Through The Lens of the Students: Using Narrative Inquiry to Evaluate an Innovative Urban High School

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ABSTRACT

MC Squared STEM High School is part of the Cleveland Metropolitan School District. It has a project-based curriculum that focuses on the core stem skills: science, technology, engineering, and math. As the school celebrated its first graduating class in 2012, administrators felt it was the right time to look back and evaluate the school's progress. This urban school district is Ohio's second largest. This paper explores the process that took place during the evaluation process. It is as much a search for the right questions to ask as for the right answers. It is also an exploration of the working relationship between researcher and practitioner, which is an important part of narrative inquiry methodology.

***Keywords*:** Project-based STEM curricula, Urban high school reform, Assessment

Background

MC^2 STEM has approximately 41,000 students are 70% Black, 15% Caucasian, 11% Hispanic, and 3% other. 83% of the student body is at poverty level and 100% are eligible for the federal universal meals program. The district serves 2,000 homeless students. A mobility rate of 38.2% of students transferring in or out of school in the course of a year creates instability and discontinuity. MC^2 STEM prepares high school students for 21st century workforce demands by exposing them to the design challenges and practices that are modeled after today's STEM industries. Students build the critical thinking and problem-solving skills necessary to effect change as they grapple with essential questions, address real problems, formulate ideas, and defend perspectives alongside their instructors, peers, and field experts.

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Students are embedded in three different regional STEM campuses. The ninth graders are hosted at the Great Lakes Science Center, where they work with both the Great Lakes Science Center and NASA Glenn Research Center. Here they experience job shadowing, internships, and hands-on work with NASA engineers. The tenth grade students attend school at GE Lighting's Nela Park Campus and work with GE Lighting employees of all professions. The focus in the first two years is a rigorous integrated curriculum in which students participate in multiple field experiences on the STEM industry campuses through hands-on learning and exploration. In 11^{th} and 12^{th} grade, students move to the next level of purposeful learning through internships, specially designed capstones and the Post-Secondary Educational Options Program (college classes).

MC Squared has been the subject of multiple local and national evaluations in its first four years. Three of these surveys are of critical importance: 1) the Youth Truth Survey completed in February 20ll, 2) the 2010 and 2011 Conditions for Learning Survey, and 3) The Center for Elementary Mathematics and Science Education at the University of Chicago evaluation done in conjunction with the Battelle Center for Elementary Mathematics and Science Education Ohio Stem Leaning Network (OSLN) Evaluation.

This paper uses narrative inquiry methodology to explore the evaluation process itself, examining how researcher and practitioner (here the principal of MC^2 STEM) must work together to provide a candid assessment of the school's progress.The sources for this paper are notes taken by both the researcher and the principal during the course of the evaluation. These notes reflect how watching the students from afar (case studies), and having the opportunity to "dance with them on the floor" (participatory research action) provided an opportunity to deeply understand the system and allow for organically driven answers to the research. This process allowed the researcher to go back and understand the data from the perspective of non-academic factors that motivate academic success within the context of the school, and to document the creative use of limited existing resources to build a new kind of education.

Urban education is complex. Research in the field is broad and explanations of the events that lead to each outcome are many. Understanding a successful urban school is akin to completing a jigsaw puzzle. At first glance, the puzzle pieces make little sense. However, by deconstructing that puzzle, we can understand how the pieces come together, and in so doing evaluate the experience with data-driven outcomes. Finding the correct research question is every bit as hard as doing the research. When we embarked on this evaluation, we had only a broad question with which to explore: What enabled MC Squared students to succeed when contextual peer school students did not? We wanted to answer this question from the perspective of the urban students whose lives had been transformed over their four years at the school.

Narrative Inquiry

Narrative inquiry is a form of research that serves to understand a phenomenon or an experience through the analysis of one's story (Clandinin & Connelly, 2000). Narrative inquiry is both the process and the product. Clandinen and Connelly (2000) define the field as, "… a way of understanding experience. It is collaboration between researcher and participants, over time, in a place or series of places, and in social interaction with milieus" (p. 20). This model is influenced and informed by the investigation and writing of scholars who have authenticated it through multiple disciplines and contexts (Bruner, 1996; Connelly & Clandinin, 1990; 1994; 2000; Grumet, 1991; Witherell & Noddings, 1991) In the methodology of narrative inquiry the stories, called field texts (Clandinin & Connelly, 2000), constitute the data. Researchers can analyze this data after they recast their stories based on narrative elements such as the problem, characters, setting, actions, and resolution (Ollerenshaw & Creswell, 2000).

The narrative inquirer emphasizes the importance of learning from participants in a setting. Clandinin and Connelly (2000) use these stories to report personal experiences (what the individual feels) as well as socially connected practices (the individual's recounting of interactions with others). "Narrative and life go together and so the principal attraction of narrative as method is its capacity to render life experiences, both personal and social, in relevant and meaningful ways" (Connelly & Clandinin, 1990, p. 10).

This paper will be shaped through interpretations of the narratives. The raw data used to formulate these narratives draw on transcribed interviews the researcher conducted with six recent MC^2 STEM graduates. In addition, the researcher spent a year getting to know the senior class by teaching a capstone (senior project) class at the school. The values, beliefs and experiences the students described will help the research team excavate complex patterns and understand how these patterns impact a person's experience from specific social and cultural standpoints. Data gained in this way will reflect the multiple voices, perspectives, and meanings experienced by the researcher and practitioner. Lastly, as Clandinin and Connelly (2000) suggest, the story may also reflect insights the researcher gained into him or herself in the process.

The reflections and thoughts of both the researcher and practitioner (principal of MC^2 STEM) are a critical component of this inquiry. The practitioner's voice in the research has traditionally been silenced (Connelly & Clandinin, 1990). Both the principal and the researcher noted their experiences as they undertook the evaluation together, documenting each milestone of learning and frustration with notes to themselves on the experience. After the evaluation was completed, they shared these reflections and explored together their professional and personal growth through the process.

For this evaluation, the question of success was examined through the lens

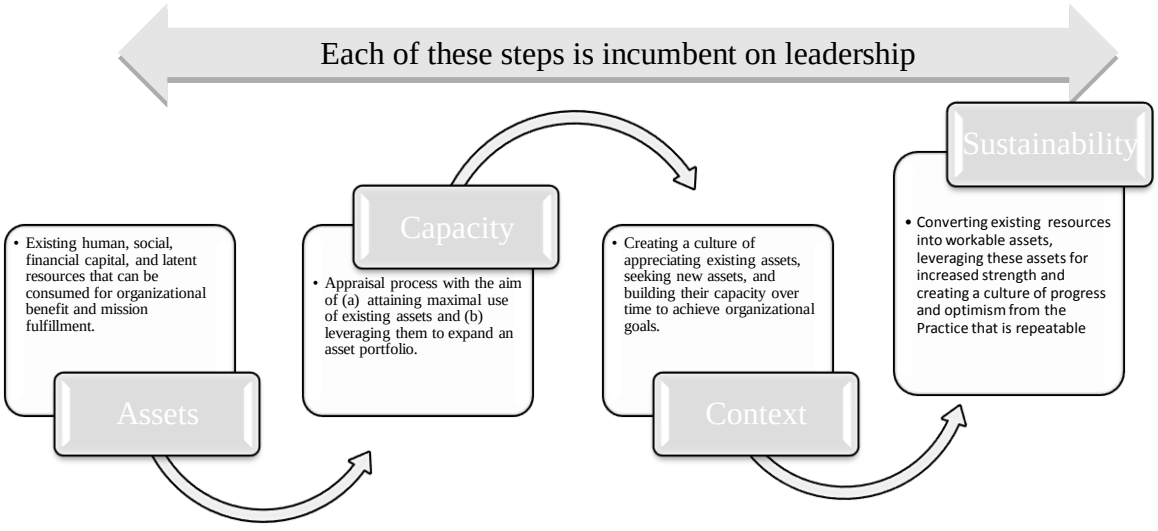
of the student. The study was designed to cultivate their point of view through a broad survey of the senior class (with some open ended questions), followed by group and individual interviews based on the findings of the initial survey. We used the established research as a basis for those group and individual questions and then analyzed this data in conjunction with existing artifact data (school reports, student work, completion rates, internship, etc.).

Asset-Based Paradigm

The conceptual basis for this analysis is the asset-based paradigm (Weisblat & Sell, 2012). Under this construct, assets in an organization are akin to the genetic traits of an individual. These genes, if properly activated, help individuals achieve their potential and maximize their efficiency. Often institutions and organizations have tremendous assets that are unrealized and underutilized (Weinberg, 1999; Zula & Chermack, 2007). While much time is spent on capacity building and creating opportunities for new development based upon this process, much less effort is expended on leveraging assets to achieve needed ends. The process of considering how existing non-economic assets can be combined within and across resource systems is thus frequently ignored. Figure 1 illustrates how the assets of an organization, its capacity for self-appraisal, and the context of creating the proper organizational culture, can lead to a sustainable organization, where existing resources are converted into workable assets.

Figure 1

Asset Development for Organizational Effectiveness[30]



[30] Weisblat et al, 2012

How People Learn

In the traditional model of education, "teaching is telling, knowledge is facts, and learning is recall" (Cohen, 1989). We know now that learning is about understanding information within a general framework and being able to relate and apply general concepts to specific experiences across contexts. *How people learn* (Bransford, Brown, & Cocking, 2000) places active learning in the service of metacognition rather than just the mastery of immediate skills. Any assessment or learning measurement must in some sense be behavioral as well. Bransford et al.'s (2000) award winning National Science Foundation definition of learning includes three main tenets: 1) understanding and accepting the learners' position and space within their community and how this relates to the generation of new knowledge, 2) incorporating existing knowledge and leveraging this information into new scholarship, and 3) embedding on-going metacognition into all facets of the learning cycle (Bransford et al., 2000). The *How People Learn* framework supports academic achievement for all types of learners, and utilizes the asset-based paradigm to further develop learning opportunities and advancement, recognizing the strengths and skills of the learner in the process (Bransford et al., 2000).

> **Researcher:** I am teaching high school kids about graduate level concepts,' I told a colleague yesterday. I got that all-knowing look in exchange, something along the lines of 'Sure you are'. I guess I would have the same response. I am learning that some experience in the context is necessary to truly understand the process. The students today described their social capital as those who had their back, their cultural capital as their ability to understand where it is safe to walk and knowing what dialect to use, their human capital as their ability to take nothing and make something. Helping them discover how to apply their existing knowledge to the theoretical constructs is truly exhilarating and in some ways just mind-boggling.

MC Squared embraces its foundational mission of high academic achievement, while pursuing the development of Wagner's 21st century skills; these skills are non-academic psycho-social factors for success, as identified in the leading-edge work of Robins et al. (2004) and Lee et al. (1995). From Robins and Lee's seminal work, McClellan (2012) proposed a multi-faceted conceptual model that provides a deeper, more complex understanding of how non-academic determinants help to support and sustain student academic success. This is accomplished by positively altering pre-existing peer, family and community relationships.

The research team proposed that the composite of psychosocial and academic-related skill predictors (including Wagner's (2008) work) were best understood by three higher order constructs: motivation, self-management, and social engagement. This model, coupled with a secondary model of the asset-

based paradigm (Weisblat, 2011), serves as the context in which the school and its processes were evaluated.

There has been much conversation about "twenty-first century" skills. Wagner (2008) suggests that students (even in "the best schools") are not being prepared for leadership in the future. Wagner defines seven survival skills that all students need:

1. Critical thinking and problem solving
2. Collaboration across networks and leading by influencing
3. Agility and adaptability
4. Initiative and entrepreneurialism
5. Effective oral and written communication
6. Accessing and analyzing information
7. Curiosity and imagination

Non-Academic Factors

One of the concerns was determining what factors contributed to the students' positive learning experiences. The literature sets forth critical components that help students reach their academic potential within their learning community. In a seminal study by Robbins, Lauver, Le, Davis, & Langley (2004), researchers examined 109 prospective studies in which various psychosocial and study skill factors were used to predict academic achievement (the processing schema necessary to accept new concepts and transfer those new concepts from one situation to another). Four main non-academic influences have been proposed as critical to academic achievement: motivation, social engagement, self-management (Robbins et al., 2004) and community engagement (Kretzmann & McKnight, 1993). In a healthy eco-system there are many points of connection that help to keep it dynamic. These points include a school's or an organization's internal and external operating systems, and the coordination between these two systems as critical to the overall ecosystem

This synergistic system derives from the roles of individuals (i.e. teachers, students, parents, business partners, etc.) and the ways they interact within the school (internally) and also with the community (externally). Individually and collectively this eco-system thrives by building on its existing assets to maximize its capacity. When the schools and organizations recognize their intrinsic value along with the value in their connections to others, their ability to develop a diverse set of strategies to achieve their goals is maximized. In other words, knowing what you have, how to work it, and when to blend it in context with the mission is the stimulus necessary for achieving success. The entropic nature of this eco-system and the connections between each of these points create a rich atmosphere fertile for student success.

> **Researcher:** Today, the students made me laugh so hard! I could barely settle them to begin work on budget analysis for implementing their projects. So I left off where we were, and I took them to their prom in

> their imagination to learn how to operationalize a budget. As they described all the items that they would need to prepare, go to prom and celebrate after, I began to understand their thinking had become a natural continuum. Their education allowed them to apply their knowledge through the very practical vehicle of real life. The exercise also spoke to their need to build off each other and to use this energy and synergy to create new ideas. As they chided one another for silly comments, flow was in the room. Students moved with ease, self-corrected, immediately adapted to new ideas and offered new solutions. All the while, I thought: if someone from the outside world came into this room, what they may see was so very different from what I and the young people were learning and experiencing.

The current model of schooling does not match the context of the work world of the 21st century. Schools need to realign their set-up to motivate every student by presenting opportunities to grow within today's environment.

Student Success Triangle

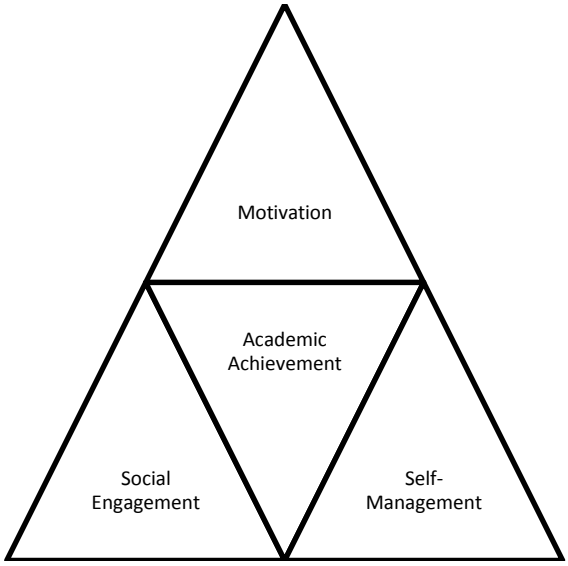
> **Principal:** We made a breakthrough today when we were talking about the way the school leverages its outside resources and we connected this (and the triangle) to [the researcher's] Asset based paradigm.

McClellan's white paper on the Theory of Student Success Triangle (2012) notes that in the world of science and engineering an equilateral triangle is the strongest two-dimensional geometric shape. The equilateral triangle has the ability to withstand immense load force without deformation. If a load is applied to any vertex or side, it is evenly distributed by all sides and, because the sides cannot change length, the shape remains stable. When the same is applied to another shape, the forces are applied to the connectors and can make the sides pivot, collapsing the shape. (http://www.reference.com/motif/Science/why-is-the-triangle-the-strongest-shape)

Similarly, maximizing and sustaining student achievement is dependent upon supporting student development within three critical components that are connected to one another. McClellan recalibrates these components of non-academic success (Self-Management, Motivation, and Social Engagement) to show that when present in full capacity and connected to each other systematically, they form the boundaries necessary for maximized sustained academic achievement. His work indicates that the values associated with academic potential need to be aligned and measured in a tri-faceted manner. His contribution is that students engaged within an ecosystem such as the one at MC Squared are able to withstand immense force (life and learning challenges) without reducing their potential for academic success.

Figure 2:

Student Success Triangle [31]



> **Principal:** I really look forward to our conversations. We always begin with a specific list of deliverables to get done `during our conversations and we never seem to get our deliverables completed but the dialogue is very good. We talk about the school and spend time connecting what is happening at the school with the research that we have read. I will share how I perceive a situation and she [researcher] will connect it to some research or theory and then explain the theory to me. It is really incredible because there are things that I know and feel but haven't necessarily been able to articulate them. She usually knows some research or theory to connect with what I am describing. Our conversations are classic examples of Heifetz's ideas about the leader being able to be on the dance floor and on the balcony. After we talk, I find myself thinking about the researcher when I am dealing with real situations. It helps me to have frameworks from which to apply action. I have started to bring separate lists to these meetings just to get her opinion as a researcher on certain situations.

Document and artifact review

The students' narratives were not the only source of data for the assessment. The research team also examined documents and artifacts in the form of school records and experiences. As a supplement to surveys and individual and group interviews, this form of data collection provided a different perspective on the case being studied (Marshall & Rossman, 2006). Two types of artifacts were

[31] McClellan (2012) Theory of Student Success Triangle

analyzed for this study: artifacts from the six identified students, and third party reports completed and presented to the school.

In order to gain a deeper understanding of each of the six students studied, a thorough review of available records was completed. The following documents (as available) were reviewed for each of the six participants:

- Application and information from initial interview for school entrance
- Report cards (any written communication)
- PSEOP credits
- Internship experiences
- Career aspirations
- Family size and history (if available)
- Background of school experience prior to entering MC Squared

> **Researcher:** However, while the data and method defined the structure of the evaluation process, it was the marriage of the data interpretation with the principal's framework and the researcher's parallel experience in the school that allowed for a new depth of data analysis.

Findings

The principal and researcher uncovered three main themes in the course of their evaluation: 1) context, play and space matter in creating, understanding and defining events; 2) allowing an entropic process of learning to occur without trying to define it or limit it at the time of the events provides opportunity to later deliver a rich linear explanation of context and experience; 3) grit, trust and uneasiness are critical elements allowing colleagues to work together and achieve a higher level of understanding.

> **Principal:** I am finding myself looking at what I see at the school and outside the school from a different point of view. I can't go back now. I have come to understand the work I do within the framework of myself, the school, my community and now in the way of an academic. The research project is complete, the report is done; but now I realize it will never be done.

> **Researcher:** Questions lead to more questions ~ staying focused and learning how to unravel this project from the inside out and from the outside in while being a part of the school has changed my life. Understanding context, and being able to explore it in an organized pathway, came from letting the process lead. I thought I got it before starting this research, but I did not really understand how little I knew until we finished the report.

Researcher and practitioner set out on this examination to understand the role of non-academic factors in a school and its students' success. What evolved through

the experience was a deeper understanding of the process of this evaluation. The researcher and practitioner gained a greater appreciation of each other's perspective, which in turn enhanced the process. The researcher garnered a new perspective on the students and the practitioner was tutored in the research method. These lessons enhanced the research in ways not otherwise attainable.

Conclusion

> **Principal:** We meet today to talk about the findings of the surveys. The researcher spent a year teaching a course during the evaluation process to a different group of seniors, learning their stories, their strengths and weaknesses, and the manner in which their journeys evolved. Having this parallel experience provided an ongoing filter to take the outcomes learned from the data in the study and think about them in a very lively and interactive manner.
>
> **Researcher:** As a researcher, the themes that emerged from teaching a capstone class, and interpretation of the data from the actual evaluation, allowed me to digest it all in a completely new manner: the marriage of participatory action research and case study. The principal's insights from his world were invaluable to truly understanding my data and my own experiences in the school. This space we created for open conversation helped advance my understanding and commitment to the process.

A traditional research method would likely yield a good understanding of non-academic factors and their role in the success of MC^2 STEM and its students. However, the opportunity for regular discourse between researcher and practitioner provided a much deeper interdisciplinary understanding of these factors. This understanding provides a new lens through which to view other social constructs.

It should be noted that the success of the school rests on the success of the students. It is they who reap the benefit of the asset-based paradigm. The evaluation process highlighted several components to the success of MC^2 STEM and its students. Follow up evaluation has begun with the same questions, now examining the first cohort's year one year post graduation and a new cohort. The adaptability and flexibility of the school's learning model allowed incorporation of existing knowledge, included experiences outside of the normal classroom, and encouraged thinking "outside of the box," all coming together to create something that was greater than the sum of its parts.

References

Bransford, J. D., Brown, A. L., & Cocking, R. R. (Eds.). (2000). *How People Learn*. Washington, DC: National Academy Press.

Bruner, J. (1996). *The culture of education.* Cambridge, MA: Harvard University Press.

Connelly, F. M., & Clandinin, D. J. (1990). Stories of experience and narrative

inquiry. Educational Researcher 19(4), 2-15.
Connelly, F. M., & Clandinin, D. J. (1994). Personal experience methods. In N. K. Denzin and Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 413-427). Newbury Park, CA: Sage Publications.
Clandinin, D.J. & Connelly, F.M, (2000) Narrative Inquiry. San Francisco: Jossey-Bass
Grumet, M. (1991). The politics of personal knowledge. In C. Witherell & N. Noddings (Eds.), *Stories lives tell: Narrative and dialogue in education* (pp.67-77). New York: Teachers College Press.
Kretzmann, J. P., & McKnight, J. L. (1993). *Building communities from the inside out: A path toward finding and mobilizing a community's assets.* Skokie, IL: ACTA Publications.
Marshall, C., & Rossman, G. (2006). *Doing qualitative research (4th ed.).* London: Sage.
Robbins, S.B., Lauver, K., Le, H., Davis, D. & Langley. R. (2004). Do psycho-social and study skill factors predict college outcomes? A meta-analysis. *Psychological Bulletin*, *130*(2), 261-288.
Wagner, T. (2008). *The global achievement gap: Why even our best schools don't teach the new survival skills our children need--and what we can do about it.* New York, NY: Basic Books
Weinberg, A. S. (1999). The university and the hamlets: Revitalizing low-income communities through university outreach and community visioning exercises. *American Behavioral Scientist*, *42*(5), 800-813.
Weisblat, G. (September, 2011). *Asset-Based Paradigm for Organizational Innovation and Effectiveness in the Non-Profit Community*. Unpublished paper presented at the Kresge Scholars Conference, November, 2011
Weisblat, G., & Sell, C. (2012), Starting Early: Teaching graduate students transferable skills beyond the discipline. *Journal of Research Administration*, 43(1), pp. 60-84.
Witherell, C., & Noddings, N. (Eds.). (1991). *Stories lives tell: Narrative and dialogue in education*. New York: Teachers College Press.
Zula, K. J., & Chermack. T. J. (2007). Human capital planning: A review of literature and implications for human resource development. *Human Resource Development Review, 6*(3), 245-262.