

**A Day in the Life of Maximiliano:  
A Tenth-Grade Student's Experience with STEM Education  
at Southside High School**

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**Author Note**

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The objective of the Opportunity Structures for Preparation and Innovation (OSPrI) research program is to examine the opportunity structures created for students in both inclusive STEM High Schools (ISHSs) and comprehensive high schools with STEM programs that engage, inspire, and prepare them for STEM fields. In contrast to highly selective STEM-focused schools that target students who are already identified as gifted and talented in STEM, ISHSs and comprehensive high schools with STEM programs do not have strict admission requirements. This inclusivity serves underrepresented minority students in STEM by providing opportunity structures that broaden sources of new STEM talent, expand workforce development, and prepare new STEM professionals.

One of the goals of the OSPrI study was to capture students' perspectives of STEM learning opportunities in both ISHSs and comprehensive high schools. In January 2015, our research team visited one such comprehensive high school, Southside High School<sup>1</sup>, a secondary school in the southwest United States. The purpose was to capture how two students, one male 10th-grader and one female 12th-grader, respectively experienced their school day. The research question was: *From the points-of-view of students underrepresented in STEM fields, what are the educational experiences and opportunity structures provided by their school?* Two researchers shadowed each student for 2 school days. We followed the students from the moment they arrived at school to when they left for home, observing them in classes and during informal activities. Two instruments guided the classroom observations: One researcher focused on the class-level activities as a whole, and a second focused on the participating student. Using semi-structured protocols, we also interviewed the students and their parents, as well as the principal, guidance counselor, advisors, and teachers. We recorded common themes in the classroom observation notes and transcribed interviews, noting the presence of the 10 critical components in Table 1 (Peters Burton, Lynch, Behrend, & Means, 2014). We also found a new set of themes that emerged from the students' points of view of the school. After each case study was written, we provided drafts to the principal and participating students to check for accuracy and approve the case. This case study of Maximiliano is the result of this site visit and interpretation of findings.

**Table 1**  
*Ten Critical Components of Inclusive STEM-Focused High Schools*

| Critical Component  | Practices Observed   |
|---|--|
| <b>1. STEM-focused curriculum</b>                             | <ul style="list-style-type: none"> <li>• Strong courses in all four STEM content areas</li> <li>• Engineering and technology offered or intentionally integrated into STEM subjects and non-STEM subjects</li> <li>• More STEM requirements than school district or state</li> </ul>   |
| <b>2. Reform instructional strategies &amp; project-based</b> | <ul style="list-style-type: none"> <li>• Active learning; project-based learning or inquiry in STEM classes</li> <li>• Incorporation of 21<sup>st</sup> Century Skills into goals and products of instructional practices</li> <li>• Performance-based assessment practices</li> </ul> |

<sup>1</sup> All of the names used in this case study are pseudonyms.

|   |   |
|---|---|
| <b>learning</b>                                     | <ul style="list-style-type: none"> <li>• Research opportunities</li> </ul>  |
| <b>3. Integrated, innovative technology use</b>     | <ul style="list-style-type: none"> <li>• Technology an explicit part of school design and implementation</li> <li>• Technology used to connect students with information systems, models, databases, teachers, mentors, and social networks</li> <li>• Technology used for student production</li> </ul>  |
| <b>4. Blended formal/informal extended learning</b> | <ul style="list-style-type: none"> <li>• STEM activities extend beyond the boundaries of a typical school day, week, or year (e.g., afterschool clubs, mentorships, internships; apprenticeships and summer programs)</li> </ul>  |
| <b>5. Real-world STEM partnerships</b>              | <ul style="list-style-type: none"> <li>• Students connected to business, industry, and the world of work via mentorships, internships, or projects applied to STEM learning</li> </ul>  |
| <b>6. Early college-level coursework</b>            | <ul style="list-style-type: none"> <li>• Flexible school schedule designed to provide opportunities for students to take classes at institutions of higher education or online; college credits accrued</li> </ul>  |
| <b>7. Well-prepared STEM teaching staff</b>         | <ul style="list-style-type: none"> <li>• Teachers are qualified and have advanced STEM content knowledge and/or practical experience in STEM careers</li> <li>• Teachers are collaborative and buy into school mission</li> </ul>   |
| <b>8. Inclusive STEM mission</b>                    | <ul style="list-style-type: none"> <li>• The overarching, inclusive, STEM-focused mission of the school manifests itself in school practices</li> <li>• Active recruiting of students from underrepresented groups</li> </ul>   |
| <b>9. Administrative structure</b>                  | <ul style="list-style-type: none"> <li>• Varies (school within a school, charter school, magnet school, etc.) and most likely affected by the school's provenance</li> <li>• Networked; able to garner community support</li> <li>• Leadership is mission-centered, nimble, innovative</li> <li>• Flattened hierarchy and shared leadership with staff</li> </ul> |
| <b>10. Supports for underrepresented students</b>   | <ul style="list-style-type: none"> <li>• Systems of advisories, tutoring, and data and communication used to create a personalized education for every student</li> <li>• Extensive college and career counseling</li> </ul>  |

*Note.* Adapted from “Inclusive STEM high school design: 10 critical components,” by E. E. Burton, T. S. Behrend, S. J. Lynch, and B. Means, 2014, *Theory into Practice*, 53, p. 1-8.

## **Maximiliano: A Day in the Life at Southside High School**

### **School Context**

Southside High School (SHS), a public secondary school (grades 9-12), is located one hour outside of a major city in the southwest United States. SHS is located in a small, rural community. The median household income is \$24,164 and 22% of families live below the poverty line. Although this community has become increasingly populated and urbanized in recent years, the town retains a traditional feel. The town currently has a population of approximately 8,000 residents and is considered part of a broader metropolitan area. This town is also the center of the lives of 924 students who attend Southside High School.

SHS opened its doors to students in 1951. The campus is made up of two buildings, one of which houses many of the Career and Technical Education (CTE) classrooms. The CTE program is well developed at SHS, and includes programs in carpentry, engineering, and culinary arts. Many students compete in SkillsUSA competitions through the CTE program. SkillsUSA is a

nationwide partnership of students, teachers, and industry, and offers a structured program of citizenship, leadership, employability, technical and professional skills training. The organization serves more than 300,000 students and instructors throughout the United States. The Air Force ROTC, school band, and varsity football programs are also successful and popular with students.

The principal had served in his current position for two years at the time of our visit. The teachers at SHS have a variety of experience levels, comprising a mixture of new and veteran. Two instructional specialists and three guidance counselors also serve on the staff.

SHS offers a number of pre-AP courses, and 85% of the students take these courses to prepare for college. The school has a partnership with the King Community College, located 30 minutes from SHS. According to the school website,

SHS has increased our college credit course offerings. Students now have the ability to leave SHS with up to 33 college credit hours. This is an increase from 24 credit hours that was offered last year. We will continue to build a strong working relationship with King College with plans to increase our college credit offerings even more in coming years.”

The students who attend SHS make up a diverse group characterized by a high percentage of economically disadvantaged and English-language learning students. As a neighborhood school, students who attend SHS are representative of the community as seen in Table 1.

**Table 1.**

*Demographic Information of SHS and Southside ISD (2012-2013)*

|                            | SHS   | Southside ISD | State |
|----------------------------|-------|---------------|-------|
| African American           | 10.9% | 11.0%         | 12.7% |
| Hispanic                   | 42.6% | 44.6%         | 51.8% |
| White                      | 44.4% | 41.5%         | 29.4% |
| Economically Disadvantaged | 67.7% | 77.1%         | 60.2% |
| English Language Learner   | 11.0% | 21.9%         | 17.5% |
| 5-year graduation rate     | 91.1% | 87.6%         | 90.4% |
| Tested SAT/ACT             | 41.7% | 36.9%         | 63.8% |

### Meeting Maximiliano

Maximiliano<sup>2</sup> reported that he started this school day as he does every day, waking up at 6:00am and eating oatmeal with pieces of cut-up banana. Afterwards he got ready for school and watched a little television before getting in the car with his mom and commuting about five minutes to school. Maximiliano arrived to school wearing a black Adidas t-shirt with dark blue jeans and Adidas tennis shoes. About half of the Southside High School students were in short sleeves, the other half were in hoodies and long sleeve shirts. Maximiliano had black hair, cut short on the sides, and styled longer on top. He stood about 5’ 9” and had an athletic build.

Maximiliano is a first-generation Mexican-American. He has an older brother that is twenty years old and works as an assistant manager at a variety store chain across the street from Southside High School. Maximiliano was born in a major city in the southeast, but has lived in

<sup>2</sup> All of the names used in this case study are pseudonyms.

Southside for the last 15 years. Now he is in 10<sup>th</sup> grade at Southside High School. Maximiliano's parents described him as "a reserved boy who was very focused on what is important to him." His mother added that,

If he is doing something, he doesn't like to be interrupted. If he is concentrating, he doesn't like it if you speak to him or ask him anything if it's not important. He also doesn't like to give explanations for what he wants or does. If you ask him, he'll tell you he knows what he's doing; that he's old enough. From the time he was a child he was like that. He's very focused.<sup>3</sup>

The parents' description of Maximiliano is similar to his teachers' remarks that he likes to work independently and wrestle with ideas on his own. The principal described him as "an extremely honest young man" and a "great role model" who will "be really successful after high school." Maximiliano gets good grades in his sophomore courses, mostly As and Bs.

Maximiliano loves soccer. His teachers, friends, and parents all emphasized Maximiliano's dedication to soccer at SHS. In his freshman year, Maximiliano started a soccer club with his fellow classmates at Southside High School. The Spanish teacher at the school had volunteered to coach this sport on his own time, and the entire soccer team is waiting in anticipation to see if the club sport will be elevated to a University Interscholastic League (UIL) sport. Maximiliano trains daily for soccer. When school gets out at 2:50pm, Maximiliano goes to powerlifting where he is given a workout to complete, and he powerlifts for 30 minutes before soccer practice starts at 3:30pm. Soccer practice then begins at 3:30pm and continues until 5:30pm. Afterwards, Maximiliano walks across the street to a private gym and works out for one hour. He doesn't get home until 6:30pm, at which time he does any homework that he has while eating dinner.

Maximiliano wants to "live life happily," which he explained as playing soccer:

I don't want to be a scientist, a doctor, a lawyer. I thought about it. You always got to think about what will make you happy in life and what you are going to do throughout your whole life. And that is what I like doing, playing soccer. Eventually what I want to do is live life happily."

Currently he has no plans to attend college, unless he is given a soccer scholarship that would allow him to pursue this goal. He would like to play soccer professionally. Or he might join the Marines. He has a friend in the Marines now and a cousin in the Army. He believes that for financial reasons, this could be a good alternative decision if professional soccer doesn't work out.

We observed Maximiliano for two days, following him from class to class. In class, Maximiliano was quiet and attentive. He would generally work on the task assigned by the teacher and would maintain focus through the end of an activity. After completing an activity, or during down-time, Maximiliano would work on homework or rest. He explained that due to his extracurricular activities, he doesn't always have enough time for homework in the evening and that when he doesn't finish it, "I do it here at school before I get to that class." On the first day we observed

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<sup>3</sup> The interview with Maximiliano's mother was conducted in Spanish. The quotes used in this narrative were translated from Spanish to English on June 15, 2015

Maximiliano finishing Algebra II homework before class and on the second day Maximiliano worked on an essay for his English class.

Although Maximiliano was very quiet, he had many friends in school. These friends included boys and girls from a mix of racial and ethnic backgrounds, primarily Hispanic. In each class, he had at least one friend to sit with. Maximiliano reported that his school was “very diverse” and that it did have cliques consisting of “popular kids,” “emos,” “gothics,” “Hispanics,” “Blacks,” and “country”. While these groups mostly kept to themselves, “individual people might talk with other people.”

### **How Maximiliano Came to Southside High School**

Maximiliano’s mother explained that he and his older brother were both enrolled in primary school in Southside after they moved from the major city in the southeast. In Southside a student’s school is determined by their residential address, so they both continued to attend schools in the Southside School District since Maximiliano was in kindergarten. As they both worked their way through primary and secondary school in the Southside school district, both Maximiliano and his older brother attended Southside High School because it was the only option for high school available for their family. Maximiliano’s mom was happy with the education his older brother received, and has been pleased with the progress that Maximiliano is making as well. She remarked, “This is a school that has something for everyone.”

### **Maximiliano’s Day at Southside High School**

#### **Period 1, Culinary Arts Class: Learning Cooking Methods**

Maximiliano’s first class was Culinary Arts. The class took place in a large, industrial style kitchen, where seventeen students sat on stools at tall tables facing a television screen hung high on a wall. Large industrial sinks lined one wall of the culinary classroom. A refrigerator, freezer and dishwasher lined another wall. There were five complete kitchens set up in the large classroom, two large racks that held well organized and labeled materials, a large pantry and an equipment closet. There were partially frosted cakes on the counters.

Students attentively watched a YouTube cooking methods video. The methods video consisted of two to five minute segments that covered the culinary topics of deep-frying, pan frying, roasting, poaching, and steaming. Maximiliano had put his elbows on the table and rested his head against his hand while watching the video. The teacher stopped the video between each cooking method and students would take notes, writing down the facts they learned while watching the video segment. Students chatted quietly together, both during the video and between segments, but Maximiliano sat quietly and did not interact with the other students. At the end of the video, Maximiliano had written down two facts for each cooking technique, which amounted to a half-page of handwritten notes. The teacher then dismissed students from the kitchen to the classroom where they waited for the bell. In the classroom, students chatted in both English and Spanish, but Maximiliano sat at his desk quietly and pulled out his cell phone to text. After sending his texts, he opened up an Algebra book and began to work on his Algebra II homework from a previous day. The teacher closed class by asking students which cooking

technique they should work on first in the kitchen. Students either raised their hands or shouted out responses, but Maximiliano did not participate in this conversation and instead continued to work quietly on his math problems until the bell rang.

In this class 80% of the time was spent on task. 90 % of the class time was teacher centered, with the teacher directing classroom attention to the media, and 10% of the class time was small group centered, with students comparing and sharing notes from the video.

The second day of Culinary Arts took place in the classroom, rather than in the kitchen. Eighteen students sat at tables that were organized in rows, reviewing definitions of cooking methods and techniques in preparation for the today's test. Maximiliano took out a review sheet of cooking terms that included a grid of the cooking techniques, their definitions, and the kinds of foods one would prepare using each method. His review sheet was partially complete, only containing the definitions for each cooking method, and lacking the food examples. After ten minutes, the teacher collected the review sheets and distributed the test comprised of matching, multiple choice, short answer and bonus questions. Maximiliano began to work and diligently looked over each question before turning the test in to the teacher. It took Maximiliano 21 minutes to complete the test and he was one of the last students to finish. As students finished they were allowed to engage in quiet activity for the rest of class. Some students worked on a culinary competition cake-decorating project, others sat quietly reading, a few students used their phones, and other students completed homework or were resting. When Maximiliano finished, he chose to rest his head on the desk and he napped until the end of class.

In this class 100% of the time was spent on task, 100% of the time was spent on individual seatwork.

Maximiliano's Culinary Arts teacher described him as "an extremely caring person" who "keeps to himself, does his work, but is also very friendly." She described his relationship with another student in class,

We have a student in his class period that is autistic and isn't very apt to being sociable with his peers. But Maximiliano always takes him underneath his wing, and he helps him out, and they do stuff together. And usually you can pick out the kids in the class that would be the type of person that would take him under their wing and I was just blown away when Maximiliano, on his own, stepped up and did it. I was very proud of him for doing that.

## **Period 2, World History: The New World and Ancient Civilizations**

Maximiliano arrived late to his World History class. After his Culinary Arts class, Maximiliano took a detour to meet with some friends and catch up. They chatted for a few minutes, but their conversation was cut short by the bell, which prompted them to begin walking to class. On their way to class, Maximiliano passed by the 9<sup>th</sup> grade principal who reminded him "to get to class". The World History teacher was still standing at the door when he arrived and greeted him. Maximiliano immediately took his seat near the far wall of the classroom.

Students were seated in rows in individual desks facing a projector screen and PowerPoint presentation labeled “Slavery in Africa.” While the students were sitting down and copying down the notes from the PowerPoint, the teacher took attendance. During this time, Maximiliano took out his Algebra II book and began working on more math problems. While Maximiliano continued to work on his Algebra II problems, the teacher started class. He asked the class, “What do you think about when someone says slavery?” One of the students yelled out, “hypocrite!” This comment prompted a discussion on the definition of hypocrite and how it related to slavery. Maximiliano alternated between paying attention to history and working on his math homework. The lecture on slavery could be characterized as a back-and-forth exchange between the teacher and the rest of the class, focusing on the triangle trade route and Atlantic Middle Passage. The teacher would introduce topics, and students would respond by asking questions or providing commentary.

After the teacher finished his lecture on slavery, he continued onto the next class topic, which covered the ancient American civilizations of the Aztecs, Incas, and Mayans. This lecture was also interactive, with both the students and the teacher participating in a back-and-forth dialog. During this conversation, Maximiliano closed his math textbook and listened intently, sometimes taking a few notes from the slides. One PowerPoint slide covered the Mesoamerican ballgame, a sport with ritual associations played by the Mayans and Aztecs civilizations. This sport-related topic piqued Maximiliano’s interest, and he asked, “Didn’t the losers get sacrificed too?” The teacher responded, “Well, we will get back to that” and eventually answered Maximiliano’s question when he talked about Aztec human sacrifices. The teacher continued to lecture until the end of the class period. He reminded students that the next class would be a test day where students would take a district-mandated diagnostic test of their current progress in World History.

In this class 87.5% of time was spent on task. 87.5% was primarily teacher centered, 12.5% was small group centered and 0% was spent on individual seatwork.

On the second day, students took their World History diagnostic assessment for the majority of the class period. After Maximiliano completed his diagnostic assessment he left for the restroom. The teacher began lecturing while he was out of the room, discussing colonial society and culture and the differences between the words peninsulares, creoles, mestizos, and mulattos while students listened attentively. The teacher lectured until the bell rang.

In this class 100% of the time was spent on task, 50 % was teacher centered, and 50% of the time was spent on individual seatwork.

### **Period 3, Pre-AP Algebra II: Review and Test**

After World History, Maximiliano continued to his Pre-AP Algebra II class that was directly across the hall. He took a seat near the back of the classroom and immediately began working on a warm-up problem that was projected onto the board. The students were asked to find the slope of the values by using a table of values: “The table shows a relationship between X and Y. Which question best represents the values in the table?” Maximiliano started the warm-up by first taking out his Algebra II textbook and a graphing calculator from a wall hanging that had

multiple pockets for TI-84 Plus calculators provided by the school. As students completed the warm-up the teacher asked, “What happens tomorrow?” The students responded, “Test!” The teacher nodded and told the students that today they would work on review problems in their textbook to prepare for the upcoming test. He informed the students that they could work together, but cautioned “if it becomes a chat-fest” they would be required to work independently. Some of the students turned to each other and began working together, but Maximiliano decided to work by himself. The teacher approached Maximiliano and asked if he wanted to work with anyone, but Maximiliano politely refused and said that he would prefer to work independently.

During the class, the teacher commented to the researcher, loud enough for Maximiliano to hear, “Maximiliano is really smart and likes to work by himself.” In a later interview, the teacher explained,

Maximiliano is doing very well. I worry about him a little, though, because he works well with others but he doesn’t work with others. He likes to be by himself. He likes to kind of do it on his own. [He is a] very bright young man.

Maximiliano worked on a Chapter 6 review in his Algebra book focused on Polynomials. The review was divided into three sections: vocabulary, examples, and practice. Approximately 50% of the class worked independently and the rest of the class worked in groups of two or three students. The teacher walked around the class and helped students as they raised their hands. Maximiliano worked quietly through the problems, sometimes flipping to previous parts of the book to look at examples and problems.

In this class 100% of the time was spent on task, 8% was teacher centered and 92% of the time was spent on individual seatwork.

On the second day, Maximiliano took the Algebra II test for the entire duration of the class period.

#### **Period 4, English: Writing a Fictional Story**

The English teacher greeted her students warmly as they entered the classroom. Sixteen students were present, sitting in groups of four throughout the classroom. As students entered the classroom, the teacher reminded them to put away their cell phones and headphones. Maximiliano arrived to class on time with a girl; they sat down together at two desks near the door. After the bell rang and students were settled, the teacher started class by re-assigning seats for the peer revision of their fictional stories that students would be doing later in class.

Before starting, students first reviewed the steps in the peer review process on an overhead projector: “1. Read first, 2. Answer revising questions 3. Give examples to improve.” The teacher asked students to give her a thumbs-up if they understood, and three students responded with a thumbs-up. As the teacher was preparing students for the peer revision task, it quickly became apparent that only a few students had completed their rough drafts that were assigned for homework. This included Maximiliano who had only written one paragraph of his rough draft. Therefore, although the peer revision workshop was planned for today, this task would not be

possible for the majority of the students in the class. So Maximiliano, along with the majority of the class, spent the rest of the class time working on their rough drafts. Maximiliano's fictional story centered on his friends and family, and was about their close experience with death. He wrote his story with a pencil and took frequent breaks to talk with his friends at his table and to go to the restroom. Students worked independently but chatted quietly as they completed their rough drafts, and for a few students, their peer review. The teacher moved throughout the classroom to assist students and reprimanded students who had not completed drafts, reminding them that final drafts and peer review would be due the following day.

In this class 91% of the time was spent on task, 64 % was teacher centered, 9% was small group centered, and 27% of the time was spent on individual seatwork.

On the second day, English class took place in the library and Maximiliano arrived two minutes late. The class was seated on one side of the library at a laptop station. Maximiliano sat in an empty seat at the end of one of the long rows of laptop stations and logged-in. As the class waited for the librarian to start class, the teacher asked students that had not yet finished their final drafts for their essays to raise their hand. Maximiliano raised his hand, along with most of the class, indicating that his story was not finished. The teacher said that after the librarian's presentation, students who had not finished their final drafts would work on their drafts in-class while those who finished would be able to browse the library and read.

The librarian began to talk about how students can now get e-books for free from their library for two weeks and that one of the purposes of today's library visit was to learn how to check-out an e-book from their school library. She asked students to log-on to the school district website where she showed them how to check-out an e-book using their student ID. Maximiliano followed the librarian's instructions, and when he reached district's e-book library main screen, several pictures of the most popular books read by teenagers populated the main page on his laptop. The librarian then showed the students how to check-out, hold, and reserve e-books using this website. After this presentation, students were free to work on their final drafts of their fictional stories or to check-out books from the library. Maximiliano took out his fictional story and pencil to get to work. For the rest of class, he sat by himself at the same bench and continued to work on his fictional story. He wrote a few sentences at a time, frequently taking breaks to rest his head on his desk. Occasionally he would talk to two other classmates. Maximiliano wrote a total of three paragraphs for his fictional story during class before heading to lunch which occurred during Period 5.

In this class 100% of the time was spent on task, 18 % was teacher centered and 82% of the time was spent on individual seatwork.

### **Period 6, Art: Identity and the Environment**

Maximiliano's art class occurred after his Period 5 lunch break. Today, there was a substitute teacher and the class resembled a study hall where students were free to complete homework or artwork, and use their phones to listen to music or text. During roll call the substitute teacher called Maximiliano's name, but he had not yet arrived to class. He entered the room four minutes later and put his backpack down near a chair at the front of the classroom and walked over to the

substitute teacher to say, “Maximiliano is here”. He then collected his art from a pile of student work lining the wall of the classroom. Students were asked to create a piece of artwork that represented one of the five unit themes: “identity”, “big world problems”, “community”, “environment”, and “abstract/non-objective art”. Maximiliano had chosen the “identity” theme and used his pencil to create a sketch of a dumbbell he used when he powerlifts.

Maximiliano sat with two other students. Another boy at his table had also chosen the “identity” theme and he was drawing a paper/pencil sketch of a cross. There was also a girl at his table, but she was unable to work on her project because it involved oils and pastels, materials she could not access with the teacher absent. Maximiliano worked on his project on and off for the duration of the period, often chatting with the boy sitting next to him and playing on his iPhone. Near the end of the class period he decided to take a nap and fell asleep for 15 minutes, resting his head on his arm on top of the table. At the conclusion of class, he got up and put his artwork away.

Students were on task, doing what they were asked to do, but few were working on art. In this class 100% of the time was spent on task according to the teacher’s direction and 100% of the time was spent on individual seatwork.

On the second day of Art, students continued to work on projects related to one of the five unit themes. Maximiliano arrived late to class again, but this time only a minute late. At the start of class, the teacher instructed students to take out their artwork from the previous day. Students moved about the room to collect their artwork and necessary supplies. The teacher aided individual students in gathering materials. Students used different mediums to complete their projects: papier-mâché, pastels, paint, watercolor, and colored pencils.

Today, Maximiliano turned in his completed “identity” themed project, which he finished yesterday. He began planning his next project. He was able to choose from one of the four remaining themes: “big world problems”, “community”, “environment”, and “abstract/non-objective” art. He selected the “environment” theme. The teacher gave Maximiliano a planning sheet to help him identify the materials he would need before beginning his next art project. This planning sheet required him to complete five thumbnail sketch designs before he would be allowed to begin his project. Maximiliano frequently flagged the teacher down and asked, “Is this right?” as he filled out the planning sheet. His “environment-themed” thumbnail sketches were different illustrations of trees and grass. He continued to work on these thumbnail sketches for the rest of class.

Students spoke in English and Spanish while they worked and helped each other to understand the steps of the project and brainstorm. As Maximiliano worked, a student asked him if he passed his math test. He answered, “Um, maybe” and another student said, “Of course he did, he makes all A’s. I probably made a 60.” Maximiliano responded, “Uh yeah probably me too.” The teacher demonstrated how to papier-mâché for two students and quickly the group of interested students swelled to eight. Throughout the class the teacher conferred with individual students to think about how they might depict one of the themes as they worked on individual projects. At the end of the class period students cleaned up their materials and prepared for dismissal.

In this class 100% of the time was spent on task and 100% of the time was spent on individual seatwork.

### **Period 7, Chemistry: Nomenclature of Acids**

Maximiliano arrived a few minutes late to this class. In this class, students sat at individual desks facing a white board with a periodic table above it. The teacher took roll and told the students that “if you complete the worksheet today, you will be able to do the experiment tomorrow”. After roll, she asked the students to copy down the notes on the board titled “Nomenclature of Acids”. The goals for the class were listed on the board: “We will: know the names and formulas of acids, I will: write the names and formulas of acids.”

Maximiliano took out a piece of paper and talked to a girl seated in front of him while he copied down the notes. The teacher lectured on acids, bases, and salts, often writing on the board and providing examples while students took notes. The teacher repeatedly asked the class to name acids based on their compounds and students answered out loud. Maximiliano seemed to be engaged, but did not contribute any answers. Most questions were answered by one boy near the front of the class who often shouted out, “I know I know, Call on me!”

After the lecture, the teacher asked the class, “Are you ready for a worksheet?” and gave a stack of worksheets to a student to distribute to the class. Maximiliano took out a reference sheet from his binder titled, “STAAR Chemistry References Material Worksheet” that had formulas for polyatomic ions. Maximiliano used the sheet to help identify the name of the polyatomic ions so that he could correctly name the acids. While students worked on the worksheet, the teacher went around the room to check on the progress of all the students. When she walked by Maximiliano’s desk, he stopped her for help on one of the worksheet questions that required him to write out the name of the acid  $\text{H}_2\text{SO}_3$ . The teacher told him, “This is sulfite.” Maximiliano replied, “So sulfur...” The teacher answered, “Sulfurous, it ends with an -ate, so it is” Maximiliano responds, “Sulfurous!” He continued to work and would occasionally ask questions of the girl seated in front of him. When the teacher came around a second time, he asked the teacher for help on a different problem that required him to write the chemical formula for phosphoric acid. Maximiliano was struggling to write the formula because he wasn’t sure if there was a “hydro” in the nomenclature. The teacher talked him through it and told him that if there was a “hydro” in the nomenclature, then there would be no O (oxygen) in the chemical formula.

All the students in the class completed and turned in their worksheets, so the teacher turned on the projector to present expectations for the next day’s lab. Maximiliano paid attention while the teacher explained how they would complete the lab. The bell rang and the students packed up and headed to their last class of the day.

In this class 90% of time was spent on task. 30% was primarily teacher centered, 40% was small group centered and 30% was spent on individual seatwork.

On the second day of Chemistry, students sat at their desks while the teacher took roll and distributed a laminated lab sheet titled “Chemical Names and Formula Experiment”. This laminated paper was a giant grid with chemical names across the top and along the side. The teacher said they were playing the roles of “matchmakers” today. In the lab, students would be required to use an eyedropper to place drops of each chemical in each box on the grid and blow

the chemicals together using a straw. The objectives of this lab required students to write the chemical formula of the starting chemicals, allow the chemicals to react using straws, and write the names and chemical formulas of the products.

After going over these instructions, students walked to the science lab that was located on the other end of the building. This walk took several minutes and as soon as the students entered the lab, they automatically put on safety aprons and goggles. Students grouped themselves into pairs at lab stations around the room, and then acquired the materials to conduct the lab activity. Maximiliano chose to work with the boy who sat behind him in class. He and his lab partner began putting the chemicals on their laminated grid right away. They worked their way through each chemical combination on the grid. They would first select the correct chemical, place drops of each chemical on their laminated lab sheet, and blow the chemicals together using their straws. After they combined the chemicals, they would write down the color of the product, and took note of whether it formed a precipitate. Maximiliano and his partner worked steadily, but sometimes played around, blowing the chemicals across the paper with their straws.

The majority of students were actively engaged in the lab. However, some students in the class chose not to participate, and instead elected to use data from other groups and observe the experiment from afar. Maximiliano's group finished a bit early. So while waiting for the other groups to finish, Maximiliano and his partner blew all of their chemical pairings together into one giant blob in the middle of their laminated lab sheet using their straws. A couple of the other students came over to watch them combine their chemicals, encouraging them and shouting as the chemical blob turned into a giant black puddle of chemicals. Hearing the commotion, the teacher came over and commented, "[Did you] Have fun? Now clean off your lab sheet." Maximiliano smiled and then walked over to get a paper towel to clean off his laminated lab sheet. In a prior interview, the teacher reported that Maximiliano is really enthusiastic about experiments and that he loves the "hands-on" work. At the conclusion of the experiment, the students picked up their belongings and headed back to the classroom, where the bell rang shortly thereafter.

In this class 100% of time was spent on task. 22% was primarily teacher centered, giving directions for the lab. 88% was small group centered, as students conducted their lab activity.

### **Period 8, Principles of Architecture and Construction: Building a Table**

After Chemistry, Maximiliano walked to his Principles of Architecture and Construction class. To get there he had to exit the main school building and walk outside to an auxiliary building that is used for many of the Career and Technical Education classes offered at CHS. At the beginning of the class, students met in a classroom attached to a large warehouse workshop and the teacher took attendance. Students were then dismissed to the workshop where they all put on safety goggles and began to work on their projects. The students seemed well versed in the safety and use of each tool. The teacher explained that he spends August to October going over the safety and use of all the tools and that he has never had one incident in his entire teaching career. The workshop was a large warehouse with professional tools and many student projects evident and in progress. Throughout the class period students moved about the workshop with a sense of purpose and were engaged in independent projects; some for class, others for an upcoming

SkillsUSA competition that required students to build an item and put together a notebook explaining the design and construction of their project. Maximiliano was not participating in this competition, but two other students in the class of fifteen students were preparing to submit projects. Students worked independently to complete their projects, but students routinely helped one another when one of them needed assistance.

Maximiliano spent his time building a small table. At times he walked over to other groups of students to borrow equipment, which included a staple gun and tape measure. At other times he walked over to the teacher's office to grab tools out of a tool chest. Maximiliano was very proficient with the tools, and he knew what he needed to do for his project. However, at one point he did require some direction from his teacher. Maximiliano was not sure how to put the legs onto his small table. The teacher indicated that the lip underneath the table was not large enough, so he brought Maximiliano over to a dining room table that another student was making and showed him how this student had attached the legs underneath the table. He showed Maximiliano how the legs of his table would provide added stability if his table had a larger lip around the bottom edges of his table. He then showed Maximiliano how and where to put the nails to attach the table legs so that the nails would be hidden from view. The teacher commented, "Maximiliano is a pretty extraordinary kid. He's smarter than he wants you to think." Throughout the class, the teacher acted as a supervisor and students approached him about using particular tools or next steps. With ten minutes to go, the teacher told students to stop working and students put all materials away. The students did this and also swept up the workshop without any further direction.

In this class 100% of the time was spent on task and 100% of the time was spent on individual project work. We were unable to observe the second day of this class because Maximiliano had an early dismissal for an away soccer game.

### **Conclusions and Implications**

After seeing Southside High School through the eyes of Maximiliano, his school and his school experience could be described in several ways. Preparing students for academics after high school was certainly a priority, but other aspects of Southside High School included its focus on their students and helping them to find their way in the world. Southside High School offered students a large menu of courses and many extra-curricular activities that served as avenues for trying out and exploring different pathways in hopes that students would find their place at SHS and in life more generally.

School staff and administrators expect all students at Southside High School to graduate high school, and expect that many will attend college. Although Maximiliano may be successfully preparing for college, during the visit, he expressed that he did not plan to attend. He explained that most of his teachers have prepared him for "college and graduating high school," but noted that his perception was that most of his teachers only really expected him to "graduate [high school]."

### **What did Maximiliano Learn?**

Five of Maximiliano's seven classes that were observed at SHS were taught via direct instruction. In these classes, time was split between lecture and an independent practice segment, typically a worksheet or laboratory experience, with support from their teacher. For example, in Maximiliano's Chemistry course, he learned the nomenclature of acids via a lecture and this was followed by independent practice segment where he worked through these skills independently with a worksheet, guided with teacher support. The next day, this content was further reinforced through a structured laboratory exercise in the school's science lab. Similarly in his Algebra II class, Maximiliano learned content by following the teacher's examples on the board and then worked through similar review problems in his textbook independently.

Two of his classes (Art and Principles of Architecture and Construction) provided Maximiliano opportunities to be creative and investigate his own interests. For example in his art class he was able to design his own art projects that aligned to broad unit themes. In this project he was required to plan out the materials he would need to complete the project in advance by creating a plan of action how he would master the different artistic skills required for the unit. In another class titled principles of architecture and construction, Maximiliano experienced the content through an especially project-oriented class that was entirely hand-on learning. In this class Maximiliano independently constructed an end table, working to measure and construct his own design. What was notable about both of these experiences was that both of these classes stressed independent projects where Maximiliano was able to test out and explore his own ideas. These projects seemed compelling to Maximiliano and he was especially engaged and focused completing these tasks.

Overall the mixture of different instructional practices: direct instruction, individual practice, and individual exploration through class projects challenged Maximiliano in various ways. The breadth of course offerings and extra-curricular activities also prompted Maximiliano to learn the knowledge necessary for a successful life after high school while also giving him the opportunities to try out different pathways that allowed for self-actualization and finding his passions.

### **What was School like for Maximiliano?**

Maximiliano was quiet and did not attract attention. He mainly kept his thoughts to himself, often answering teachers and his fellow students with short, brusque answers to questions. He appeared relaxed at school and also among his friends. He seemed to have a positive self-image and was confident; adding that girls would probably consider him "cute." Maximiliano self-identified as a sporty guy who was "big [physique-wise], strong, and pretty funny". He explained that the school did have cliques and that, "people normally stay within their own groups," but sometimes "individuals from one group talk to individuals in other groups."

Southside High School offered a variety of different extra-curricular activities, including sports such as soccer and powerlifting. Maximiliano found his niche at school playing sports, and invested several hours a day developing his soccer talents and athletic build. SHS offered Maximiliano the avenues to build his community and identity around playing soccer.

Maximiliano described his positive relationship with a Spanish teacher and advisor who helped him to organize a club soccer team and who acted as his coach. In an interview, Maximiliano enthusiastically discussed his hopes for official status of his soccer team and for school funding of the sport. For Maximiliano, his life at SHS revolved around soccer, and his school provided him the opportunities and structure to explore and fulfill this interest.

### **Where will Maximiliano's experience at Southside High School take him?**

At SHS there was a clear expectation that students should have a plan beyond high school and the school provided many avenues for students to try out different fields and explore different career interests. The school has facilitated this avenue through opportunities for Maximiliano to play soccer at the school and connecting him with a nearby community college during the school's "College Day" that also had a soccer team. However, the notion of attending college after high school was not an idea that resonated with Maximiliano. He stated that the only condition under which he would attend college would be if he were offered a soccer scholarship. He lived by his motto of "living life happily" and acknowledged that it was possible that professional soccer may not work out, in which case, he would join the Marines to earn a living.

While Southside High School had the necessary supports in-place for students who wanted to attend college, it seemed that the responsibility was placed on students to seek out and access these supports and opportunities. From the eyes of Maximiliano, college was certainly an option, but was not perceived as an expectation. The school administration explained during an interview that they had plans to address some of these issues. The principal stated that he wants his students prepared to "go on to do bigger and better things" and has worked to increase the level of rigor in the school along with supports for students and families. For the 2015-2016 school year, the principal plans to increase the student enrollment in pre-AP, AP, and dual enrollment courses by increasing the King Community College dual credit offerings and increasing the number of teachers certified with pre-AP training through College Board. The principal also stated that he sees career technical education as an area where the school is already well-situated and one possible avenue for students "to be ready for society."

### References

Peters-Burton, E. E., Lynch, S. J., Behrend, T. S., & Means, B. B. (2014). [Inclusive STEM high school design: 10 critical components](#). *Theory Into Practice*, 53(1), 64-71.