

September 2024

## Two Roads: A Case Study Comparing Project-Based Learning to Traditional Program with Student Choice

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### Recommended Citation

Warsen, Gregory D. and Vandermolten, Rick (2024) "Two Roads: A Case Study Comparing Project-Based Learning to Traditional Program with Student Choice," *School Leadership Review*. Vol. 19: Iss. 1, Article 3. Available at: <https://scholarworks.sfasu.edu/slr/vol19/iss1/3>

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## **Two Roads: A Case Study Comparing Project-Based Learning to a Traditional Program with Student Choice**

Project-based learning is an established educational movement, first mentioned in the literature in the early 2000s (Sorrels et al., 2004; see also Drinka et al., 2006). Since then, many contemporary researchers have touted its benefits (Sever, 2022; see also Makkonen et al., 2021). Entire secondary schools have transitioned completely to project-based approaches or have allowed individual content areas to do so. Missing, however, from the research literature is a comparison in student engagement and task perseverance between a traditional program and a project-based program. This case study examines a midwestern high school that offered its students a choice in their freshman year: a project-based model of learning or the traditional program.

Most educators understand the value of engagement in learning. Learning can happen with low engagement, but the chances of retaining that learning for any period of time can be low, especially if not used on a regular basis. This study sought to better understand how GRIT scores and engagement look in a side-by-side comparison. GRIT refers to how researcher and author Angela Duckworth (2016) conceptualized a person's ability to stay with or persevere through a challenging or complex task (see also Appendix D) such as learning something new. For engagement, we are depending on Schlecty's (2011) model below (see Appendix C). Our specific research questions are as follows:

1. How do GRIT scores change over time for students in both the project-based learning program and the traditional comprehensive program?
2. How do engagement levels compare between project-based learning and traditional programs?
3. How do students in each program describe their learning experience?
4. What impact does student choice have on student perceptions of each program?

### **Literature Review**

#### **Changing World of Work**

Since the inception of the internet, the world of work has significantly changed. In this new world, collaboration and teamwork are the expectation (Boss, 2018), and many organizations now rely heavily on groups of people to make a team work. Effective collaboration is critical in an environment where organizations face challenges such as emerging and fast-changing technology, sustainability, and hybrid work settings (Gardner & Matviak, 2022). Considering the transformation organizations and businesses must do to stay competitive in the market, it is no wonder that employees with skills such as collaboration, teamwork, communication, critical thinking, and self-management are highly sought after (Boss & Larmer, 2018).

#### **Project-based Learning**

Given this demand, educators have embraced project-based learning (PBL) because it emphasizes skills over content. Considered a constructivist method, PBL, at its best, motivates and engages students because it is a student-centered approach (Wurdinger, 2016). Teacher-directed learning has been shown to demotivate students and exacerbate a passive learning

approach (Wurdinger, 2016). The PBL classroom encourages student-directed learning through projects and even failure as an option for learning (Wurdinger, 2016).

Current research focused on the classroom environment, how that environment affects engagement (Shernoff, 2013), and how that engagement impacts academic performance (Lopez et al., 2023). Students who experience PBL gain the dispositions, skills, and “empowerment to tackle life's challenges” in this new work world (Boss & Larmer, 2018, p. 1).

### 21st Century Skills

In 1990, the Secretary’s Commission on Achieving Necessary Skills indicated that “people work best in the context of application” (SCANS Report, 1990, p. 2). SCANS identified personal qualities and thinking skills critical for the workforce at the time (see Table 1.1).

**Table 1.1**

#### *20th Century Skills*

<b>Thinking Skills</b>	<b>Personal Qualities</b>
Creative thinking	Responsibility
Decision-making	Self-esteem
Problem solving	Sociability
Seeing things in the mind's eye	Self-management
Knowing how to learn	Integrity/honesty
Reasoning	

More recently, Wagner conducted research and asked business owners what employees would need to flourish in the 21st century workforce. Wagner concluded that employees should possess seven survival skills upon entering the workforce (Wagner, 2008): problem-solving, collaboration, agility, oral and written communication, initiative, assessing information, and curiosity (Wurdinger, 2016).

Digitization in the 21st century has also dramatically impacted information and communication technology (Suyantiningsih et al., 2023). Many recent studies have found that technology use and integration have motivated student learning (Suyantiningsih et al., 2023). The use and integration of technology in teaching illustrate the shift in classroom teaching and learning exchange. Effective educators recognize the need to incorporate learning models that leverage technology to enhance student motivation and learning (Suyantiningsih et al., 2023).

A study conducted on 103 university students in Indonesia found that students exposed to PBL and PBL integrated with Digital Mind Mapping showed more growth in critical thinking than their traditional counterparts (Hidayati et al., 2022).

Live PBL, in which students get to work with real-world clients or implement their creations, equips them with technical skills and meta-skills such as creativity, collaboration, critical thinking, and communication (Rohm et al., 2021). Rohm et al. found that PBL had a

“central role” in developing meta and technical skills to prepare students for the workforce (Rohm et al., 2021, p. 205) and claimed that educators should attempt to identify technical skills that would best prepare students for post-secondary education or the workforce. Rohm et al. also highlighted the role of meta-skills in this study. They identified the “4 C’s” (critical thinking, collaboration, creativity, and communication) by stating that they will help students become “robot-proof, future-proof, and real-world ready” (Rohm et al., 2021, p. 206).

### **PBL and Traditional Program Learning and Engagement**

Student learning is the most essential function a school can offer its students. The theory of the instructional core indicates several important outcomes for student learning to occur (Elmore, 2008). First, in order for students to be active learners, their role in the classroom, as intended by their teacher(s), must be student-centered (Meyer-Looze, 2015). Student-centered simply means that the teacher is planning and designing learning experiences and that students take a self-directed role in the learning and may feel more empowered and motivated to learn. Second, teachers must be diligent and selective in the tasks they choose for students to complete. Elmore indicates that task predicts the performance capability of students (Elmore, 2008). What students know in a classroom and can do (independently or collaboratively) is predicted by the tasks they are asked to do. One can observe students dutifully completing tasks they think the teacher is asking students to do but may not know why they should complete the task or be motivated to do so (Elmore, 2008). The PBL instructional model moves instruction from teacher-centered to student-centered. Teachers design learning experiences that are relevant and connected to the real world. Newman and Wehlage described these learning experiences as the “five standards of authentic instruction”: higher-order thinking, substantive knowledge, depth of knowledge, connection to the world, and social support for student learning (Newmann & Wehlage, 1993, p. #). PBL embraces these aspects of authentic instruction, putting students in positions of empowerment and self-directed learning.

In contrast, traditional learning can be described or observed as highly controlled and directed by the teacher. Students complete the assignments and activities but may not understand why or how the assignment connects to previous learning or learning activities to be completed in the future. The students may have a passive role in their learning and fail to develop the critical reasoning skills needed in post-secondary or workforce settings (Luke et al., 2021). The comparison and side-by-side contrast between PBL and traditional learning research and studies is relatively scarce. Most literature comparing the two teaching-learning models comes from the higher education setting, and this is a small amount. Even then, the literature is more heavily emphasizing the benefits of PBL and Blended Project-based Learning (BPBL). One recent study in a higher education setting did look at a comparison between the two learning models. Dental school instructors were concerned students could not apply learned oral radiology concepts in situations competently (Luke et al., 2021). As a result, the researchers conducted a meta-analysis according to Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA). The results of this analysis indicated that PBL significantly affected dental students versus the traditional learning (TL) approach to improve radiographic interpretation skills and knowledge (Luke et al., 2021). Luke et al. concluded that “PBL fostered activation of prior learning, high motivation to learn, and the development of self-directed learning skills among the dental students” (p.18).

These results and the lack of research comparing the two learning models (in the PK-12 setting) raise the importance of research in this area and the research questions posed in this study (see above).

### **Learning and Student Motivation**

Author and motivational speaker Simon Sinek published a book in 2011 called *Start with the Why*, in which he shares his perspective for businesses and corporations about the critical importance of purpose for their “bottom line.” Wurdinger uses Sinek’s message to make a case for urgency in the education industry (Wurdinger, 2016). He indicated to his readers that schools and faculty within the school should keep their focus squarely on the importance of inspiring students to learn (p. 1). The “why” for educators, according to Wurdinger, is the encouragement by teachers to their students to be creative and curious in the learning process (Wurdinger, 2016). Teachers focus on getting to know their students, building relationships, identifying student interests and passions, and using effective teaching strategies.

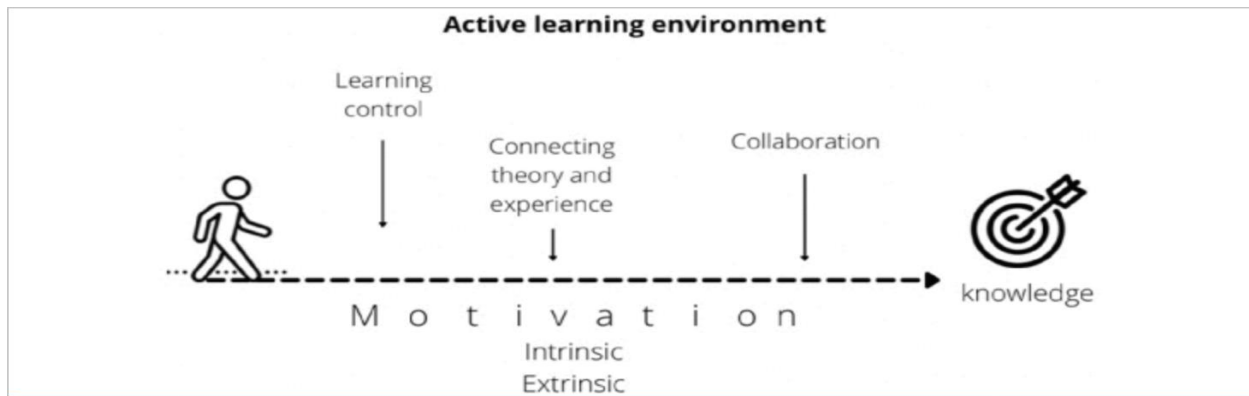
Unfortunately, the transmission of knowledge model has been a dominant model of learning in many PK-12 and higher education organizations. The focus has been on the “what,” not the “why.” While some students may appear engaged and enjoy the transmission model of learning, for most, this does not motivate or drive behavior in students for learning (Wurdinger, 2016). As we emphasize in this study, engagement is a key indicator of student motivation for learning. According to Schlecty, engagement is achieved when a task has relevance and meaning to the student. As a result of this, motivation persists despite rigor or difficulty in the learning task (Schlecty, 2011).

Hadjikou (2022) conducted a study to examine student motivation to engage in music lessons. Students in this study indicated students valued practical work. Teachers participating in the study who made “practice” a key instructional strategy received feedback from students that their motivation was enhanced. Student motivation intensified when instructors gave students autonomy to develop their own melodies (Hadjikou, 2022). This is supported in the literature that student motivation can be increased when autonomy (mastery and purpose) is present in the tasks they are asked to do (Pink, 2009). In an experimental study conducted by Fidai et al., researchers employed non-traditional teaching strategies (i.e., PBL) to determine whether student apathy toward Science, Technology, Engineering, and Mathematics (STEM) could increase student interest in learning and possible careers in this field (Fidai et al., 2019). Researchers and educators were increasingly concerned about how classroom experiences in STEM-related classes would influence their effect on careers in this field. The results indicate teachers using a more hands-on and project-based approach with students found students to be more fully engaged and motivated, evidenced by participation and depth of learning (Fidai et al., 2019)

Some current definitions of learning state the student's role in learning is “active,” where students have the autonomy to make decisions by using reasoning and logic (Lopez et al., 2023). This definition is illustrated in Figure 1.

**Figure 1**

**Active Learning Environment**



*Note.* Lopez et al., 2023.

The research in the cognitive constructivist theories of learning emphasizes this active approach to ensure students are the constructors of knowledge and “learning to think and learning to learn” (Agra et al., p.252, 2019). From this we can ascertain that learning is a dynamic process that is nonlinear, highly individualized and requires teaching and learning strategies that give students autonomy, purpose and relevance to be sure the student motivation “lever” is engaged. While not ripe with comparative studies between Project-based Learning (PBL) and traditional learning (TL), the current literature provides important research about student motivation in the learning process. Noteworthy then is that PBL embraces many teaching and learning strategies and engagement approaches to motivate, own, and empower learning.

**Theoretical Framework: Engagement and GRIT**

The operational theory grounding this research in terms of engagement is the work of Philip Schlecty (2011) on student engagement. He describes five levels of engagement, which depend on the interplay between attention and commitment (see Table 1.2):

**Table 1.2**

*Schlecty’s (2011) Student Engagement Framework*

Attention Level	Commitment Level	Engagement Level
High Attention	High Commitment	Engagement: The student associates the task with a result or product that has meaning and value for the student. The student will persist in the face of difficulty and will learn and high and profound levels
High Attention	Low Commitment	Strategic Compliance: The task has little relevant or

		direct value to the student, but the student associates it with outcomes or results that do have value to the student (such as grades). Student will abandon work if extrinsic goals are not realized and will not retain what is learned.
Low Attention	Low Commitment	Ritual Compliance: The student is willing to expend whatever effort is needed to avoid negative consequences. The emphasis is on meeting the minimum requirements. The student will learn at low and superficial levels.
No Attention	Low Commitment	Retreatism: The student is disengaged from the task and does not attempt to comply with its demands, but does not try to disrupt the work or substitute other activities for it. The student does not participate and learns little or nothing from the task.
Diverted Attention	No Commitment	The student refuses to do the work, acts in ways to disrupt others, or substitutes tasks and activities to which he or she is committed. Student develops poor work and sometimes negative attitudes towards formal education and intellectual tasks (Schlechy, 2011).

This framework was used in combination with the concept of GRIT, which was coined and surveyed by Angela Duckworth (2016), who describes it as a combination of strong desire and a willingness to keep focus on a task. The two theories complement each other well in addressing the research questions of this study.

## Methodology

The method used here is a case study with both quantitative and qualitative analysis (Yin, 2014). The unit of study is one high school with two groups of students: the project-based students and the traditional program students. For the quantitative phase, we used Duckworth et al. GRIT survey (2007) compares measures of central tendency (i.e. mean, median, range, etc.). This is complemented in the qualitative phase with Schlechy's levels of engagement (2011) to drive focus group questions. We were able to make valuable comparisons on the research questions between the two groups of students who self-selected each program, a rare natural occurrence and one not seen in the current literature.

## Setting

The case study setting was a midwestern high school within a larger midwestern, upper middle-class school district of 9,136 students and a relatively low 14.7% economically disadvantaged (ED) rate when compared to the state ED rate of 53.95% (MiSchooldata.org).

Because data were collected in both the freshman and senior years, the following data is shared to illustrate what the class looked like in 2019 and then again in 2023:

**Table 1.3**

*Participant Demographics*

2019	All students <sup>a</sup>	9th grade <sup>b</sup>	2023	All students <sup>c</sup>	12th grade <sup>d</sup>
Male	49.5%	48.5%	Male	50.2%	47.8%
Female	50.5%	51.5%	Female	48.8%	52.1%
Economically disadvantaged	16.3%	15.5%	Economically disadvantaged	16.4%	13.5%
Hispanic	5.2%	5.0%	Hispanic	5.6%	6.4%
2 or more races	5.2%	5.6%	2 or more races	4.8%	4.8%
White	73.9%	73.6%	White	73.2%	73.2%
Asian American	10.5%	9.9%	Asian American	9.8%	11.1%
Black	5.4%	3.0%	Black	6.7%	5.4%
Students with disabilities	5.6%	3.6%	Students with disabilities	7.0%	4.0%

*Note.* Source: MiSchooldata.org.

<sup>a</sup>*n* = 1,196. <sup>b</sup>*n* = 303. <sup>c</sup>*n* = 1,134. <sup>d</sup>*n* = 297

The data above indicate that while most major ethnic classifications are represented, White students are in the majority. Moreover, each category's raw number and percent breakdowns are fairly stable across the four years of the student's high school experience.

In one of the district's three high schools (the high school in the above table represented by 9th and 12<sup>th</sup>-grade levels), the school and district leadership along with faculty launched a PBL model (termed "Project Next" in this district) alongside a traditional comprehensive high school curriculum. With district support, they marketed this model to 300 incoming freshmen and their families, allowing students to choose which model they felt would best fit their educational needs. Approximately 150 students chose each program. We became aware of this naturally occurring set of comparison groups and approached the school and district to offer research services. That led to a research and evaluation partnership, which gave the district feedback on the implementation of the project-based model and the researchers the opportunity



to compare these self-chosen groups of students in a PBL model and a similarly sized group of students who chose the comprehensive high school, a college preparation curriculum.

### Data Collection

Data collection was longitudinal in the quantitative phase as all incoming freshmen were given a GRIT survey (Duckworth, 2016) at the beginning of their freshman year (2019) and again in the spring of their senior year (2023) to address research question (1): how do GRIT scores change over time for students in both the PBL program and the traditional comprehensive program?

We also randomly selected students from both groups to participate in focus groups and respond to questions about their experience in general and, more specifically, their engagement level at the end of their senior year (2023). To define engagement, we used Philip Schlecty's (2011) five levels of engagement which range from high attention/high commitment to diverted attention/no commitment (see Table 1.2 and Appendix A for focus group questions).

During the focus groups, we first showed a YouTube video to illustrate Schlecty's engagement model (Spencer, 2018). Responses to these questions were used to address the following research questions: (2) How do engagement levels compare between project-based learning and traditional programs? (3) How do students in each program describe their learning experience? (4) What impact does student choice have on student perceptions of each program?

### Data Analysis: Quantitative

The GRIT surveys were given to students from both groups in the freshman and senior years of their high school experience. These results were analyzed using descriptive statistics and a T-test comparison (Creswell, 2022). The results are as follows:

**Table 1.4**

*Summary Statistics by Participant Group*

Variable	N	Mean	Median	Std Dev	Minimum	Maximum
Pre-Control Total Score	108	33.51	34.00	5.30	21.00	44.00
Post-Control Total Score	32	32.47	32.00	6.15	21.00	43.00
Pre-Treatment Total Score	54	33.31	33.00	6.19	18.00	47.00
Post-Treatment Total Score	11	34.91	35.00	7.45	25.00	48.00

*Note.* Pre-Control: traditional program, 9<sup>th</sup> grade. Pre-Treatment: Project Next (PN) group, 9<sup>th</sup> grade. Post Control: traditional program, 12<sup>th</sup> grade. Post Treatment: (Project Next) PN group, 12<sup>th</sup> grade.

As the reader will notice from Table 1.4, a two-sample t-test compared the GRIT scores for the treatment group (PBL students) in both their freshman years ( $M = 33.31$ ,  $SD = 6.19$ ) and senior years ( $M = 34.91$ ,  $SD = 7.45$ );  $t(13) = -0.66$ ,  $p = 0.518$ . Similarly, we performed a two sample t-test analysis to compare GRIT scores in the control group (traditional program) for students in their freshman year ( $M=33.51$ ,  $SD = 2.3$ ) and again in their senior year ( $M = 32.47$ ,  $SD = 6.15$ );  $t(45) = -0.87$ ,  $p = 0.391$ . Neither of these freshman-to-senior year differences were statistically significant (B. Jankens, personal communication, August 29, 2023).

### **Data Analysis: Qualitative**

We recorded responses to the semi-structured interviews of focus groups via audio and later transcribed them. Fifteen randomly selected students (eight from the traditional program and seven from the project-based program) agreed to participate and, per the University's IRB protocols, had parent consent. Students also had the opportunity to assent or decline the focus group opportunity after parent consent had been secured. None declined.

We used the semi-structured interview with fidelity, limiting follow-up questions to those that queried students on issues that arose related to the research or interview questions. Each of us then examined the transcriptions independently, looking for emergent themes as well as some that logically resulted from the questions posed, using the methodology espoused by Marshall and Rossman (2006). Each researcher coded the exact text of the transcribed interviews. We captured themes consistent across respondents as determined by both researchers. We then met to compare findings. Outliers were infrequent, though we discussed each one carefully before deciding not to include it. Those insights common to both researchers are detailed below.

## **Results**

### **GRIT Scores**

As noted, statistically significant differences did not occur when comparing the scores of students in their freshman year to when they finished as seniors. Of note, however, the GRIT scores dropped in the traditional program by 1.04 points (from 33.51 to 32.47) and rose in the treatment group by 1.6 points (from 33.31 to 34.91) over a four-year high school career.

### **Focus Group Responses**

#### *Engagement*

The PBL students indicated with a high frequency that the program contributed and enhanced their engagement in learning instead of detracting from it, at a ratio of 9:2 in favor of enhanced engagement. For example, students were intrinsically curious about the outcome of their projects and inspired to think of others, "I'd wonder how they (projects) would turn out." This student later commented that she "would love to see the medical side of brain activity (for project-based students), like we're the project." As former high school teachers and administrators, this insight from a high school senior was impressive. Teacher relationships were also prized as contributing to engagement: "I loved all four teachers and it was probably my favorite school year ever." Finally, since this was the first class to experience the program, it was interesting to see a certain level of ownership, "It's important to know that we have three grades under us in this program, and they are thriving."

Students in the traditional program characterized their engagement differently, connecting it more to Schlecty's strategic compliance (2011):

I was a strategic compliance guy throughout high school....I'm very much just trying to get through school the best that I can to assure grades. And then I don't really care about keeping that knowledge until later because I don't know how much I'm really going to use.

Similar to the students in the PBL model, the value of the teacher was prized: "Like your level of engagement really depends on the teachers you have." If absent, however, this could also detract from engagement: "In class she will lecture for the whole hour, not engaging

whatsoever.” That said, when teachers in the traditional program veered towards PBL elements, student engagement picked up. For example, this PBL student said of a science class, “But once you get into like the dissecting part, that part is interesting.” And when the program was more future-focused, that also garnered engagement: “But I mean, with the career stuff they're doing in senior year I'm like oh that was really interesting.”

### *Learning Experience*

Responses to questions about the students' learning experience helped us learn more about what was driving the difference in students' assessment of their own engagement. Again, differences emerged between the two groups.

Students in the PBL program described their learning experience as emphasizing “real life skills” such as communication, problem-solving, and product development. They were expected to demonstrate their learning as follows: “We didn't take tests, but we still had to show that we knew the material, usually with a presentation or a product.” This occurred in part because of the passion of the teachers who guided them: “It's like the teachers that want to change the education system” and “It's just like I feel like their passion, just like we fed off of that.” Students also appreciated that teachers and administration were asking tough questions of themselves along the way: “Every single year the teachers have gotten together and said, OK, what worked? What didn't?” and “Administration has done a good job, just kind of fitting it to what works for that year and keeping things that worked, changing things that didn't.” Consequently, as the first cohort of students in the program, students took pride in their role in its development, “Project Next (the name of the PBL program) has been something so just integral to my high school experience that I'm just proud to see how much we have helped it grow.”

Students in the traditional program described their experience with some appreciation as well, but responses were more muted, such as “I think our school does a good job offering like lots of AP or like specific interest classes.” They also describe an awareness of the system they had decided on in terms of its goals and purpose: “I'm going to know, really learn how to study for a test, whether you understand as well or not.” Traditional program students also noticed the sometimes-repetitive nature of the program: “With traditional, it's kind of just, you know, the same schedule over and over every day, it's just more boring.” From another student: “It feels repetitive, and you get bored easily if it's too predictable.”

A few students in the traditional program focus group had begun in PBL but then switched to the traditional program. This had value as they could compare the two methods of education as well as offer insight on why they had ultimately chosen the traditional route, “But I mean, yeah, there was just a lot of time if you weren't committed to working on your stuff, you would just screw around on your computer and do whatever (in the project-based program).”

### *Student Choice*

Students who chose the project-based program expressed an appreciation to how the option was presented: “They started developing it and they came down to the middle school to kind of explain it to the incoming freshmen to make them want to join,” as well as the option itself: “Oh my God, I don't have to do boring high school.” Parent involvement varied from some letting their students decide to others taking a very directive approach: “So my parents are both talking to me, and they said I should try something new.” And those that chose PBL also

appreciated how their agency continued to be honored within the program: “They give us these guidelines, but it is up to us to really create what we want to include in our work.”

Students in the traditional program also had agency, which led some to return to the traditional program: “But being the guinea pig here, there was nothing I could do about it, so I just decided I'd rather go back to traditional.” Moreover, some of their parents definitely wanted the traditional route for them, “But my parents were like, No, you got to do this (traditional program) like it's you're going to have so many opportunities in the future.”

Traditional program students also felt as if the unknowns of the project-based environment could negatively impact their GPA: “I probably wouldn't (go back and choose project-based), just because it's just so I wouldn't take those hits to my GPA.” Related to this, some voiced the pressure specific to their district: “Being in (case district), the expectations of being a good student and getting good grades and going through a good schedule, to get good scores and enter a good college.”

### *Emergent Theme: COVID Impact*

A theme that was expressed by both groups that we had not directly queried was the impact of the pandemic. This study asked students to reflect on their experience from 2019 to 2023, so it makes sense that this would come up. One student captured it well this way: “Junior year was not what it was supposed to be because we weren't here and we couldn't be here.” Another expressed the challenges for students and teachers: “It's been really stressful, and like those teachers have been through it with us.” Another described the time as “An explosion of we have no idea what we're doing because of COVID.”

## **Discussion**

We were surprised to find no statistical significance in the GRIT scores from the freshman to senior years for either group, but as mentioned, this is an upper-middle-class district. Pressure on students to display GRIT can be quite high, as evidenced by student comments above.

When viewed through the lens of the student engagement side of the theoretical framework (Schlechy's levels of engagement), we learned about the differences in student engagement, learning experience, and the impact of choice in both the project-based model and the traditional model. Students in the project-based model expressed higher levels of engagement, which aligns with Schlechy's “High Attention, High Commitment” (2011). In an objective report on the results above, it is challenging to convey the differences between the two groups in tone and overall enthusiasm as they described their high school experience. Although students in the traditional program were aware of and appreciative of receiving a quality education, students in the PBL program conveyed an almost zealous ownership over what they had accomplished and a fervent hope that the program would continue after their graduation. They viewed their teachers as staunch allies in their educational journey who chose to be on the front lines of dramatically improving students' high school educational experiences. Their gratitude was palpable and effusive.

Given that this difference in educational experience was so noticeable, it caused researchers to ponder if some of the PBL students' enthusiasm could be attributed to the novelty of the program. Put another way, were these students more invested because they felt they were part of something new, an approach to high school education that had not been tried on this scale

in this district before. It is possible, as in a very real way, they are part of something new in the story of this district. On the other hand, they often connected their responses to the specifics of their learning experiences. It could be a matter of both/and as opposed to either/or.

### **Implications**

This apparent difference between the students in the two programs raises important implications. First, can other districts of similar size (the high school has approximately 1,200 students) or even smaller offer a similar choice between programs? Clearly, for both groups of students, the element of choice was important to them and their families.

Second, if a fully developed project-based program is not what a school or district chooses to offer, might some elements of it benefit certain content areas or units of study? We believe this is, in fact, the case as the literature is filled with resources to support this kind of implementation (e.g., Sever, 2022), as well as resources for those schools serving a more diverse population of learners (Mulcahy & Wertz, 2021).

Finally, given the difference between the experience of the two groups of students and the much more enthusiastic response of the PBL group, it raises the question as to why more districts choose not take this approach or at least offer it as an option. Given the researcher's experience in school and district level leadership, we suspect at least part of the reason is lack of political will. Marzano (2005) describes two levels of change in schools and districts: first order and second order. His conceptualization has to do with level and intensity of the change. First order is the next logical click of improvement (e.g. from a chalkboard to dry erase board). It is relatively small. Second order change, by contrast, is much deeper and systemic, and one of its characteristics is noticeable resistance to the change effort. Moving from a traditional program to PBL is without question a second order change, and in fact half of the students resisted it by not choosing it. Subsequent studies could determine the degree to which this resistance prevents a move to PBL.

### **Conclusion**

This study, like all case studies, has inherent limitations. The case is limited to one school in one district in the Midwest, making generalizability to a broader population of schools and districts difficult, if not inappropriate. Further, the population of students in this study was from an upper-middle-class district, which brings many intervening variables on issues such as engagement and GRIT. That said, the conclusions for this district and school have value and could spawn other studies.

First, the project-based program in this study was launched during COVID and still enjoyed success from a student engagement perspective. One wonders what might have been different had the pandemic not entered after two years. Second, side-by-side offerings could be found in other districts, and similar research could be done to see if patterns replicate when student and parent choice is introduced. Finally, though this study is unique in the side-by-side comparison of two populations within one school, it also reinforces the benefits of PBL for student engagement. Moreover, as most educators realize, an intrinsically engaged student is well-positioned for deep learning.

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## Appendix A Informed Consent Form



Consent Form for Research Study: **Parent/Guardian of Student**

TITLE: Project-based Learning vs. Traditional Instruction: A Comparative Study

RESEARCHERS: Principal Investigator: Gregory D. Warsen, Ph.D.  
Co-Investigator: Richard VanderMolen, Ed.D.

### Key Information for You to Consider

**Voluntary Consent.** You are being asked to consent for your child to volunteer for a research study. It is up to you whether you choose to have your child participate or not. There will be no penalty or loss of benefits to which you are otherwise entitled if you choose not to have your child participate or if he/she discontinues participation.

**Purpose:** The study compares the student experience in a project-based learning environment vs. a traditional instructional program.

- **Duration.** It is expected that your child's participation will last 30 to 45 minutes.
- **Procedures and Activities.** Your child will be asked to take part in a focus group with 3-4 peers. A GVSU researcher will ask questions that you and your child will have seen in advance. This will take place during lunch (which will be provided at no expense) at Forest Hills High School in a conference room. You and/or your child will have no out of pocket costs. This focus group will be audio recorded.
- **Risks.** We do not see any risk to your child.
- **Benefits.** Your child may benefit from sharing how they experienced learning in either a project-based or traditional instruction program. He/she may also benefit from hearing from how other students have experienced these formats.
- **Alternatives.** As an alternative to participation, you could have your child submit written responses to interview questions.

REASON FOR INVITATION: Your child has been selected at random to take part in a focus group because he/she is a 12<sup>th</sup> grade at Forest Hills Northern High School.

HOW PARTICIPANTS WILL BE SELECTED: Participants have been selected randomly.

POTENTIAL BENEFITS TO SOCIETY: This study should benefit society by learning about how project-based learning compares to a more traditional approach at the high school level.



**VOLUNTARY PARTICIPATION:** Your consent for your child's participation in this research study is completely voluntary. He/she does not have to participate, even if you consent. He/she may quit at any time without any penalty. If your child has or is planning to apply to Grand Valley State University, accepting, declining or withdrawing from the study will have no impact on application or admission status.

**PRIVACY AND CONFIDENTIALITY:** Your child's name will not be given to anyone other than the research team. All information collected from him/her or about him/her will be kept confidential to the fullest extent allowed by law. In very rare circumstances, specially authorized university or government officials may be given access to our research records for purposes of protecting your child's rights and welfare. It is again noted, however, that accepting, declining or withdrawing from the study will have no impact on application or admission status if your child has or plans to apply for to Grand Valley State University.

**PERSONAL DATA:** Personal data to be collected in this study includes: email addresses of parent/guardian and child. Personal identifiable information (such as name or email address) is the only personal data needed. Sensitive personal data will be handled and processed only by researchers conducting this study, or by specially authorized university or government officials to make sure the research was done properly. In the event that a data breach occurs, researchers would notify the school and parents.

**DATA SECURITY:** GVSU is committed to keeping your data secure. We have put in reasonable physical, technical, and administrative data protection measures for this research. If you suspect a data breach has occurred, please contact the Vice Provost for Research Administration at Grand Valley State University, 1 Campus Drive, Allendale, MI. Phone: 616-331-3197. E-mail: [rci@gvsu.edu](mailto:rci@gvsu.edu).

**DATA RETENTION:** Personal data will be retained for one year following the completion of this research.

**WITHDRAWING CONSENT:** You have the right to withdraw your consent to the collection and processing of your child's personal sensitive data at any time. If you would like to withdraw your child from participating in this study, please contact the lead researcher: Dr. Gregory D. Warsen at [warseng@gvsu.edu](mailto:warseng@gvsu.edu). If you would like to request that you or your child's personal data be removed from this study, please contact the Vice Provost for Research Administration at Grand Valley State University, 1 Campus Drive, Allendale, MI. Phone: 616-331-3197. E-mail: [rci@gvsu.edu](mailto:rci@gvsu.edu).

**RESEARCH STUDY RESULTS:** You will be informed about any significant new findings developed during the course of the study that may relate to your willingness to consent to your child's continued participation in the study. If you wish to learn about the results of this study you may request that information by contacting Gregory D Warsen, Ph.D. at [warseng@gvsu.edu](mailto:warseng@gvsu.edu) or at 616-331-6209.

**PAYMENT:** There will be no payment for participation in the research except for the lunch on the day of the focus group.

**REMOVAL FROM STUDY:** There are no consequences for a subject's voluntary withdraw from the study. Data collected from a withdrawing participant will be destroyed.

AGREEMENT TO PARTICIPATE: By signing this consent form below you are stating the following:

- The details of this research study have been explained to me, including what my child is being asked to do and the anticipated risks and benefits;
- I have had an opportunity to have my questions answered;
- I am voluntarily agreeing to consent to my child's participation in the research as described on this form;
- I am voluntarily agreeing to have my and my child's personal data used for this study and agree the data can be transferred to the United States if originally collected outside of the United States;
- I or my child may ask more questions and/or my child may quit participating at any time without penalty.
- I agree that my child may be interviewed.
- I agree to have my child's interview audio recorded.
- I understand that COVID 19 protocols of Forest Hills Public Schools will be honored at the time of data collection.

Print Name: \_\_\_\_\_

Sign Name in ink: \_\_\_\_\_

Date Signed: \_\_\_\_\_

If you have any questions about this study you may contact the lead researcher as follows:

NAME: Gregory D. Warsen PHONE: 616-331-6209

E-MAIL: warseng@gvsu.edu

If you have any questions about your rights as a research participant, please contact the Office of Research Compliance & Integrity at Grand Valley State University, 1 Campus Drive, Allendale, MI. Phone: 616-331-3197. E-mail: [rci@gvsu.edu](mailto:rci@gvsu.edu).

This study has been approved by the Institutional Review Board at Grand Valley State University (Protocol #22-100-H).

## Appendix B Student Assent Form



Assent Form for Research Study: **Student**

TITLE: Project-based Learning vs. Traditional Instruction: A Comparative Study

RESEARCHERS: Principal Investigator: Gregory D. Warsen, Ph.D.  
Co-Investigator: Richard VanderMolen, Ed.D.

### Key Information for You to Consider

**Voluntary Assent.** You are being asked to volunteer for a research study. It is up to you whether you choose to participate or not. There will be no penalty or loss of benefits to which you are otherwise entitled if you choose not to participate or discontinue participation.

**Purpose:** The study compares the student experience in a project-based learning environment vs. a traditional instructional program.

- **Duration.** It is expected that your participation will last 30 to 45 minutes.
- **Procedures and Activities.** You will be asked to take part in a focus group with 3-4 peers. A GVSU researcher will ask questions that you will have seen in advance. This will take place during lunch (which will be provided at no expense) at Forest Hills High School in a conference room. You will have no out of pocket costs. This focus group will be audio recorded.
- **Risks.** We do not see any risk to you as the participant.
- **Benefits.** You may benefit from sharing how they experienced learning in either a project-based or traditional instruction program. Participants may also benefit from hearing from how other students have experienced these formats.
- **Alternatives.** As an alternative to participation, you could submit written responses to interview questions.

REASON FOR INVITATION: You have been selected at random to take part in a focus group because you are a 12<sup>th</sup> grade at Forest Hills Northern High School.

HOW PARTICIPANTS WILL BE SELECTED: Participants have been selected randomly.

POTENTIAL BENEFITS TO SOCIETY: This study should benefit society by learning about how project-based learning compares to a more traditional approach at the high school level.

**VOLUNTARY PARTICIPATION:** Your participation in this research study is completely voluntary. You do not have to participate. You may quit at any time without any penalty or choose not to respond to any given question. If you are planning to apply to Grand Valley State University, accepting, declining or withdrawing from the study will have no impact on application or admission status.

**PRIVACY AND CONFIDENTIALITY:** Your name will not be given to anyone other than the research team. All information collected from you or about you will be kept confidential to the fullest extent allowed by law. In very rare circumstances, specially authorized university or government officials may be given access to our research records for purposes of protecting participant's rights and welfare. It is again noted, however, that accepting, declining or withdrawing from the study will have no impact on application or admission status if your student has or plans to apply for to Grand Valley State University.

**PERSONAL DATA:** Personal data to be collected in this study includes: email addresses of parent/guardian and student. Personal identifiable information (name or email address) is the only data being collected. Sensitive personal data will be handled and processed only by researchers conducting this study, or by specially authorized university or government officials to make sure the research was done properly.

**DATA SECURITY:** GVSU is committed to keeping your data secure. We have put in reasonable physical, technical, and administrative data protection measures for this research. If you suspect a data breach has occurred, please contact the Vice Provost for Research Administration at Grand Valley State University, 1 Campus Drive, Allendale, MI. Phone: 616-331-3197. E-mail: [rci@gvsu.edu](mailto:rci@gvsu.edu).

**DATA RETENTION:** Personal data will be retained for one year following the completion of this research.

**WITHDRAWING ASSENT:** You have the right to withdraw your assent to the collection and processing of personal sensitive data at any time. If you would like to withdraw from participating in this study, please contact the lead researcher: Dr. Gregory D. Warsen at [warseng@gvsu.edu](mailto:warseng@gvsu.edu) . If you would like to request that your personal data be removed from this study, please contact either Dr. Gregory D. Warsen or the Vice Provost for Research Administration at Grand Valley State University, 1 Campus Drive, Allendale, MI. Phone: 616-331-3197. E-mail: [rci@gvsu.edu](mailto:rci@gvsu.edu).

**RESEARCH STUDY RESULTS:** You will be informed about any significant new findings developed during the course of the study that may relate to your willingness to continue participating in the study. If you wish to learn about the results of this study you may request that information by contacting Gregory D Warsen, Ph.D. at [warseng@gvsu.edu](mailto:warseng@gvsu.edu) or at 616-331-6209.

**PAYMENT:** There will be no payment for participation in the research except for the lunch on the day of the focus group.

**REMOVAL FROM STUDY:** There are no consequences for a subject's voluntary withdraw from the study. Data collected from a withdrawing participant will be destroyed.

AGREEMENT TO PARTICIPATE: By signing this assent form below you are stating the following:

- The details of this research study have been explained to me, including what I am being asked to do and the anticipated risks and benefits;
- I have had an opportunity to have my questions answered;
- I am voluntarily agreeing to participate in the research as described on this form;
- I am voluntarily agreeing to have my personal data used for this study and agree the data can be transferred to the United States if originally collected outside of the United States;
- I may ask more questions or quit participating at any time without penalty.
- I agree that I may be interviewed.
- I agree to have my interview audio recorded.
- I understand that COVID 19 protocols of Forest Hills Public Schools will be honored at the time of data collection.

Print Name: \_\_\_\_\_

Sign Name in ink: \_\_\_\_\_

Date Signed: \_\_\_\_\_

If you have any questions about this study you may contact the lead researcher as follows:

NAME: Gregory D. Warsen PHONE: 616-331-6209

E-MAIL: warseng@gvsu.edu

If you have any questions about your rights as a research participant, please contact the Office of Research Compliance & Integrity at Grand Valley State University, 1 Campus Drive, Allendale, MI. Phone: 616-331-3197. E-mail: [rci@gvsu.edu](mailto:rci@gvsu.edu).

This study has been approved by the Institutional Review Board at Grand Valley State University (Protocol #22-100-H).



## Appendix C Student Focus Group Protocol

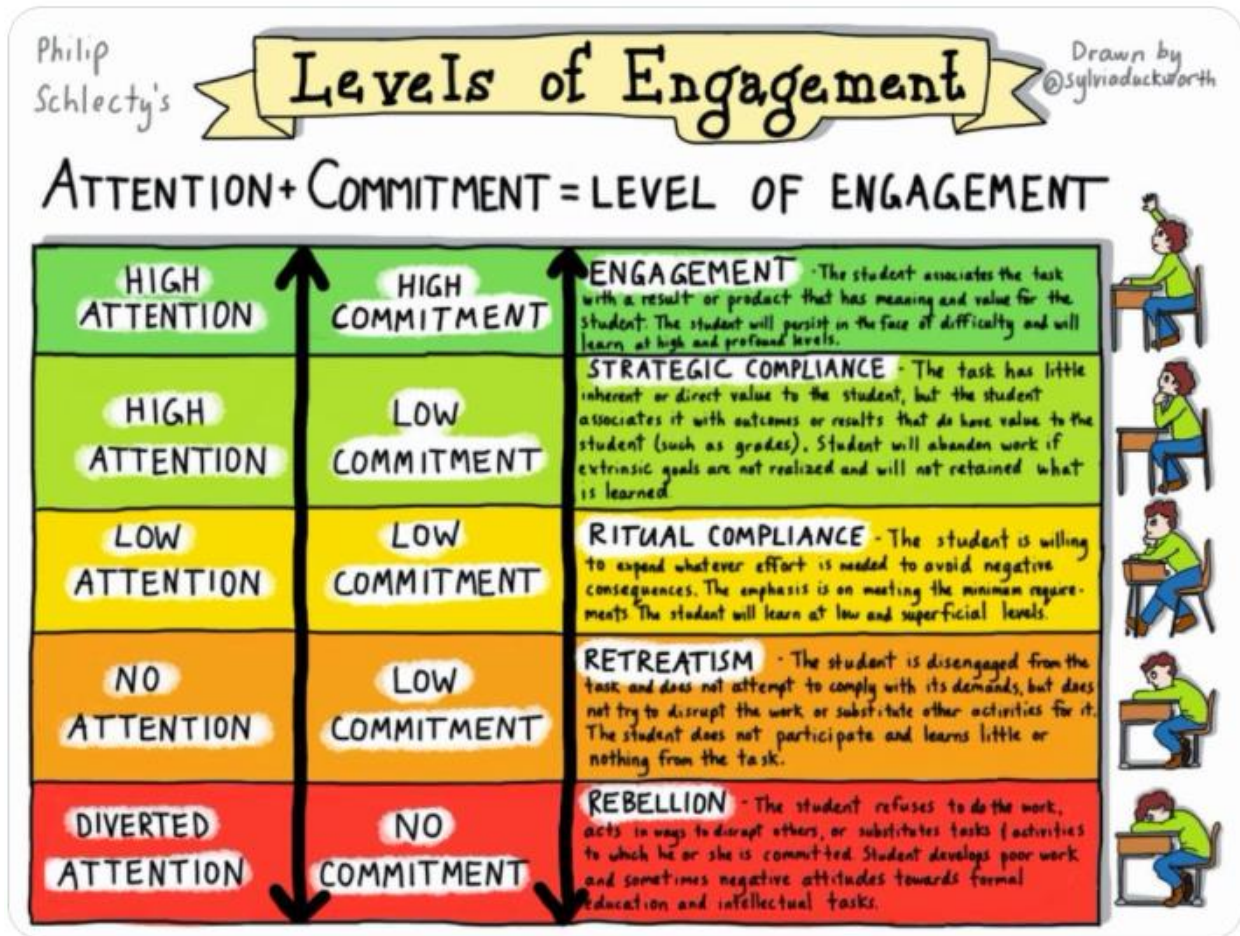
### Project Next Student Focus Group Interview Questions

#### Student focus group questions:

1. Show Schlecty's levels of engagement and the video, and then ask in light of this model, how would you describe your level of engagement in this program? Why would you describe it the way you did?

**Figure C1**

4 minute video on engagement: <https://www.youtube.com/watch?v=256hluHbp2o>



2. What parts of the program that you were in contributed to your engagement in learning?
3. What parts of the program that you were in detracted or took away from your engagement in learning?

4. How would you describe your learning experience over the past four years to someone from another school?
5. You were able to choose the program that you wanted in your freshman year. How important was that to you? Why? How did you go about making that decision?
6. If you had to make the choice again, would you make the same decision? Why or why not?
7. What else would you like for us to know about the program you experienced?

## Appendix D Grit Scale

### 12- Item Grit Scale

*Directions for taking the Grit Scale: Please respond to the following 12 items. Be honest – there are no right or wrong answers!*

1. I have overcome setbacks to conquer an important challenge.
  - Very much like me
  - Mostly like me
  - Somewhat like me
  - Not much like me
  - Not like me at all
  
2. New ideas and projects sometimes distract me from previous ones.\*
  - Very much like me
  - Mostly like me
  - Somewhat like me
  - Not much like me
  - Not like me at all
  
3. My interests change from year to year.\*
  - Very much like me
  - Mostly like me
  - Somewhat like me
  - Not much like me
  - Not like me at all
  
4. Setbacks don't discourage me.
  - Very much like me
  - Mostly like me
  - Somewhat like me
  - Not much like me
  - Not like me at all
  
5. I have been obsessed with a certain idea or project for a short time but later lost interest.\*
  - Very much like me
  - Mostly like me
  - Somewhat like me
  - Not much like me
  - Not like me at all
  
6. I am a hard worker.
  - Very much like me
  - Mostly like me
  - Somewhat like me



- Not much like me
- Not like me at all

7. I often set a goal but later choose to pursue a different one.\*

- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

8. I have difficulty maintaining my focus on projects that take more than a few months to complete.\*

- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

9. I finish whatever I begin.

- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

10. I have achieved a goal that took years of work.

- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

11. I become interested in new pursuits every few months.\*

- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

12. I am diligent.

- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

Scoring:

1. For questions 1, 4, 6, 9, 10 and 12 assign the following points:

5 = Very much like me

4 = Mostly like me

3 = Somewhat like me

2 = Not much like me

1 = Not like me at all

2. For questions 2, 3, 5, 7, 8 and 11 assign the following points:

1 = Very much like me

2 = Mostly like me

3 = Somewhat like me

4 = Not much like me

5 = Not like me at all

Add up all the points and divide by 12. The maximum score on this scale is 5 (extremely gritty), and the lowest score on this scale is 1 (not at all gritty). (Duckworth et al., 2007).