

Agentic Trajectories: Development and Learning in a Project-Based High School for Marginalized Students

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Abstract: Traditional approaches to schooling can marginalize already vulnerable students, preventing them from learning; we explore how agency might play a role in supporting such students to develop as learners in a project-based high school that employs design pedagogy. We first examine whether agency can explain variance in standardized mathematics scores. Regression analysis indicates home language and agency had a significant effect on mathematics scores. We then turn to data collected through extended participant observation to characterize decisions students make. Based on these, we detail a developmental agency trajectory: *dis/engagement* agency serves as a covert means for students to learn; *makerly* agency serves as an entry point for students to explore and develop interests, and *designerly* agency allows students to take ownership of design problems and learn as they do so.

Major issues addressed and significance

The value of students having agency—opportunities to make and carry out decisions about how and what they are learning—is contested in research; some view agency leading to increased learning (Pellegrino, 2004), while others critique this stance (Schwartz & Okita). Students from high socio-economic groups are likelier to receive experiential, high-agency approaches to instruction, creating opportunity gaps (Milner, 2012) that reproduce and further widen existing achievement gaps. We investigate whether high agency in a design-based school that serves marginalized students relates to achievement. We characterize the types of decisions students make and consider how such decisions create developmental trajectories for these students. We were guided by research questions: (1) Do demographic variables, attendance, and measures of agency explain variance in standardized mathematics scores? (2) What kinds of agency do students have at a project-based school that serves students marginalized by traditional schooling? How might these create or lead to learning opportunities?

Theoretical approach

We define agency as making decisions, and focus on decision that affect learning. Agency is socially-constructed (Ahearn, 2001); decisions and actions are constrained or afforded by social structures, which in turn are shaped and reshaped by decisions and actions (Bourdieu, 1977). Thus, agency “progressively emerges out of interactions between participants and their activities” (Damsa, Kirschner, Andriessen, Erkens, & Sins, 2010, p. 115). Agency depends on the *opportunity* structure (Narayan & Petesch, 2007), which can be thought of by considering whether there are opportunities to make decisions, whether students actually make decisions, and whether they are satisfied with the outcomes (Alsop, Bertelsen, & Holland, 2006). In a project-based learning setting, the locus of control is shifted more to the students than it is in traditional settings (Brown & Campione, 1994). In project-based settings that employ design pedagogy, even more control may be granted to the learners; designers occupy an *agentive* position. Design pedagogy positions students as designers working on authentic problems for actual clients and customers (Edwards-Vandenhoeck & Sandbach, 2014).

Methodological approach

The participants were students enrolled in an urban, not-for-profit charter school in the American Southwest. The school aims to have high impact by serving students who have been marginalized by traditional schooling. The original sample included 522 students (every student enrolled during a one-year period). The school population is *highly* mobile. We selected students who had complete data for all measures, which resulted in a sample of 44 students (~one third of the students enrolled/attending regularly during data collection). The participants were predominantly male (n=30). Thirty-eight identified as Latino/a, four as White, and two as American Indian. Thirty-two students reported speaking English and twelve reported speaking Spanish at home. The mean attendance rate for Trimester 2 was 93% ($SD=9.16\%$).

A survey with 5-point Likert items adapted from Alsop et al. (2006) was given at the beginning of the trimester (n=105). Discovery Education (DE) assessments (n=114) were given in the middle of the trimester. Qualitative data were collected through participant observation, resulting in ~1000 pages of field notes, and ~400 hours of audio/video records, organized into a searchable database.

We modeled variance in DE math scores as a linear combination of attendance, home language, and two agency variables: (1) I have had opportunities to make decisions related to this project. ($M=3.43$, $SD=1.02$); (2) When I made a decision related to this project, I was happy with the result. ($M=3.77$, $SD=.77$). We conducted interaction analysis (Jordan & Henderson, 1995), beginning with a general analytic focus—agency, identifying particular moments of agency situated in and reflective of the school practices. We grouped these into three types and share representative vignettes for each.

Findings

Regression modeling

We modeled DE mathematics scores ($M=1573$, $SD=74$). In model 1 (Table 1), a multiple linear regression was calculated to predict DE mathematics scores based on attendance and home language and was significant, ($F(2, 41)=4.42$, $p<.05$). Speaking English in the home predicted higher DE mathematics scores, but attendance was not significant. In model 2, we added reported agency, and this was significant, ($F(3, 40)=5.12$, $p<.05$). Students who reported higher levels of agency tended to have higher DE mathematics scores. In model 3, a multiple linear regression was calculated to predict DE mathematics scores based on attendance, home language and satisfaction with the decisions they had made; this was significant ($F(3, 40)=3.46$, $p<.05$), but reported satisfaction with decisions was not.

Table 1. Regression models of variance in Discovery Education mathematics scores

	Unstandardized Coefficients		Standardized Coefficients	t
	B	Std. Error	β	
<i>Model 1: attendance and home language</i>				
Intercept	1569.46	108.56		14.46***
Home language	68.02	23.23	.42	2.93**
Attendance	-.49	1.14	-.06	-.43
<i>Model 2: attendance, home language and reported agency</i>				
Intercept	1486.54	108.90		13.65***
Home language	72.81	22.13	.44	3.29**
Attendance	-.49	1.08	-.06	-.45
Reported agency	22.96	9.77	.32	2.35*
<i>Model 3: attendance, home language and satisfaction with decisions made</i>				
Intercept	1533.90	119.66		12.82***
Home language	67.70	23.36	.41	2.90**
Attendance	-.51	1.15	-.06	-.44
Satisfaction with decisions made	9.88	13.60	.10	.73

* $p<.05$; ** $p<.01$; *** $p>.001$; Model 1, $r^2 = .14^*$; Model 2, $r^2 = .23^*$; Model 3, $r^2 = .14^*$

Qualitative findings

We present vignettes to highlight three types—*dis/engagement*, *makerly* and *designerly*—of agency we observed, specifically related to learning.

We define *dis/engagement agency* as the choices students make about how to engage with *delivered content*. Some students exhibited relatively traditional indicators of being engaged. Benjamin, for instance, interjected questions as they occurred to him when a guest speaker presented. However, detecting whether a student has decided to engage with particular content can be difficult. For instance, we consider observations of Ivan, a member of a clique of young men who appeared to systematically disengage. On some occasions, they appeared quietly disengaged, staring at their smartphones. While we observed them using their smartphones to socialize, we also observed that staring at one's smartphone can *sometimes* be a means to listen. It can signal to one's peers, "leave me alone, I am busy" and creates a stance of disengagement that is comfortable for many of these students to wear.

2015/01/30 field notes: 11:01am: A video of interviews with people who are homeless is playing. Some students take notes, some don't have notebooks out. Ivan stares at his phone. A student on the other side of the partition continues to play music on his phone, which is audible and increases in volume, making it somewhat hard to hear the video. At 11:08 Ivan asks Mr. F to "get the music turned off."

We see this as evidence of Ivan's dis/engagement agency. We infer that he made this request because he wanted to be able to hear the video that was playing, and not that he simply disliked the music, as the music had been playing prior to the video. Near the end of the project, (2015/03/10) the teachers discussed poverty and homelessness. Ivan was staring at his phone during the beginning of this exchange. Mr. F asked:

Mr. F: What is poverty? How 'bout that. Who knows what poverty is. Look it up on your phone.
Benjamin: Ask the Google
Mr. F: Ask the Google. Ivan's on it. Tell me what poverty is. Look it up.
Ivan: Poverty is—poverty is where you can be living in a house, but you are on such low income, if not—if any income—you're almost a bum in a house.

We see this exchange as suggesting that Ivan had been attending to the conversation, and further, that Mr. F was aware of this. We do not argue that staring at one's phone should be viewed as evidence that a student is listening, or that Ivan's attention was fully on listening; rather, we argue that when students have developed identities as *failures* and *troublemakers* in response to traditional schooling, they may seek covert ways to engage, particularly when the material is meaningful to them. As another student, Raoul explained to us, "People think we aren't listening, Miss, but we are." Mr. F confirmed that he believed students choose to listen covertly, and that he takes advantage of this as a way to draw students into more active participation.

We define *makerly agency* as students making decisions about the process and form of the things they are making. Viewed from a constructionist lens, the things students make should be meaningful and publically sharable. While the things they make are shared at exhibitions, the making can be rather mechanical at times. We observed instances of this, where students used hot glue guns and cardboard to assemble something in a routine, mechanical fashion. Much more commonly, however, we observed a makerly stance, with much tinkering and testing. For instance, in one project, students were asked to make models of Cal-Earth Ecodomies by filling long skinny balloons with sand. They quickly discovered getting sand into the balloons was difficult, and began making tools to assist them in this task. The tools began as paper funnels, but quickly developed. Ivan and his friends dug through trash bins for straws and water bottles and combined these in various ways, resulting in some of the most sophisticated tools. While we don't argue that this activity directly supported content learning, more students chose to participate than we had observed up to this point, in this project.

We define *designerly agency* as the choices students make to frame the problem they are solving. Designerly agency more directly relates to learning. We share vignettes of how Mr. F explained problem framing, and how two senior students differently framed the problem.

Mr. J: So what we're gonna do right now as a group, is define our problem, alright. We kinda know the whole purpose of what we're trying to do here, but I want everybody to be on the same page, and I could tell you what the problem is, but that doesn't include you guys and more importantly it doesn't give you guys the opportunity to contribute and say, 'No, I think this is the problem,' or 'I think we should word it that way.' So what we need to do, as a group, here, is collaboratively come up with a specific problem that we are trying to address by building these homeless shelters. So someone start shouting something out. What's the problem that we are trying to fix right now? What are we trying to solve?
Benjamin: I'm just guessing here, but homelessness.
Mr. J: Homelessness. Alright. So are we trying to solve homelessness, in general?
Benjamin: No, we're trying to help them.

A couple weeks later, Mr. F asked Andre to describe the project to a new student. Benjamin joined in.

- Benjamin: This project's basically oriented around homeless people and how, how we're gonna help them, and, uh, right now, um, we've just been—we went to a—an interview with them and talked to him and got to know him, a bit of understanding, a bit of what—how their everyday life is.
- Andre: What's their needs and stuff, I mean//
- Benjamin: //What's their needs.
- Andre: The project's name is actually called Waste Land II, so we are, we, um, we also rely on, also, the—what's available to them on the streets, to give 'em ideas of what to make shelters of to stay warm, stay safe at night. [...]
- Benjamin: It's most definitely a interesting project and we, we're all —we are gonna help someone, so we're trying to do this, so. It's interesting.

We see both students expressing interest in the project. Benjamin framed the problem generally—helping people who are homeless, and Andre framed the problem specifically—designing temporary shelters from found materials. These framings led them to make different choices about what information to seek.

Conclusions, discussion, and implications

We found students who speak English at home and who reported higher levels of agency scored higher on a standardized math assessment. It is promising that students making decisions, even ones they are not happy with, can predict higher math achievement. Qualitative analysis afforded an opportunity to detail the kinds of agency endemic to this school. While the set is not intended to be exhaustive, we see it as useful for learning scientists as they go about viewing data from less affluent and privileged settings. We do not argue the set generalizes broadly, but rather, that “attending to both learning and development through a cultural lens” (Lee, Spencer, & Harpalani, 2003, p. 6) is particularly important for learning scientists working with marginalized students; it is easy to miss indicators of engagement that fall outside our worldviews. We found traditional markers of engagement can mask the ways students choose to engage in content delivery, decisions students make about making can serve as a point of entry for learning, and decisions students make about designing can provide meaningful, extended learning opportunities.

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