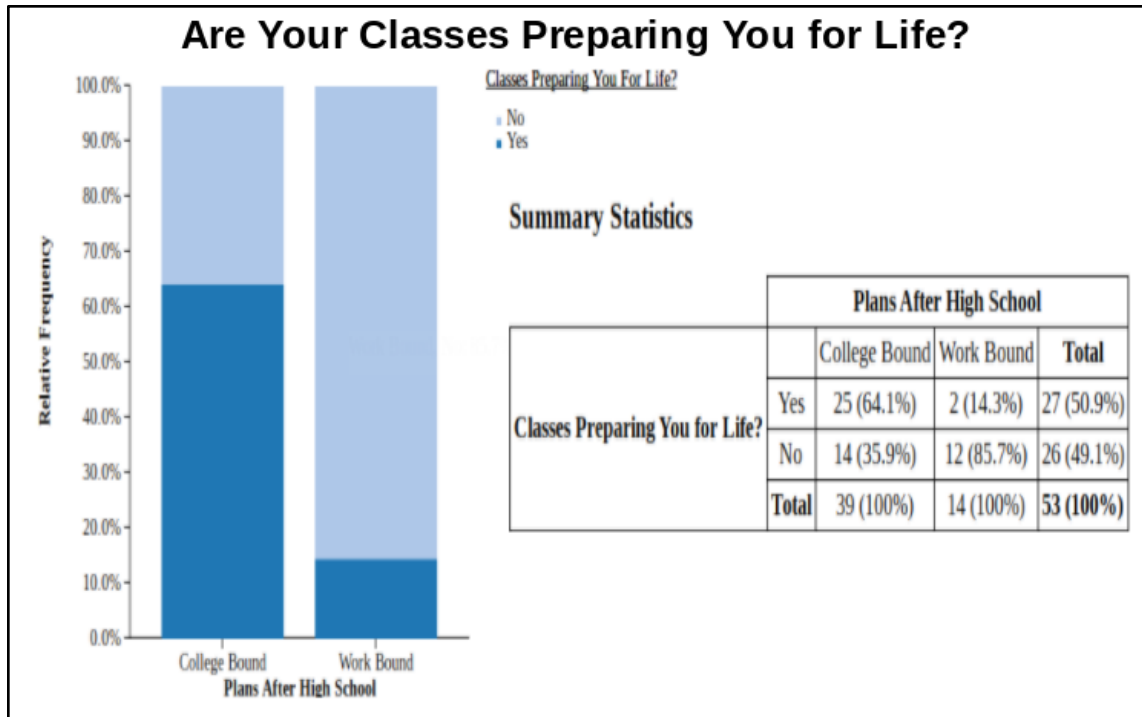


#### Group 4: Are We Preparing Students for Their Life After High School?

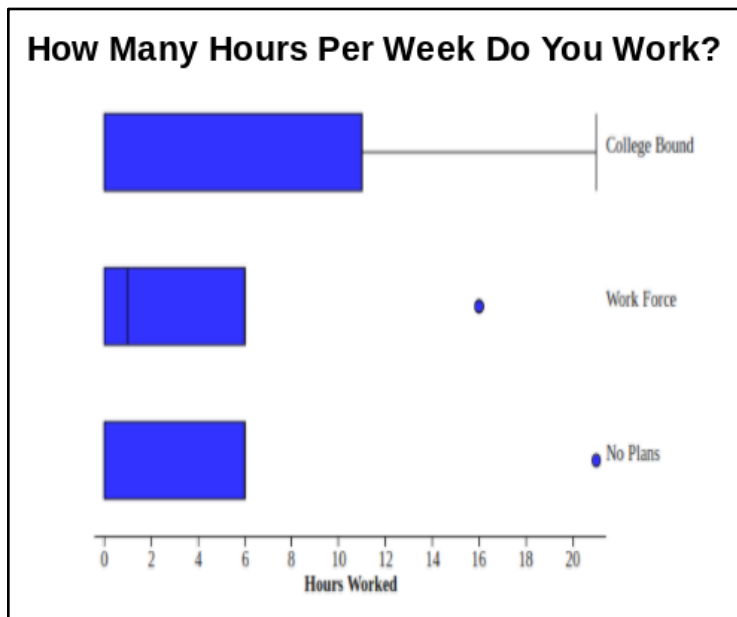
Assigned Adult: Clintonville Public School District Board of Education Member

*“I approached this project with two hats on, both related, as a school board member and as a member of the newly formed CTE (Career and Technical Education) Committee. With either hat the goal is the same, are students prepared for life after high school no matter what direction they decide to go. Obviously as a school board member, the opportunity to sit down with a couple of students and ask them about their high school experience and future plans was great, we wish we could do it with more/all students. That is where this project now steps in to assist with that. -Larry Czarnicki*

This group, who worked with School Board Member Larry Czarnicki, an engineer at a local manufacturing company, gained a large reaction within the room among the adult stakeholders. When the students revealed the graph below, showing 64% of college bound students feel our curriculum is preparing them for their future (I felt good as a upper level math teacher that my work is meeting their needs, though room for improvement), but I was saddened that only 14% of the non-college bound felt they were getting an experience to prepare them for their life. My hope is that classes like Intro to Stats will help change this opinion among students. This was concerning to the administration and the board member in the room, as well. If our goal is for students to be both career and college ready, we are failing students. “I was very pleased with the presentation and information presented by the students I worked with. Some of the slides you expected, but there was one that jumped out at me. The response was really eye-opening and much lower than I would have guessed—that a strong majority of those planning to work after school do not feel prepared,” stated Mr. Czarnicki.



This group did a much better job fulfilling my rubric than most groups, as shown below. Though not the most traditional looking boxplot, they were able to adequately compare the groups and draw a conclusion that essentially half of each group were not working any hours at an out of school job during the school year.



One of the group members commented, “The overall experience with the press conference project was positive. Working with our administrator was a great thing. I worked with a board member, so I got to learn how that position affects the student’s school life. At the beginning of

the semester, Mr. Reese was saying that this would be our final. The entire class started laughing and soon we found that he was not lying. I enjoyed that this was our semester exam. When my partner and I met with the board member, we all were curious about the topic of plans for after high school and the school's youth apprenticeship programs. This made our presentation worthwhile. When the administrators there examined our graphs and asked us questions about them, I felt like I made something that they can use to help better the learning environment of our school."

### **Final Reflections**

*"As a general statement, I would say every presentation had that one 'A-ha' or 'Wow' slide that we were not expecting which is awesome. Unknowingly at the time, the students were giving us and admin something to really think about and take back for further review and probable action. I am not sure they fully realize the significance of some of the findings. I think that is an important fact given the type of course and students in it. As I put on my school board and CTE hats, I will use this result to shape future questions, discussion, and decisions with the goal of improving for our students." - Larry Czarnecki*

My personal reflection positions me towards continuing to allow students to present their raw authentic interpretation of their findings. They had a rubric to reference throughout the project and I also modeled a project for them (the student council adviser—me, by the way—had some concerns about continuing with some homecoming week traditions). Part of me initially wished to have polished perfect boardroom ready presentations that were without any error. I felt maybe I should have done more check-ins, been more helpful in correcting their errors for them on rough drafts. However, once I truly took the time to reflect, their presentations in their own words, not only showed me what they knew, and how well they knew it so I could give them an accurate grade in gradebook, but in the end, showcased that students leaving our nest of education will need to make sense of all sorts of graphs, not just textbooks ones, and my students could and did show that they could do that. Henry emailed after his visit to watch the presentations that "In addition to your development of the project with adults from the beginning, I think the following also stand out: (1) The seriousness of the statistical questions was apparent in the presentations and in the survey questions; (2) the surveys were clearly designed to address the statistical questions, and as an adult was involved in exploring the issues with the kids, the surveys were relevant to the overall statistical questions; and (3) the conclusions were good to outstanding. And, like all good statistical studies, more questions emerged! That was the real beauty of the project—I think the adults and the kids started to realize what other survey questions should have been considered, and what was still not clear in their conclusions." At first, more questions than answers was unsettling, but after taking a moment to step back and reflect, I was encouraged that my students gave the adults more to think about (maybe even questions for next year's version of this project!). The adults weren't dissatisfied but instead called to action by the efforts of my pioneering Into to Stats students.

Next year, more time will be allowed to collect the data and to work with the data once collected. However, even with the sense of urgency the quick turnaround created I was very impressed with the student presentations. The goals were so much bigger than having a ready-to-serve presentation that the administrators could steal and take with them to their next meeting. Instead, the goals were to have these students, who had been reluctant math learners who had typically

had negative math experiences, proudly standing in front of adults they don't normally interact with, helping those adults better understand a school through their eyes by showcasing what they can do with an often ignored subset of the math standards.

### **The Scoring Rubric**

I am admittedly a rubric novice; it remains a work in progress. I based it on the [AMA poster judging rubric](#). I was so absorbed in the presentations and in listening to the stakeholder discussions that I found the rubric to be too detailed and I want to slim it down.

### **Intro to Stats Semester Project Rubric**

#### **Formulate a question that can be answered with data**

Act professionally in a meeting with an assigned adult to learn the adult's area of concern to be researched.

0      1      2      3      4

Presentation has a title page that clearly communicates to the audience the intent of the project.

0      1      2      3      4

Presentation includes a biography that establishes credibility and topic motivation of the assigned adult.

0      1      2      3

Presentation allows sharing of a student's own experiences and motivation for the topic.

0      1      2      3      4

Question(s) are statistical questions that can be answered with data and expect variability.

0      1      2      3      4

#### **Designing plan to collect appropriate data**

Correctly randomly select a sample of students from the student body.

0      1      2      3      4

Well worded survey questions approved and reviewed by the teacher and/or the assigned adult.

0      1      2      3      4

Presentation includes the wording of survey questions that pertain to the topic.

0      1      2      3      4

Presentation identifies the population of interest and who/how sampled.

0      1      2      3      4

Presentation includes description of response rate (non-response bias)

0      1      2      3      4

### **Analyzing the collected data utilizing graphical and numerical methods**

Presentation includes at least 1 bivariate graphical summary that compares 2 or more groups of quantitative data.

0      1      2      3      4

Presentation includes the appropriate statistical summaries for quantitative data graphs.

0      1      2      3      4

Presentation includes at least 1 bivariate graphical summary that compares 2 or more groups of categorical data.

0      1      2      3      4

Presentation includes appropriate statistical summaries for category data graphs.

0      1      2      3      4

Other collected data, of interest to the assigned adult, is appropriately displayed and summarized.

0      1      2      3      4

### **Interpreting the results to reflect insight on the original question**

Presentation interprets and answers the quantitative data statistical question correctly.

0      1      2      3      4

Presentation interprets and answers the categorical data statistical question correctly.

0      1      2      3      4

### **Quality of project presentation**

Both group members involved the statistical problem-solving cycle and final presentation.

0      1      2      3      4

Projected presentation is readable to the audience.

0      1      2      3      4

Overall quality of the project allows for usefulness beyond presentation for the assigned adult.

0      1      2      3      4

*Kevin W. Reese is in his 20th year as a math teacher at Clintonville High School in Clintonville, Wisconsin, and was Wisconsin's 2017 [Presidential Awards for Excellence in Mathematics and Science Teaching](#) Award Winner. He has served on the Wisconsin Standards for Mathematics review writing team and as a contributing educator to Wisconsin's [Instructional Practice Guide for Equitable Teaching and Learning in Mathematics](#).*