

## **Annotated Excerpts from Successful Proposals**

What does it take to assemble a high quality proposal and demonstrate your research team's capacity to conduct the work?

To guide potential applicants, we have developed this collection of annotated excerpts from exemplar proposals. These select excerpts showcase the kind of thinking, theorizing, and methodological rigor we expect to see in proposals, whether one is conducting a qualitative, mixed method, or experimental study. These examples are intended as guides. They do not, however, dictate the specific topic or study design that we are seeking. In fact, we have excerpted examples from full proposals that were completed as part of our former research initiative on understanding youth social settings. Even still, they are great examples of the qualities we hope to see in the most competitive proposals. These include clear thinking, research questions that are motivated by theory, well-defined terms, and tight alignment between the literature review, research questions, methods, and analyses.

We hope you find this resource useful.

### **Proposals included, in order:**

**Cynthia Lewis and Cassandra Scharber, University of Minnesota**

"Bright Stars: Technology-Mediated Urban Settings for High-School Aged Youth as Pathways for Engaged Learning"

**Reed Larson, University of Illinois**

"Development of Self-Direction in Youth-Program-Family Interaction Systems: Latino and Non-Latino Adolescents"

**Jill V. Hamm, University of North Carolina at Chapel Hill, and Thomas W. Farmer, Penn State University**

"Networks of Teachers Affects Children in Transition"

## EXCERPT FROM:

### **Bright Stars: Technology-Mediated Urban Settings for High-School Aged Youth as Pathways for Engaged Learning**

**Cynthia Lewis and Cassandra Scharber, University of Minnesota**

*It was one of the classes during the day that I got excited to go to, and I don't really know how else to explain it . . . It was just kind of like, what are we going to do today, or what new thing are we gonna learn about, or what are we gonna write about? . . . With the things we do, like the blog posts or the advertisement we created, I feel [technology] gives me more opportunities to be creative within myself.*

Allison (10<sup>th</sup> grade) talking about her English class

*It's fun and you also get to learn new things and be able to do things you wouldn't be able to do in the outer world, I guess . . . Like a college education.*

Carissa (9th grade) talking about her experiences in a summer community-based technology program

*I can use what we do here in school. For example, iMovie. So, I use it here and I know how to make trailer and stuff. And, then for school, we do like, projects, iMovies and stuff. So, it's like, "I know this. I can help you guys."*

Mahdi (11<sup>th</sup> grade) talking about her experiences as a mentor in a library-based technology program

These youth describe what it means to be engaged learners in three different settings, a public urban high school, an urban community-based organization (CBO), and an urban library program. If we accept Shernoff's (2013) definition of engagement as "the heightened, simultaneous experience of concentration, interest, and enjoyment in the task at hand" (p. 12), then these youth certainly fit the bill. Yet all three of the settings to which they refer serve low- income racially and ethnically diverse youth for whom disparities in educational opportunities and outcomes are typically persistent and seemingly intractable (Rowan, Hall, & Haycock, 2010). Engagement has been identified as one of the most significant predictors of learning and achievement among youth (Finn & Zimmer, 2012; Kelly, 2008; Skinner & Pitzer, 2012) and is also tied to positive youth development and decreases in negative emotions and behaviors (Christenson, Reschly, & Wylie 2012; Li, Bebiroglu, Phelps, Lerner, & Lerner, 2014). Engagement/disengagement is also recognized as a correlating factor with decisions that lead to dropping out of high school (Finn, 1989; Yazzie-Mintz, 2010). Klem and Connell (2004) estimate that 40-60% of high school students who have not dropped out are chronically disengaged, with engagement levels declining by almost 10% as youth transition to high school settings (Kelly & Price, 2014).

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*The first paragraph provides a clear statement of the puzzle at the heart of the proposed study and offers student engagement as a possible way to reduce inequalities in educational opportunities and outcomes.*

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Given these predictions and the importance of youth engagement in formal and non-formal settings, we wanted to understand more about settings that are known to effectively promote engagement in learning. Is there something about these settings that promotes the level of engagement we hear in the voices of the young people quoted here? How do particular activities, goals, and tools in each setting influence youth engagement in learning? And what do youth learn

as they engage in these activities? In 2012-2013 we conducted a funded pilot study of three high-quality settings (school, library, and CBO) that positioned youth (including those quoted here) as engaged learners through the use of digital technologies. As highlighted in the youth voices we have quoted and echoed throughout our pilot findings, youth identify the central role of digital technology in enhancing their engagement. Indeed, promising evidence indicates that opportunities to create and solve problems using technology motivates young people to engage in learning (e.g., Barron, Walter, Martin, & Schatz, 2010; Papert, 1980; Peppler, 2013).

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*The authors introduce a potential lever for enhancing engagement and provide support for this claim.*

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Our proposed study closely examines the complex features of school, library, and community-based urban settings that position youth as knowledge producers, meaning-makers, and creators of their own learning through the use of technologies. Typically, these settings function independently with little knowledge and few strategies shared across settings about how best to engage youth in learning (Erstad, Gilje, Sefton-Green, & Vasbo, 2009; Heath & McLaughlin, 1994; Sefton-Green, 2012; Shernoff, 2013; Shin & Yoshikawa, 2008). Yet, scholars of “connected” learning (Ito et al., 2013) and “pathways” for learning (Barron et al., 2010; Halpern, 2013) argue that learning develops across multiple settings, informal and formal, and both settings are in need of close examination. Our study focuses on three primary settings to examine youth engagement in learning in order to improve practices in similar settings, inform practices across settings (locally and nationally), and identify the affordances and constraints of each setting.

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*The second and third paragraphs provide clear statements about what the research team proposes to do and why.*

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## Major Research Questions

*How do school, library, and community-based urban settings position youth as engaged learners through the use of digital technologies?* Specifically, (a) how is engagement demonstrated in each setting? (2) how do particular activities, digital technologies, and social relationships in each setting (S, L, C) influence youth engagement in learning? (c) what do youth learn in each setting as they engage in these activities, digital technologies, and social relationships? and (d) for a subset of youth participants, how does engagement in learning vary in a comparison setting?

## Rationale

*Connections to W.T. Grant Foundation Initiatives.* This research is directly focused on investigating high quality settings that promote engagement in learning and reduce inequalities in youth development. Given persistent gaps in achievement and opportunity, there is an urgent need to understand settings that effectively make use of digital tools to promote engagement in learning for youth within urban communities. Minneapolis and St. Paul are important settings for this study given that the achievement gaps in these two cities are some the largest in the nation (Minnesota Department of Education, 2013). Further, while the state graduation rate is improving (79% in 2013), the differences between white students (85%) and their black (57%), Hispanic (58%), and American Indian (49%) peers remains dire (Minnesota Department of Education, 2013). Over 70% of youth who attend Minneapolis and Saint Paul Public Schools are from low-income households of color. It is these youth—minoritized youth from low-income households—who are participants in the settings we have chosen

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*The rationale clearly states why the proposed settings (i.e., the cities and public school systems) are important to the study.*

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for this study.

The current problem of low rates of high school retention in urban settings will not abate without focused attention to engagement in learning and on offering youth the tools they need to become digitally literate, creative, critical citizens of the world. Whereas the digital revolution and resulting divide were about access to these technological tools above all else (Warschauer, 2003; Warschauer, Knobel, & Slone, 2004; Warschauer & Matuchniak, 2010), the current revolution is one of *participation*, where it is imperative for youth to have access to both the technology and the skills (technical and cultural) to create, evaluate, and contribute to society (Jenkins, 2009).

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*This section explains the focus on a particular tool (e.g., technology) and its potential to create change.*

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The participation gap closest to disappearing is that between whites and other racial groups, but low household income and lack of a high school education are still significant negative predictors of Internet use (Zickuhr & Smith, 2012). This broader context speaks to the need for this study of engagement in learning that has the potential to create pathways for learning across settings that serve Twin Cities' urban youth. Our research focused on settings that offer these resources to mostly low-income marginalized youth is essential to a democratic vision of access and opportunity. To further support these efforts, we established a local network of youth educators who are energized about our ongoing conversations, research, and resource sharing called the Minnesota Digital Youth Educators Network. We have already built on these strong indicators of interest and capacity and conducted a funded pilot study in 2012-2013 (described later).

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*The proposal indicates the particular inequalities that make the proposed study important.*

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A first step in establishing pathways across settings for engagement within technology-mediated learning is to examine the key features in each. Both Twin Cities' public library systems have recently enhanced their capacities to offer youth workshops for creating digital media. An increasing number of community-based organizations also are focused on digital media creation in order to offer youth access to 21st Century capacities for learning. Both Minneapolis and Saint Paul Public School districts have strong initiatives for integrating digital media creation and analysis into their curricula. This is an optimal time to study the intersection of setting, learning, and engagement in technology-mediated spaces. Ito et al., (2013), Halpern (2013), and Shernoff (2013) argue that institutions that support engaged learning must build bridges as well as cross-institutional knowledge so they can collectively better support youth. There is much to learn on local and national levels with this study, including a deeper understanding of how similar settings can better support youth and how formal and informal settings can be mutually informed, laying the ground work for coordinated, cohesive learning pathways (Halpern, 2013).

*Advancing Theory and Research.* Recent research has provided important findings about the learning affordances of specific digital tools and the characteristics, interests, and identities of the learners in using those tools in formal and informal settings (e.g., Black, 2008; Cohen, Kahne, Bowyer, Middaugh, & Rogowski, 2012; Gee, 2007; Hull & Katz, 2006; Ito et al., 2009). Missing from this body of work are close examinations of complex technology-mediated learning settings<sup>1</sup> “through the lens of equity and opportunity” (Ito et al., 2013, p. 25). Our research responds to this challenge by focusing on learning settings for minoritized youth that successfully incorporate technology as a tool within complex sets of interacting components.

To better understand this complexity and its effects on engagement in learning, Activity Theory (AT) serves as our theoretical framework. Our goal is to illuminate the dynamic and interdependent interactions among activity system features that include, for example, particular norms for interaction, divisions of labor, and forms of community ethos. Tseng and Seidman (2007) argue that research on settings for youth development would advance through a more complex vision of settings borrowed from cultural anthropologists, whose conceptual tools include observations of norms, activities, scripts for behavior and youth networks. As our methodology makes clear, these foci are similar to those used in Activity Theory, which builds on the Neo-Vygotskian work of cultural psychologists (e.g., Michael Coles, James Wertsch) and anthropologists (e.g., Barbara Rogoff, Jean Lave). Given our interest in learning within formal and non-formal settings, AT offers the added benefit of emphasizing the mediational role of signs and tools used in object-driven activities such as learning. This research is grounded in the theoretical and empirical scholarship of Activity Theory, connected learning, participatory culture, and engagement in learning.

*The team introduces Activity Theory, which serves as their theoretical framework.*

*Theory and Literature Connections: Activity Theory.* As a theoretical framework, AT is useful for understanding engaged learning in technology-mediated settings. Rooted in theories first developed by Vygotsky (1962) and Leont'ev (1974), AT suggests human activity is goal-oriented and mediated by symbolic and concrete tools which have particular social, cultural, and historical uses within the system (Engeström, 1999). In our research, youth are purposeful actors creating meaning with tools to meet goals within a system. Furthermore, our theoretical framework views learning not as primarily an individual mental act but as a social act dependent upon interaction among people and their tools and technologies (Rogoff, 1995; Wenger, 1998). In our research, the idea of learning as transformation through collective use of technology within social learning settings is central.

*This section defines and describes the framework as it relates to the proposed project and the key themes of engagement and learning.*

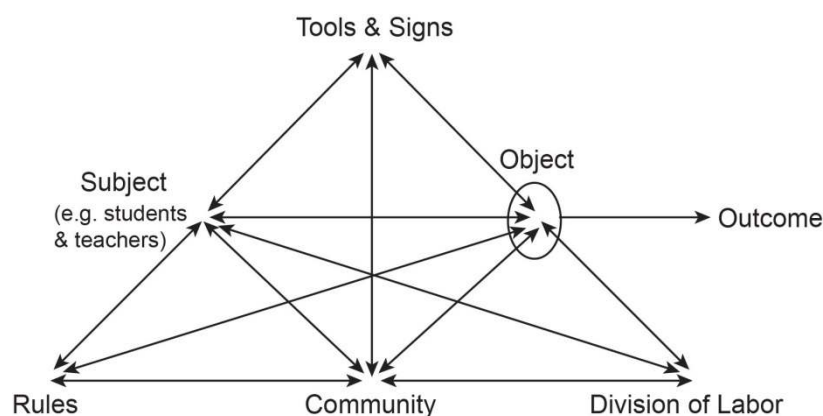
AT holds that individuals are indivisible from their contexts. Social settings shape the individuals who are situated within them and vice-versa. The activity that occurs within social settings “does not only transform the object, but also the participant and its mediated relations” (Cole & Engeström, 1993). This framework expands the unit of analysis to the activity within settings rather than the individual. Activity systems are not discrete, but rather intersect with other activity systems resulting in a framework for understanding settings and their effects on human action as a complex and dynamic interaction. In our study, the primary activity settings to be examined are our observations sites; however, as explained in our section on methodology, we will give secondary consideration to how each setting is shaped by its institutional context, both in terms of affordances and constraints related to engagement in learning with digital media.

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<sup>1</sup> Using the phrase “technology---mediated” rather than “technology---integrated” is consistent with our focus on Activity Theory. Central to AT is the analysis of cultural tools that mediate between human action and institutional/historical/cultural settings (Wertsch, 1995). Thus, the concept of mediation is critical to our understanding of the role of technology in formal and non---formal settings for youth. We are interested in how technology as a cultural tool functions in activity settings that involve youth as central creators of their own learning. We want to better understand the affordances of the tool that link the youth to the setting and its goals and learning objectives. We use the terms “digital media” and “digital technology” depending on the term used by our participants and by the scholars we cite.



Activity systems evolve through dialectical contradictions within the system. The types of contradictions that drive the evolution of activity systems are important dimensions of analysis, as fully explained in the data analysis section of this proposal.



The diagram provides reviewers with a useful visual aid. This is a good use of space.

Figure 1: Illustration of Activity Theory (Engeström, 1999).

Within an AT framework, youth are purposeful actors who bring their own histories and cultural repertoires to collective activity, creating meaning with tools to meet goals within a socially and culturally meaningful system (Gutiérrez & Rogoff, 2003). The elements of activity systems delineated in our research questions interact in ways that must be understood in order to arrive at a nuanced understanding of engagement as a dynamic process with links to learning and participation. The section on data analysis delineates our method of analysis (and explains the components of the triangle that make up the activity system). Activity System Analysis (ASA) is the methodology aligned with an AT framework (Yamagata-Lynch, 2010).

The narrative consistently situates the discussion of prior work around Activity Theory and then relates it back to the proposed project.

*Theory and Literature Connections: Connected Learning and Participatory Culture.* The increasing emphasis on “transforming education” using technology-infused learning in national policy initiatives (e.g., USDOE, 2010; H.R. 521, 2013) underscores the importance of moving beyond nascent knowledge of technology skill acquisition to what some scholars are calling “connected learning” (Ito et al., 2013). Connected learning focuses on learning “pathways” that move across formal and informal settings to transform the very nature of learning – what it means, how it occurs, and where it takes place (Barron et al., 2010; Hobbs & Frost, 2003; Jenkins, 2009; Peppler, 2013). Such learning has been described as interactive, improvisational, participatory, and social (Jenkins, 2009), reflecting new epistemologies and pedagogies for learning that occur in flexible settings with learning extending beyond school. Knobel and Lankshear (2007) argue that new literacies have led to new social practices related to producing, representing, and consuming knowledge. Skills associated with “participatory culture” include such skills as “transmedia navigation” which involves “the ability to follow the flow of stories and information across multiple modalities” and “distributed cognition,” which involves the ability “to interact meaningfully with tools that expand mental capacity” (Jenkins, 2009, p. 4).

The research team develops a link between learning and engagement, and motivates the types of settings and experiences that will be studied.

Focusing on schools alone to develop these capacities is not the answer; instead, pathways for learning must be established in and across multiple settings (Halpern, 2013). Because youth often participate in new media culture independently, outside of any formal learning setting, Jenkins (2009) states that some educators feel that “youths can simply acquire these skills [media literacies] on their own without adult intervention or supervision” (p. 15). However, Jenkins argues that without adult intervention, three core issues of new media culture will not be addressed:

1. *The Participation Gap*: access to skills, opportunities, experiences and knowledge for full participation;
2. *The Transparency Problem*: challenges that youth face learning to critically evaluate the media they consume as well as create, and how media shape perceptions of the world;
3. *Ethics Challenge*: the breakdown of traditional forms of professional training and socialization that might prepare youth for their increasingly public roles as media makers and community participants.

The sites we propose to study address these core issues, which are important for youth as creators and as consumers of digital media. Our own research has shown the power of

participatory culture in an urban high school program focused on critical literacy and academic rigor through digital media studies. We found that students were engaged in learning when they had a chance to produce rather than merely analyze digital media, circulate their work for a range of audiences, use their work to represent their identities, and take up agentic stances to comment on injustice and effect change (e.g., Lewis & Causey, in press; Lewis, Doerr-Stevens, Dockter-Tierney, & Scharber, 2012).

Participatory culture is viewed as the basis for contemporary learning, civic engagement, and communication (Delwiche & Henderson, 2012; Kafai & Peppler, 2011; Rheingold, 2012; Soep, 2014). Low-income youth lag behind more well-resourced youth who regularly create digital content to participate in local and global meaning-making and communication. Because our research seeks to better understand what *is* working rather than what has not been effective in addressing this “participation gap” (Jenkins, 2009), our focus is on urban settings that provide regular opportunities for youth to use technology and that engage them in participatory culture. In their research on the factors that most influence eighth-grade students’ uses of technological tools for empowering and generative purpose, Barron et al. (2010) point out that although access to technology tools is important, “we need to attend to the broader learning ecologies that students access and develop, and find ways to make these more diverse, generative, and interconnected” (p. 188). However, before creating effective pathways across settings, we must fully understand how to create effective learning ecologies within settings where youth typically participate in technology-mediated learning. Our goal is provide a detailed account of such settings and their affordances and constraints in creating learning ecologies that engage youth.

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*The research team identifies limitations and gaps in the existing body of research evidence.*

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*The team explicitly states how the proposed work will address gaps in the literature and extend prior research. The team also signals a shift in focus. They are moving from understanding what the problems are to identifying ways to address them. In proposals on reducing inequality, the narrative should include more information about how the research will shed light on ways to respond to these challenges.*

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*Theory and Literature Connections: Engagement and Learning.* Engagement can be conceptualized as “the experience of simultaneous, heightened concentration, enjoyment, and interest” (Shernoff, 2013, pg. 12). All three of these elements are strongly related to learning (Shernoff & Csikszentmihalyi, 2009), with engagement increasing when youths’ passions, participation, and accomplishments are cultivated (Benson & Scales, 2007). This conceptualization of engagement is also referred to as “vital engagement” (Nakamura, 2001), “spark” (Benson & Scales, 2007), and “flow” (Csikszentmihalyi, 1990). Scholars working in the area of “connected learning” (already discussed) have built on these insights into engagement to emphasize the importance of what has been termed “interest-driven” learning (Ito et al., 2013; Peppler, 2013).

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*This entire section provides an in-depth discussion of the literature on engagement and learning. The team clearly defines key terms and grounds the discussion in the framework (i.e., Activity Theory). This thoughtful presentation helps reviewers anticipate the study's likely theoretical contributions.*

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Sustaining the engaged learning these scholars describe requires conditions that support engagement. Recent scholarship on engagement advocates for a systems-oriented construct of engagement as the nexus linking young people’s agency to their social worlds and institutional culture of their school or other learning setting (Lawson & Lawson, 2013). Based on their meta- analysis of research on school engagement, Fredricks, Blumenfeld, and Paris (2004) conclude that research investigating the multidimensionality of engagement is needed in order to consider the dynamic interplay of the behavioral, emotional, and cognitive aspects of engagement. Bartko (2005) endorses the multidimensional nature of engagement and notes that the behavioral, emotional and cognitive dimensions may be equally, or even more, applicable for outside-of- school settings than school settings. Behavioral engagement is indicated through participatory involvement in activities (i.e., attendance, attention, preparation). Emotional engagement is indicated by a positive or negative attitude toward the setting (people and tasks) and a sense of belonging. Cognitive engagement is indicated by involvement and persistence related to tasks, such as task completion, and efforts to master skills as well as comprehending complex ideas. Fredricks (2011) calls for research that investigates the multidimensional view of engagement and examines influences that include characteristics of facilitators, peers, structures, and tasks. This proposed study answers this call through measures of all dimensions and by focusing on engagement through the sociocultural lens of Activity Theory.

Complementing our multidimensional construct of engagement framework is our theoretical framework of learning that builds on Vygotsky (1935/1978) to situate learning not as primarily an individual mental act but as a social act dependent upon interaction among people and their tools and technologies (Engeström & Sannino, 2010; Lave, 1996; Rogoff, 1995; Wenger, 1998). Scholarship on learning as a social practice has many strands, and reviewing the distinctions among them is beyond the scope of this review of literature. However, scholarship that emphasizes participation in communities is especially relevant to our project and, thus, will be briefly summarized. For both Rogoff (1995) and Lave (1996), participation starts with high levels of scaffolding that are gradually released as learners take on more legitimacy and responsibility. Rogoff calls this process “participatory appropriation” (1995, p. 151), which defines learning as the process by which individuals make meaning of activities in communities and, through their participation, ultimately transform the self as well as the setting. This transformation of self can be viewed as developing a learning identity (Wortham, 2004) and integrally connects learning to social interaction (Lewis & Ketter, 2011). Based on her research on learning communities outside of schools, Lave argues that learning is about constructing



“identities in practice” (1996, p. 157). Wenger (1998) also views learning as arising from the identity work that occurs through participation in communities of practice, communities “created over time by the sustained pursuit of a shared enterprise” (p. 45). Participation in such communities is always a work in progress shaped by individual and collective efforts to create coherence through participation in varied social contexts. Related specifically to the scholarship on “communities of practice” (Lave & Wenger, 1991; Wenger 1998), Barton and Hamilton (2005) argue that this work does not sufficiently examine the mediating nature of language in learning. However, as Wells (1996) and Moje and Lewis (2007) have pointed out, AT is conducive to an examination of language use because it addresses norms of interaction as part of its emphasis on sign/tool use (language being a central ‘sign’ in the formation of community), a concept more fully developed in the methodology section of this proposal.

Renowned AT scholars, Engeström and Sannino (2010) have developed a conceptual model of learning—different from both the acquisition and participation models—called “expansive learning.” Expansive learning involves learners constructing concepts or objects through collective activity that then moves the collectivity toward transformation. In this way, settings are transformed by learners, just as learners are transformed by their social settings. The concept of learning as transformation is further elucidated by Stetsenko (2008) who contends that “the collaborative purposeful transformation of the world is the principled grounding for learning and development” (p. 471). In our research, this idea of mutual change through collective use of digital technology within social settings is central and aligned with our pilot study findings as described in the next section. As participant-observers in the settings we study we want to understand learning, as Vadeboncoeur (2006) suggests, not as a predetermined set of principles, but as it is defined by what counts as learning within each setting. To answer our third research question about what students learn, we will first determine what counts as learning within setting.

*Pilot Study: Hypotheses and Findings.* In 2012-2013, we conducted a funded pilot study of one site in each of three settings (S, L, C). This pilot helped us to refine our design, hone instruments, test hypotheses, and formulate preliminary findings (Scharber, Lewis, Isaacson, & Pyscher, 2014), all of which have informed this proposed study. For example, in addressing our second research question about particular aspects of the activity system that promote engagement, we hypothesized that the role of the facilitator would be central in making these systems “high quality,” but we wanted to learn more about *how* this happened as well as to explore the relationship between the facilitator (“subject”) and the “object” (problem space/purpose). Activity System Analysis (fully described in the section on methodology) helped illuminate that while the objects were different for each setting (e.g., developing expertise through mentorship (library), social justice/social critique (school), and community exploration with media skills (community-based organization)), the objects were collectively taken up by all social actors within each system. The settings shared the same assumptions about the nature of learning (e.g., learning is creation-centric, goal-driven, socially-embedded, peer/team orientated) and these assumptions co-occurred with youth engagement in the overarching object of each activity system.

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*The research team strengthens their case for the current work with evidence from a pilot study.*

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In their work on game-based learning, Barab, Gresalfi, and Ingram-Goble (2010, p. 526) describe three core elements of transformational play, which they equate with deep learning: “person with intentionality” (social actors have agency to act and transform signs and relationships) “content

with legitimacy” (conceptual/technical constructs are needed in order to solve problems) and “context with consequentiality” (social actors can modify contexts in ways that lead to new purposes and outcomes). These three elements of transformational play were present in all of our pilot settings. In all three settings, youth had multiple opportunities to make decisions, develop relationships, and transform signs – e.g. analyzing media in new ways to understand racism and producing media to interrupt racism. In all three, the problems posed required skills or academic content to complete, and in all three, the setting was modified by participants, thus leading to new purposes and outcomes. For example in the school setting, a student used a forbidden smartphone to provide the class with information about ethical relief organizations related to a book the students had read about Hurricane Katrina.

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*The research team provided enough detail for reviewers to understand the programs, how they operate, the role of facilitators, and what youth did.*

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The facilitators played a crucial role in communicating, modeling, and reaffirming assumptions about learning that included these core elements of play/deep learning, and were expert at making the object/problem space compelling enough for deep investment from youth participants. The "bright star" element across these settings is that the object was not dictated but rather facilitators invited and expected youth to take up and transform the object, share in decision making and participation (e.g., equitable division of labor), and bring their own related purposes to bear. Moreover, although we had speculated that deep engagement might not hold in the classroom setting due to mandatory attendance, this did not emerge as a finding. Instead, youth were highly engaged in the classroom we studied with digital media creation as a central feature of an activity system that included extensive opportunities for connections related both to the students' identities and to the institutional community to which they belonged.

Contradictions between/among activity components drive change within the system or between intersecting systems. In our pilot study, for example, the larger library activity system had an impact on the sense of belonging present among the teen team members who facilitated weekly drop-in technology workshops for other teens. This team operated within in a small library setting within a high poverty area. The team lacked a designated space in the library to prepare for and conduct their workshops, as there were scheduling overlaps (in time and space) with an after-school homework help program. These realities caused the program facilitator to worry about what she perceive as the lack of value placed on the program. She also was concerned that the teen team would lack a sense of worth, that they would feel undervalued. She preferred the main library branch in another part of the city, which is a modern, newly designed space—where she occasionally met with the teen team to plan for their workshops with neighborhood youth back in their home library. However, the interviews with the teen team told a different story. The teen team actually preferred the small, cramped library in their neighborhood and felt connected to a larger purpose when in that space. Some youth talked about feeling very comfortable no matter how small or undesignated their program space. Instead, they saw themselves as representatives of the neighborhood library as a whole—not just the teen technology team. As researchers, then, it became even more important to understand how community norms were effectively co-constructed among the participants in this program and related to the larger institution, and AT helped us do this through understanding more about the social actors (teen tech team) in terms of their social and cultural histories and ties to the neighborhood.

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*The description of the pilot study provides the questions motivating the work, explains what the pilot study allowed the researchers to do, (e.g., hone instruments and test hypotheses), and lays out how the pilot work will inform the proposed study.*

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Language proved to have a powerful, shaping influence on the formation of community norms and the establishment of trust in each of our pilot settings. In general, the language use in all settings was dialogic (Nystrand, Wu, Gamoran, Zeiser, & Long, 2003), characterized by student-generated questions, seamless weaving of formal and informal language, official and unofficial knowledge, “new” (digital media) and “old” (print texts) technologies, and animated sharing of multiple perspectives that continually referenced previous speakers, class texts, and media sources. This intertextuality (Bakhtin, 1986) — uses of language that are steeped in others’ words, ideas, and texts—was central to the dynamic process of establishing a learning community in each setting. Of course, even in optimum settings, communities have conflict and must negotiate the politics of participation that stem from unequal power relations and competing social and cultural histories (Lewis, Enciso, & Moje, 2007; Linehan & McCarthy, 2001). In our observations of the pilot school classroom, for example, early discussions proved to be dominated by white male students despite the fact that the majority of students in the class were African American, African, and Latino/a. From an activity theory perspective, however, this contradiction between nodes (social actors, community, and division of labor) drove change in that the form of dialogue led to new participation structures. All five of our focal students in this setting spoke to the importance of dialogue about difficult issues and their sense of trust in the community; and, although different issues arose, the role of language was very important to understanding engagement in learning within this classroom as well as in all three pilot settings. As already mentioned, several scholars have found that the scholarship on communities of practice does not adequately account for the role of language in learning and identity development. Although our pilot study did not include detailed discourse analysis, our methodology section proposes targeted uses of this method as an important addition to our proposed study.

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*When appropriate, the description links the pilot work back to theory.*

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These findings provide promising threads to pursue in a more robust study of these high-quality settings. Due to funding constraints, our pilot study did not include the engagement surveys, engagement protocol, and other quantitative measures that will lead to richer analyses and more comprehensive findings in the proposed study. What makes these settings work well? These deep examinations of technology-mediated learning settings will inform both within and cross-setting knowledge, fuel potential collaborations, and enable us to better support urban youth. In their report on connected learning, Ito et al. (2013) assert that without “a proactive reform agenda that begins with questions of equity, leverages both in-school and out-of-school learning, and embraces the opportunities new media offer for learning, we risk a growth in educational alienation by our most vulnerable populations” (p. 7). In closely examining settings that work well to engage youth in learning, we hope our research will provide a roadmap for such reforms.

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*The research team describes what the pilot study did not do, and sets up the proposed study.*

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## Research Questions

*How do school, library, and community-based urban settings position youth as engaged learners through the use of digital technologies?*

*The research questions are clearly defined and well situated from the prior discussion of theoretical context.*

**How do school, library, and community-based urban settings position youth as engaged learners through the use of digital technologies?**

<b>1. How is engagement demonstrated in each setting?</b>
What are the expectations for engagement in each setting? How is engagement (cognitive, emotional, behavioral, sociocultural) evident? How are the expectations for engagement similar and varied across settings?
<b>2. How do particular activities, digital technologies, and social relationships in each setting (S, L, C) influence youth engagement in learning?</b>
How does each setting function as an activity system with digital technology as a central tool in object-driven activity? What do the activity systems have in common? How do the activity systems differ? How is each activity system shaped by its larger institutional context? How is engagement tied to individual and interdependent components of the activity system?
<b>3. What do youth learn in each setting as they engage in these activities, digital technologies, and social relationships?</b>
What assumptions about learning are evident in each setting? What expectations about learning are evident in each setting? What learning goals are explicit or assumed in each setting? How are these aspects of learning similar and varied across settings? What do youth learn in each setting?
<b>4. For a subset of youth participants, how does engagement in learning vary in a comparison setting?</b>
How is the comparison setting similar or different than the primary study setting in which the youth participates? How is the youth participant's engagement (cognitive emotional, behavioral, or sociocultural) evident in the comparison setting?

## Research Methods

**Overview.** This two-year study (2015 & 2016) employs a mixed-methods embedded multi-case study design (Merriam, 2009) that includes both qualitative and quantitative measures of youth engagement in learning across formal and non-formal settings (see Appendix A, Figure 2). A funded pilot study was completed during 2012-2013. This pilot study enabled the research team to identify and coordinate appropriate research sites across the Twin Cities, test and select data collection instruments, and hone data collection and analysis strategies. We received IRB approval for the pilot and this proposed study in September 2012 (Assurance of Compliance Number: FWA00000312; IRB Number: 1209S19944) (see Appendix B).

**Settings and Participants.** The proposed study will focus on nine formal and non-formal learning sites within the Twin Cities where high-school aged youth (ages 14-18) actively use and create

with digital media through consistent and sustained access to technology. The focus is on school classrooms, library programs, and community based organizations because these are the three primary settings with clear boundaries where youth have opportunities to create and learn through the use of digital media. After-school programs were considered as an additional setting. However, we decided against adding this setting due to the characterization of after-school settings as frequently adopting school-based expectations and priorities (Sefton-Green, 2012; Vadeboncoeur, 2006), thus potentially blurring distinctions between settings and complicating data analysis.

Over the two-year duration of the study, three school classrooms (S1, S2, S3), three public library programs (L1, L2, L3), and three community-based organizations (C1, C2, C3) will serve as study sites. Library sites will include both open lab and focused workshop sites so that we can learn more about how different activity settings affect engagement in learning within the same institution. School sites will include high school English/Language Arts (ELA) classrooms. Limiting the focus to ELA classrooms is best suited to this study because the core standards for ELA include media literacy (21<sup>st</sup> century) standards that include both media production and analysis. Moreover, ELA classrooms tend to emphasize processes (e.g. writing/speaking/creating) over content, thus offering more opportunity for youth creation of digital media. Community-based organizations that highlight digital media creation in their informational documents will be selected so that researchers can count on extended durations for data collection that match the data collection periods (in duration rather than calendar schedules) for the library and school settings.

Participants will include youth and facilitators at each site. All youth and facilitators at each site will be recruited for participation in the study. Five to seven focal students will be identified at each site (9 sites) for individual interviews and more focused observations. In addition, two mini-case youth will be recruited from each setting (6 youth total; 2 S, 2L, 2C) to gather more information about their engagement in learning within another context outside of the primary setting (S, L, C) where we first encounter them.

Our collaboration with colleagues from the Center for Youth Development at the University of Minnesota confirmed our sense that communication, locally and nationally, across the three settings we wish to study has been rare. Together, in 2011, we formed a network of Twin Cities' youth workers and teachers with interests and experience in working with youth in technology-mediated settings (<http://lt.umn.edu/blog/updates/1081>). Network participants confirmed the lack of communication across settings, and expressed strong enthusiasm for developing resources and sharing knowledge to open new pathways for learning among youth. In response, we worked together to sponsor a well-attended symposium on digital media learning headlined by Dr. Nichole Pinkard (Co-Founder of the Digital Youth Network) that was attended by youth workers, media specialists, and teachers from across as well outside of the Twin Cities (<http://lt.umn.edu/blog/updates/1114>). We just hosted our second symposium for this network focused on youth production in digital-age civics in February 2014 featuring Dr. Elisabeth Soep (Senior Producer and Research Associate at Youth Radio) (<http://lt.umn.edu/blog/updates/446123>). We continue to be committed to conducting this research locally not only because the need is strong as discussed in our rationale, but also so that we can continue our work with local stakeholders, share findings, and collaborate together to offer Twin Cities' youth enhanced



opportunities to take up and design their own learning through digital media creation *within and across* multiple settings/institutions (Halpern, 2013; Ito et al., 2013). This focus on changing practice will also inform our work on local, state, and national advisory boards that inform policy.

*Site Selection.* We used criterion sampling (Patton, 2001) to identify case sites in our three setting categories. In order to select high-quality technology-mediated sites, we turned to criteria that are grounded in both practice and theory. Our pilot study aided in the selection of appropriate research sites. These practice-driven criteria are guiding our inclusion and selection of research sites:

- Youth actively use and create with digital media;
- Youth have consistent and sustained access to technology;
- Digital media production plays a central role in the learning processes;
- Recognition by external community or other entities as having quality programs (grants, awards).

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*The research team adopted a systematic approach to site selection.*

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In addition to being driven by practice-based criteria, our selection of research sites is also driven by theoretically-based criteria. Research sites must also meet three out of Jenkins' (2009) five criteria for encouraging "participatory culture:" (1) with relatively low barriers to artistic expression and civic engagement; (2) with strong support for creating and sharing one's creations with others; (3) with some type of informal mentorship whereby what is known by the most experienced is passed along to novices; (4) where members believe that their contributions matter; (5) where members feel some degree of social connection with one another. Specifically, we are interested in *how* strong sites that have these features of participatory culture engage youth in learning, and also in understanding the nuances within the complex nature of the "object" (problem space) of activity systems and how the object is fostered. Our research aims to understand how different settings (different activity systems) support *engaged learning*, an aim which extends the concept of "participatory culture" and links it to engagement and learning.

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*The narrative delineates the theoretical criteria driving the site selection strategy and the steps the team taken in the field to try and meet them.*

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We have used a combination of strategies to identify sites that meet our selection criteria: (a) sites that received external grants (e.g. the large grants from funding agencies that were awarded to both library systems to support the development of teen technology spaces); (b) principal and co-principal investigators' experiences in other professional capacities that have resulted in a depth of knowledge about sites in each setting category (e.g. previous research conducted in a teacher's classroom that provided knowledge about her consistent and sustained use of technology); and (c) ongoing discussions with the local network of youth workers, media specialists, and teachers whose work with youth involves digital media content creation; and (d) site demographics such as high numbers of students on "free and reduced lunch" (indicating low income) in the case of the urban schools we selected and, in all sites, youth from non-dominant, minoritized groups.

Three sites were included in our pilot study: one school classroom, one library, and one community-based organization. To date, six of the nine sites have been identified for inclusion in this larger study, including "Teen Tech" programs within both of the largest library systems in

the Twin Cities (*Hennepin County Library*: <http://www.hclib.org/pub/>, *St. Paul Public Library*: <http://www.sppl.org>), two high school ELA classrooms, and two community-based organizations that serve urban youth (*St. Paul Learning Network*: <http://spnn.org/youth> and *Intermedia Arts*: <http://intermediaarts.org>). Analysis and findings from our pilot study (Scharber, Lewis, Isaacson, & Pyscher, 2014) are guiding us in our selection of remaining sites based on a combination of the selection criteria already delineated and on our wish to select a range of sites that vary based on such factors as demographics and sources of funding.

*Design and Data Collection Methods.* We will employ a mixed-methods multi-case study design (Merriam, 2009), which will allow us to study several sub-units/cases (different sites) within each setting (case). We will utilize both qualitative and quantitative methods to study school (S), library (L), and community-based learning settings (C) over the course of two years. A mixed-methods design allows us to (a) take advantage of the strengths of qualitative research and the strengths of quantitative research, (b) compensate for the limitations of each method, and (c) triangulate our findings (Denzin, 2012; Patton, 2001). We will collect the qualitative and quantitative data in the same time frame and mix the data *within each site* throughout data collection, analysis, and interpretation—an integrated mixed-methods approach (Jang, McDougall, Pollon, Herbert, & Russell, 2008). The qualitative data will have priority during integration because we are using Activity Theory as the overall theoretical frame for the study. Activity Theory assumes that participants and settings are indivisible and co-evolve through interaction of different components of activity and this assumption is consistent with a qualitative research approach.

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*The data collection plan is clearly specified.*

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Each site will be examined in depth over the course of an academic school year for classrooms settings, or program duration and/or the carrying out of a specific project – from conception to completion – for library and community-based programs (e.g., **Y1:** S1, S2, L1, L2, C1; **Y2:** S3, L3, C2, C3). Our mixed methods design incorporates qualitative and quantitative measures of engagement and learning as well as detailed observation and analysis of each setting. Multiple sites within a case, multiple data sources, mixed-methods, and a team of researchers enable triangulation (Denzin, 1978, 2012) of our interpretations, thereby ensuring the validity and credibility of our findings, and adding depth to our case descriptions. We have strategically aligned our data, tools, and methods with our research questions (see Appendix C, Table 1) and created a data collection timeline for each measure within each setting (see Appendix C, Table 2). Intensive qualitative observations of each site combined with quantitative data will allow us to generate robust case descriptions for each setting as well as discern common and varying features across learning settings. In the following paragraphs, we describe in more detail our data collection measures/tools and methods.

**Observations:** Observations are our primary data source and will provide insights into the features of the activity system in each setting, as well as learning and engagement in each setting. Three methods will be used to collect data during observations: Qualitative fieldnotes and two separate formal protocols. The two formal protocols are an Activity System Observation Protocol (ASOP) and the Youth Program Quality Assessment (YPQA) (Smith & Hohmann, 2005) which will be analyzed using mixed methods.

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*Information is provided about what will be noted and interpreted, as well as the two observational protocols that will structure data collection.*

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During each site visit, researchers in the role of participant-observer will take

fieldnotes that focus primarily on description with some supplementary interpretive comments. Descriptive notes will include description of the activity and physical setting, accounts of students' behaviors, and reconstruction of dialogue. Interpretive notes, noted in italics, will include impressions and speculations related to observations (e.g. a speculation that a participant's visible change in behavior is related to an immediate change in the activity system/setting). Regular audio and pictorial and occasional short video-recordings of discussions and activities will supplement field notes and allow us to analyze the dynamics of discourse as well as nonverbal interaction.

The *Activity System Observation Protocol* (ASOP, see Appendix D) is our most important observational data source. We have developed and successfully piloted the ASOP to provide a detailed account of the components of a learning activity as enacted in a given session or class period. The ASOP directly connects to the study's research questions. Researchers will first complete fieldnotes for each observation and then select activities for further analysis using the ASOP multiple times per setting. Each ASOP will focus on one activity that the researcher finds particularly salient in answering our research questions. (The ASOP also has been successfully piloted in several research seminars at the University of Minnesota.)

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*The research team provides a well-developed observational protocol.*

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The *YPQA* is a formal observation protocol that measures instructional process best practices in a range of settings, including community organizations and schools. The YPQA has been validated in both formal and non-formal settings (Smith & Hohmann, 2005). We will use YPQA Form A: Program Offerings to collect quantitative data on three system features—safe environment, supportive environment, and interaction—and student engagement. Researchers will complete the YPQA 2 times *per month* for school sites, school-year library programs and programs at community-based organizations that are of a month or longer duration. We will also complete the YPQA at least 2 times for 6-week library programs and short-term programs in community-based organizations (see Appendix C, Table 1).

Site-specific indicators: Quantitative data from school and program records will provide information about performance related to cognitive and behavioral engagement as well as youth demographics. Data on cognitive and behavioral engagement will include rates of project completion as well as records of enrollment, attendance, graduation, and credit completion when applicable to specific sites. Demographic information will include age, gender, race/ethnicity and participation in the free- and reduced-price lunch program (an indicator of family socioeconomic status) as available in each setting's records.

Technology use survey: An online survey will quantitatively measure student/youth digital media use outside school and program settings (see Appendix E). The survey will be given at the start of each course or project to determine the nature of the technology used by youth and its frequency. Our survey is adapted from the Study of Social and Cultural Influence on Adolescent Literacy Development at the University of Michigan (Moje, Overby, Tysvaer, & Morris, 2008) and was tested during our pilot study.

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*The research team provides reasonable and similar levels of detail about each data source.*

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Project-specific engagement survey: An online survey will measure youth's perspectives about learning and engagement during a course or project (see Appendix F). The survey will include scaled and open-ended items for all dimensions of

engagement (behavioral, cognitive, emotional) as well learning goals/outcomes. Surveys will be given at the end of each project or unit. We implemented during the pilot study and are currently refining it. It is adapted from the following existing surveys: the School Engagement Survey by the National Center on School Engagement; a survey by the COMET® Program within the University Corporation for Atmospheric Research in Boulder, Colorado; the Engagement versus Disaffection with Learning survey by Skinner, Kindermann, & Furrer (2009); and the Cognitive Strategy Use and Self- Regulation Subscales of the Motivated Strategies for Learning Questionnaire by Pintrich & DeGroot (1990).

Experience Sampling Method: We will use the Experience Sampling Method (ESM) to collect qualitative and quantitative data on youth engagement “in the moment/in action” via iPod Touches (Hektner, Schmidt, & Csikszentmihalyi, 2007; Shernoff & Vandell, 2007). This method will provide data on what youth are thinking and feeling at specific moments in time while they participate in technology-mediated settings, as well as their level of engagement. Open-ended questions such as “What are you doing right now?” and “How do you feel about what you are doing?” and “Do you want to keep doing what you are doing or switch to something else?” will help to gauge in-the-moment reflections as a way to triangulate the retrospective recall required for interviews and surveys. A small selection of scaled items drawn from the project-specific engagement survey will allow researchers to compare youth’s self-reports of engagement in-the-moment (ESM) with their reports of engagement in the project as a whole, as measured by the engagement survey. This comparison will help corroborate youth’s responses from the project- specific engagement survey, which are dependent on their recall of experiences throughout the project.

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*The research team uses multiple methods and sources of information to bolster the strength of their evidence.*

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Student/youth interviews: Individual interviews with focal youth will be conducted with a focus on understanding how digital tools and activities affected their engagement and learning. These semi-structured interviews, which will be audio-recorded and transcribed, will follow interview protocols (see Appendix G). In each site, 5-7 focal youth will be selected to participate in the interviews based on the following criteria. We are looking for focal participants who are willing to participate who display *a range* of each of the criteria:

- a. Gender (as close to equal number of males and females as possible)
- b. Race/Ethnicity (students from different racial/ethnic groups if possible)
- c. Engagement in class/program activities based on observations, ESM, project-specific engagement surveys, and the facilitators’ impressions (a range of engagement levels)

Teacher/facilitator interviews: Individual interviews with teachers/facilitators will focus on understanding her/his perceptions of learning and engagement within the setting and the ways in which pedagogical practices and technology impacted these variables. These semi-structured interviews, which will be audio-recorded and transcribed, will follow interview protocols (see Appendix H). Within the formal classroom setting, these interviews will be conducted at the end of each grading period; within non-formal settings, interviews will occur at the end of programs.

Artifacts and/or documents: During our observation visits and interviews we will gather artifacts and documents such as mission statements, rules, expectations, guidelines, and curriculum materials for use in describing the features of technology-mediated activity systems within each setting. Photographs will also be used to document the learning space for use in describing the learning environment of each setting.

### Youth-created products/projects:

Youth projects or products (both in-progress and final versions) will be collected and/or documented via photos. These projects relate directly to what youth learn in settings and will aid the research team in its understanding of the “outcome” of each activity system.

### Mini-cases:

Two mini-case youth who demonstrate engagement in the original study learning setting will be recruited from each research setting (6 youth total; 2 S, 2L, 2C) to observe in a comparison setting (see Appendix A, Figure 2). Specifically, 2 youth participants from the library settings will be observed in a school or CBO; 2 youth participants from our school settings will be observed in a library or CBO; and 2 youth in a CBO setting will be observed in a library or school. Each mini-case will include 4-6 observations (field notes/ASOP) of the youth in the alternate learning context, ESM data in this context (as well as primary S, L, C), artifact collection (if permitted), and additional questions about this context during the interview.

### **Data Analysis Plan**

*Theoretical Framework: Activity Theory.* Learning in activity systems occurs in the sociocultural activity of people, tools, and symbols within the system. The activity theory (AT) theoretical framework expands the unit of analysis to *the activity within settings* rather than the individual (Engeström, 1999). The following list identifies the components of activity systems that AT examines with special emphasis on the mediational means of carrying out the activity (e.g. digital technology) and the object of the activity; all activity is object driven, which gives meaning to human action within the system:

1. Subject(s): the social actors or people acting on the object;
2. Object: the purpose or problem space of the activity; what is driving the activity?  
What can be learned from engaging in this activity?
3. Outcome: the result of the activity (e.g. learning goal achieved; product created);
4. Tools/Signs: artifacts and symbols that mediate activity. (e.g. what means are used to carry out the activity?);
5. Rules, norms: expectations or regulations for actions and interactions within the activity system;
6. Community: what is the environment, social group, or organization in which the activity takes place?
7. Division of labor: the division of activities among social actors within the system (e.g., who is responsible for what and how are the roles organized?).

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*The analysis plan is tightly tied to the theoretical framework. The list of component activities provides reviewers with a guide of how an Activity Theory analysis will be structured.*

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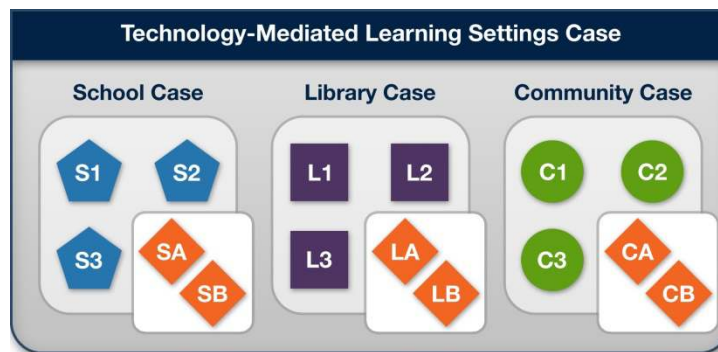
Activity systems evolve through dialectical contradictions or tensions within the system. Three kinds of contradictions drive the evolution of activity systems: (a) contradictions within nodes in the system (e.g. digital tools with blocked access in sites where the safety of youth is a concern); (b) contradictions between nodes in the system (e.g. tools and division of labor such as when youth who are most competent at using digital technology take control of group projects; and (c) contradictions between intersecting activity systems (e.g. conflicts between classroom culture and home culture) (Yamagata-Lynch, 2010). Tensions such as these fuel change in systems and are an important dimension of analysis, as we learned in our pilot study. For example, when youth in



the CBO setting had technology problems at a film location (contradiction between two nodes—tool and social actor) and experienced real embarrassment to have performed poorly in the professional role they were given, they convened, planned, prepared, and worked doubly hard the next time. Sometimes, of course, contradictions are more subtle yet still drive the activity system, as when students in a classroom create digital media to serve as a kind of counter-narrative to myths about urban youth. (See the earlier pilot study section for an example of a contradiction between intersecting activity systems and its importance to the analytic process.)

*Case Study.* Grounded in this AT theoretical framework, we will utilize an embedded multi-case study design (Merriam, 2009), which will allow us to study several sub-units/cases (different sites) within each setting (case). This design requires two stages of analysis; the first stage is the within-case analysis and the second stage is the cross-case analysis (Merriam, 2009). For the within-case analysis, each setting (S, L, C) is first treated as its own case with several embedded sub-units/cases of analysis (e.g. C1, C2). Next, in order to answer our fourth research question, “For a subset of youth participants, how does engagement in learning vary in a comparison setting?”, mini-cases will be developed from data collected on a subset of 6 youth drawn from each setting (2S, 2L, 2C). Once we have completed the analysis of each case and six comparison mini-cases, we will begin our cross-case analysis of technology-mediated learning settings (see Figure 3).

*The research team provides a rationale for the mini-cases (e.g., linked to research question #4). They also acknowledge the limitations.*



*Figure 3.* Illustration of the embedded multi-case study, where orange diamonds represent the six mini-cases.

Both stages of case analysis will use Activity System Analysis (ASA) (Yamagata-Lynch, 2010). For each site observation, fieldnotes will be completed. Then, selected activities from the observations found to be particularly salient in addressing our research questions will undergo further examination using the Activity System Observation Protocol (ASOP), which is grounded in ASA. ASOP observations and fieldnotes are this study’s primary qualitative data sources and the interviews and artifacts are the secondary data sources. Primary quantitative data sources include YPQA and surveys. Frequency and type of data collection varies by setting to accommodate individual site duration and length of program or grading period (see Appendix C, Tables 1 and 2).

*Qualitative Data Analysis: Activity System Analysis.* An activity system is not discrete, but rather intersects with and nests inside other activity systems resulting in a framework for understanding settings and their effects on human action and outcomes as a complex and dynamic interaction.

This study focuses on each site (e.g., S1, S2, S3) as a primary activity system. We will analyze each site as an embedded sub-unit/case within the larger setting category (case) of school (S), library (L), or CBO (C) (see Figure 3). Whereas our primary activity sites within each setting (e.g., S1, L2, C3) will be foregrounded, we will examine intersecting systems as they become salient through data collection and through targeted data sources connected to one of our sub-questions for the second research question, “How is each activity system shaped by its larger institutional context?” For example, in the section on pilot study findings, we discuss the contradiction between the teens’ perception regarding the program space compared to the facilitator’s perception. This indicated the need for more information about the larger institution (library) in terms of how it characterized this program in informational and public relations material and how the facilitator viewed her program’s status within the larger library context. For the proposed study, we will collect artifacts and documents as well as research the specific institution online to help us understand and define its institutional characteristics.

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*The research team offers a clear roadmap for the analysis with enough details for reviewers to evaluate.*

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The ASOP was designed to help us map and delineate the components of activity and understand the relationships between the system and its components. Each ASOP component (i.e., subject, object, community, division of labor, rules, tools, outcome) will be entered into a data analysis program (Dedoose). Next completed ASOP data for each component will be uploaded and coded by research team members for patterns within each AT component (e.g. under ‘tools’, our pilot study included such codes as ‘competence,’ ‘affordance,’ ‘shaping curriculum’). Fieldnotes will also be coded using the ASOP categories in order to understand the primary observational data from an activity system perspective. In keeping with our research questions, we will identify patterns that show *how* features of each setting work to enhance engagement in learning. For example, in the pilot CBO, we were able to connect how features of that program nurtured the development of technical media production skills (e.g., using Adobe Premiere Pro CS6 to edit video, conducting interviews with camera and sound equipment) as well as vocabulary and conceptual knowledge of media production (e.g., “We have to put B-roll right here,” Tia, during week 5) necessary for the creation and composition of documentary videos. The additional sites included in this proposal will allow us to test our pilot study findings for convergence and contradiction within the broader institutional settings (library, school, and community). The goal of this ASA analysis is to understand how parts of each activity system work together as a whole and how parts are connected, contradictory, and dependent on each other. In addition, interviews with facilitators/teachers and youth will be coded and analyzed to triangulate the analysis of the observations (including areas of convergence, inconsistency, and contradiction).

To enrich our analyses, we will develop mini-cases based on data collected on a subset of 6 mini-case youth drawn from each setting (2S, 2L, 2C) (see Figure 3) in order to address our fourth research question, “For a subset of youth participants, how does engagement in learning vary in a comparison setting?” Each mini-case will include data collected from a specific youth in both the primary setting and a comparison setting to allow for comparisons across settings. Qualitative data from observations and interviews will be analyzed using Activity System Analysis (ASA) (Yamagata-Lynch, 2010) as described above. In addition, quantitative data from ESM will be analyzed, as described below, to provide information about the youth’s levels of engagement in both primary and comparison settings. Due to the small sample size, we will not be able to conduct any statistical tests to determine the statistical significance of any observed differences in engagement, as measured by ESM. The purpose of the qualitative and quantitative min-case

analyses is to identify, for each youth, (a) how the comparison setting is similar or different than the primary study setting in which the youth participates, (b) how the youth participant's engagement is evident in the comparison setting, and (c) how engagement in learning might vary in a comparison setting.

*Qualitative Data Analysis: Discourse Analysis.* Decades of research have supported the central role of talk in teaching and learning. For the most part these studies have repeatedly shown the ubiquitous occurrence of teacher dominant interaction patterns (Cazden, 2001). However, another strand of research shows the positive effects on learning when youth have the opportunity to explore ideas in open-ended discussion rather than being limited to the display of factual knowledge (Mercer, 2008; Nystrand, Wu, Gamoran, & Zeiser, 2003). Research in non- formal learning settings has illustrated similar results. Heath & Roach (1999), for example, have tracked interactional patterns in community arts programs and found that the emphasis on imaginative problem solving in an apprenticeship-like environment leads to language use (such as 'what-if' speculations) that support deep learning.

Given the central role of language in learning, our study will employ discourse analysis (DA) as a secondary analytic method to aid in deepening our understanding of each site (e.g., L2, L3) and in revealing interactional patterns and anomalies within and across settings (S, L, C). Language use and interaction is often neglected in studies focusing on activity systems but several scholars (including the PI for this research) have productively combined the use of AT and DA (Moje & Lewis, 2007; Wells, 1996) in ways that illuminate how language (as a sign/tool) is implicated in components of activity. In particular, DA will be useful in understand how rules/norms have been constructed within each site and what this means for interaction with digital tools. If, for example, the ASOP reveals that youth work together on digital projects and that the division of labor is fairly equal, then using DA to determine the role of language in these processes can be illuminating (e.g. youth using speaking turns to refer to peers' ideas and build connections to those ideas).

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*The research team discusses the general reason for their analytic approach (e.g., discourse analysis and the central role of language in learning).*

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The DA approach we will use combines interactional sociolinguistics (Erickson, 2004; Gumperz, 1992) with sociocultural discourse analysis (Gee, 2010). We will use the ASOP to identify strong patterns or perplexing contradictions related to our research questions that would benefit from a closer look at language use. Related segments of audio recordings from site observations will be transcribed for discourse analysis. Approaches to interactional sociolinguistics will provide a method for examining participant structures and contextualization cues (such as how topics are initiated, controlled, shifted, rules of entry, length and frequency of speaker turns, and so forth) that reveal classroom interaction patterns but, more importantly, youth acceptance, manipulation, and/or resistance to those patterns. To better understand the values at work in the activity system, the situated meanings of words and the belief systems that shape those meanings will be examined. For example, a youth's interaction with a facilitator or peer about the hip-hop music she loves can mean different things to different people in the setting, depending on their identities and affiliations. Whether or not the youth feels comfortable incorporating her passion for hip-hop into a digital media project (as background music or as the focal point of a poetry project) will depend on how community is created within the activity system and how acceptable behavior and content are regulated within

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*The research team discusses the specific ways they will use discourse analysis and offer concrete examples to demonstrate what they mean.*

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the setting. The youth's comfort level may also relate to her competence with digital tool use and in meeting the goals of the activity. All of these possibilities exist in a view of the setting as an activity system with norms for language use and structures for participation. Discourse analysis is especially useful in examining anomalies or contradictions, and is often used to better understand data that appears to disconfirm a coding category or that is nuanced in a way that defies categorization. This function of data analysis is in keeping with our focus on settings as complex activity systems, which we intend to examine in order to understand the engagement in learning in technology-mediated settings.

As mentioned earlier, findings from our pilot study related to interaction patterns was important to our understanding of the settings, particularly related to the interactional norms and anomalies that related to the co-construction of community. In the library, for example, the language of mentorship was especially important (not surprising given that the program we studied was a peer mentoring program). Youth were invited to take a prominent role in sharing their knowledge related to the use of digital tools as well as working with their peers in both formal and informal situations. Adults did not provide youth with explicit answers to technology issues, and instead frequently called upon them to find solutions on their own and share them with the group. A closer analysis of this interactional pattern will help us to understand how this division of labor shaped engagement in learning for the peer mentors. We did not audio-record these interactions in the pilot study, but thus far, interviews indicate that the youth were motivated to problem solve and felt trusted in these exchanges. Closer analysis of discourse following the procedures described in the previous paragraph will provide more detailed information about *how* the interactions work to propel youth to deeper learning as they embrace the problem space.

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*When relevant, the team brings the reader back to the findings of the pilot study and links it to the proposed work.*

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**Quantitative Data Analysis.** The quantitative analysis will occur in two stages. During the first stage, we will calculate descriptive statistics for each quantitative measure from the data collected within each site. In the second stage, we will integrate the quantitative and qualitative data within each site to give us a richer, deeper, complementary data set that will extend, reinforce, or complicate the qualitative data pertaining to engagement in learning within the site. The quantitative data will be analyzed as follows within each site:

**YPQA observation protocol:** For each observation, the YPQA results in a score for each of four dimensions (safe environment, supportive environment, interaction, and engagement) plus an overall score. To summarize the distribution of a score, say, the overall score, across the observations we will calculate three measures of central tendency (mean, median, mode) and one measure of variability (standard deviation). We will also create a bar chart to graphically represent the dispersion of the score across observations. Three different measures of central tendency will be calculated because in data sets that contain extreme, or outlier, scores and data sets that are small, the median or the mode may be a more accurate summary statistic than the mean.

**Technology use survey:** We will calculate the number and percent of youth choosing each response for the scaled response items. Then we will calculate a technology access sub-score for each youth by adding up their responses to the items that measure access. We will also calculate an outside of school activity sub-score for each youth by adding up their responses to the items that measure this kind of activity. Then, for the group of youth as a whole within each site, we

will calculate descriptive statistics, as described for the YPQA above, and create box-and-whisker plots for each sub-score.

Project-specific engagement survey: For each administration of the survey within a site we will calculate the number and percent of youth choosing each response for the scaled response items and the number and percent of youth selecting each level for the rubric type item. Then, for each youth we will calculate sub-scores for each type of engagement (behavioral, cognitive, emotional) and an overall engagement score. For the group of youth as a whole within each site we will calculate descriptive statistics and create box-and-whisker plots for the sub-scores and the overall engagement score.

Experience Sampling Method: For each administration of the ESM survey within a site we will calculate the number and percent of youth choosing each response for the scaled response items. We will also calculate an overall engagement score for each student by adding up each youth's responses to the scaled response items. Then, for the group of youth as a whole within each site, we will calculate descriptive statistics and create a box-and-whisker plot for the overall score.

Because each youth will complete multiple ESM surveys over the duration of a project and/or their course/program, we will also calculate an average across surveys for each youth on each scaled response item and their overall engagement score. We will compare these results with youth reports of engagement in the project as a whole, as measured by the project-specific engagement survey to determine the accuracy of the engagement reported by youth on the project-specific survey. For the group of youth as a whole within each site, we will also create a series of box-and-whiskers plots to show the overall engagement score at each measurement point during the project. Youth responses to the open-ended items on the ESM survey will be included in the qualitative analysis.

Site-specific data: The site-specific data will be summarized as follows for each site:

*Age* – descriptive statistics will be calculated; *Gender, Race/ethnicity, Free and reduced lunch, Grade level, Initial and final enrollment* – the number and percentage of students in each category of the variable will be calculated; *Compiled attendance records* at the end of each semester or program – the attendance rate for each student will be calculated (number of sessions attended/number of sessions offered) and then descriptive statistics will be calculated for each site; *Grades* – the number and percentage of students receiving each grade will be calculated as one indicator of what youth participants learn; *Project completion* – the number and percentage of students who completed a project will be calculated; *Credit completion* – descriptive statistics will be calculated.

*Integrating Qualitative and Quantitative Data*. The research team will meet bi-monthly throughout data collection, and also during within-case analysis and interpretation phases of the study to integrate the qualitative and quantitative data. For example, during data collection we will 1) use data from the Technology Use Survey and ESM to select focal youth for the interviews, and 2) use data from the ESM survey during the interviews to help youth recall their experiences during the project. During data analysis phases, we will use the quantitative data to triangulate the observation and interview data (including areas of convergence, inconsistency, and contradiction) *within* each site. For example, we will compare the quantitative data from the YPQA to the observation and interview data to triangulate the qualitative data about the

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*The narrative attends to why a mixed method approach was adopted.*

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features of technology-mediated activity systems. We will use data from the ESM survey and the project- specific engagement survey to triangulate observation data on student engagement because it can be difficult to observe youth's cognitive and emotional engagement. Through comparative analyses of the qualitative and quantitative data we will determine the degree of convergence (Patton, 2002) between the qualitative data and the quantitative data and this will deepen our understanding of the complexities inherent within settings and engagement in learning. In our analysis and interpretation, the qualitative data will receive more weight than the quantitative data because AT is the driving theoretical framework for the study.

*Cross-Case Analysis.* Case narratives will be composed for each site (e.g., C1, C2) and each setting (e.g., all school sites). Narratives will be based on both qualitative and quantitative data analysis from each site. Coding of ASOPS will be primary data compared across sites to aid in development of case narratives focused on each setting. These narratives will include both commonalities and differences across sites. Case narratives of settings will then serve as the cases to be used for cross-case (S, L, C) analysis. Again, these cross-case narratives will include comparisons and differences across settings. Using these analytic procedures for our pilot study (albeit with only one site per setting) allowed us to arrive at the cross-case findings reported in an early section of this proposal. By composing case narratives for each setting based on coding and analysis of ASOPs, fieldnotes, and interviews, we were able to richly describe and interpret how each setting worked to engage youth in technology-mediated learning. We found that the problem space (object), the interactional patterns (language use), and the facilitator's assumptions about learning were central to engagement across all three settings. These findings are the result of comparing across case narratives. We expect that our cross-case narratives will be more robust for this proposed study, in that they will include quantitative data and more cases at the site level. Based on our pilot data, we speculate that we will find differences among the settings (S, L, C) related to the kind of technology-mediated learning each supports. For example, school classrooms with innovative teachers often have a curriculum that challenges youth to think critically over time across genres and modes. Library settings, on the other hand, tend to be organized as drop-in sites and, thus, engage learners through interest-driven activities rather than sustained critical thinking. We speculate that we will learn more about what engaged learning means in each setting and the conditions that create these meanings. Cross-case analyses will help us to examine these speculations and consider how they are confirmed, contradicted, or complicated by the data. This level of analyses promises to yield richly detailed results through an analytic procedure that is straightforward in its focus on comparison of commonalities and differences across settings.

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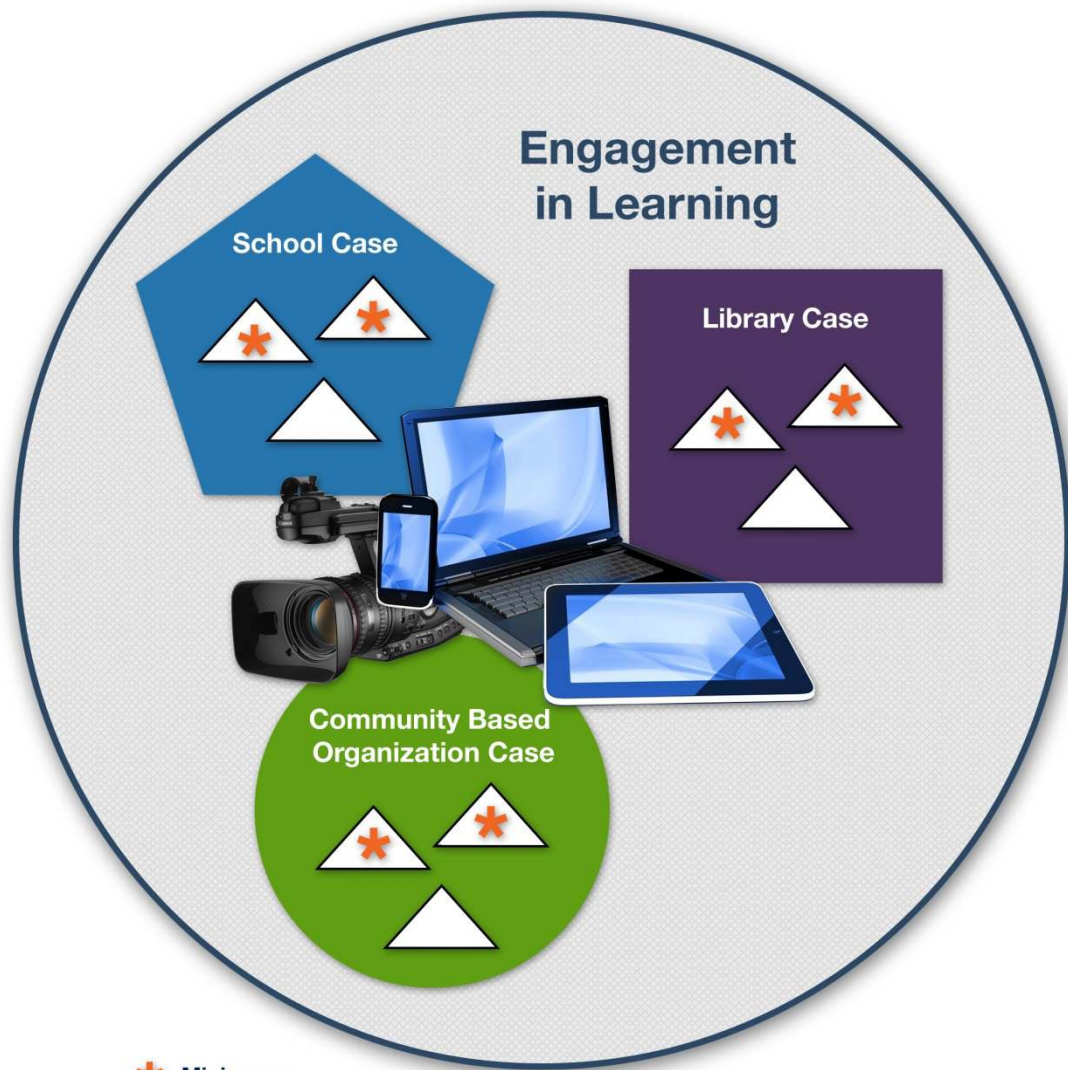
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\* Mini-cases

Table 1. Alignment of Research Questions and Data Sources

	Data Sources									
	YPQA Observation Protocol	ASOP Observation & Fieldnotes	Artifacts and Documents	Interview: Youth Participants	Interview: Teacher/ Facilitator	Youth- Created Projects and Products	Project- Specific Engagement Survey	Experience Sampling Method (ESM)	Technology Use Survey	Site-Specific Data
<b><i>R1: How is engagement demonstrated in each setting?</i></b>										
What are the expectations for engagement in each setting?		X	X		X					
How is engagement (cognitive, emotional, behavioral, sociocultural) evident in each setting?	X	X		X		X	X	X		X
How are the expectations of engagement similar and varied across settings?	X	X		X	X	X				X
<b><i>R2: How do particular activities, digital technologies, and social relationships in each setting (S, L, C) influence youth engagement in learning?</i></b>										
How does each setting function as an activity system with digital technology as a central tool?		X	X	X	X	X			X	
What do the activity systems have in common?		X	X	X						
How do the activity systems differ?		X	X	X						
How is each activity system shaped by its institutional context?		X	X		X					X
How is engagement tied to individual and interdependent components of the activity system?	X	X		X	X		X	X		
<b><i>R3: What do youth learn in each setting as they engage in these activities, digital technologies, and social relationships?</i></b>										
What assumptions about learning are evident in each setting?			X	X	X					
What expectations about learning are evident in each setting?		X	X	X	X	X				
What learning goals are explicit or assumed in each setting?		X	X	X	X	X				
What do youth learn in each setting?		X	X	X	X	X				X

<b><i>R4: For a subset of youth participants, how does engagement in learning vary in a comparison setting?</i></b>										
How is the comparison setting similar or different than the primary study setting in which the youth participates?		X	X	X						
How is the youth participant's engagement (cognitive, emotional, behavioral, or sociocultural) evident in the comparison setting?		X		X				X		



Table 2

*Data Collection Frequency and Timeline Within Each Setting*

<b>RQ1: How is engagement demonstrated in each setting?</b>	
<b>Data Collection</b>	<b>Frequency</b>
<b>Setting: 3 High School Classrooms</b> in urban high schools (one semester each)	
Fieldnotes	8-10 observations per classroom (frequency determined by the study's focus on technology-mediated object-driven activity)
ASOP	5-7 full ASOPs completed per classroom based on which fieldnotes best answer our research questions
Project-specific engagement survey	Administered at the culmination of major projects (2-3X per semester)
EMS (using iTouch for texting response)	1X per week from each student in class 1X per observation for focal students
Interview (student)	1X (5-7 focal students)
Youth products/projects	Collected throughout the duration of the class
Site-Specific data	Initial and final enrollment, attendance records, behavior records
YPQA	2X per month per class
<b>Setting: 3 Library Programs</b> (2 libraries; 2 six-week summer programs and 1 school-year program)	
Fieldnotes	15-20 observations for year-long programs; 6-10 for shorter programs
ASOP	8-10 ASOPs (longer programs) or 3-5 ASOPS (shorter programs) completed based on fieldnotes
Project-specific engagement survey	Administered at the culmination of projects (1-2 for 6-week programs and 4-6 for school-year programs)
EMS	1X per week from each youth in program 1X per observation for focal youth
Site-specific data	Demographics, initial and final enrollment, attendance per program
Interview (youth)	1X (5-7 focal youth)
Youth projects/projects	Collected throughout the duration of the program
YPQA	2X per 6 wk programs; 2X per month for school-year programs
<b>Setting: 3 Community-based organizations</b> (3 different programs, one at each CBO, duration will vary)	
Fieldnotes	15-20 observations for year-long programs; 6-10 for shorter programs
ASOP	8-10 ASOPs (longer programs) or 3-5 ASOPS (shorter programs) completed based on fieldnotes
Project-specific engagement survey	Administered at the culmination of projects (1-2 for every 6-weeks of programming and 4-6 for school-year programs)
EMS	1X per week from each youth in program 1X per observation for focal youth
Interview (youth)	1X (5-7 focal youth)

Site-specific data	Demographics, initial and final enrollment, attendance per program
Youth projects/projects	Collected throughout the duration of the program
YPQA	2X per 6 wk programs; 2X per month for school-year programs

**RQ2: How do particular activities, digital technologies, and social relationships in each setting (S, L, C) influence youth engagement in learning?**

Data Collection	Frequency
<b>Setting: 3 High School Classrooms in urban high schools (one semester each)</b>	
YPQA	2X per month per classroom (GA4)
Fieldnotes	8-10 observations per classroom (frequency determined by the study's focus on technology-mediated object-driven activity)
ASOP (Classroom Focus)	5-7 full ASOPs completed per classroom, based on fieldnotes that reveal most about typical and atypical aspects of the activity system
ASOP (School Focus)	2 ASOPs focusing on the school as the larger activity system with a focus on its goals/initiatives, establishment of community, positioning of social actors, and division of labor
Site-specific data	Initial records of F&R lunch, reported demographics
Student products/projects	Collected throughout the semester
Artifacts/documents	Collected throughout the semester (e.g. curriculum materials; school docs)
Technology use survey	1X in September
<b>Setting: 3 Library Programs (2 libraries; 2 six-week summer programs and 1 school-year program)</b>	
YPQA	2X per 6 wk programs; 2X per month for school-year programs
Fieldnotes	15-20 observations for year-long programs; 6-10 for shorter programs
ASOP	8-10 ASOPs (longer programs) or 3-5 ASOPS (shorter programs) completed based on fieldnotes
Site-specific data	Demographics, reports
Youth products/projects	Collected throughout the duration of the program
Artifacts/documents	Collected throughout the duration of the program
Technology use survey	1X at start of each program
<b>Setting: 3 Community-based organizations (3 different programs, one at each CBO, duration will vary)</b>	
YPQA	2X per short-term programs; 2X per month for programs > 1-month
Fieldnotes	15-20 observations for year-long programs; 6-10 for shorter programs
ASOP	8-10 ASOPs (longer programs) or 3-5 ASOPS (shorter programs) completed based on fieldnotes
Site-specific data	Demographics, reports
Youth products/projects	Collected throughout the duration of the program

Artifacts/documents	Collected throughout the duration of the program
Technology use survey	1X in at start of each program

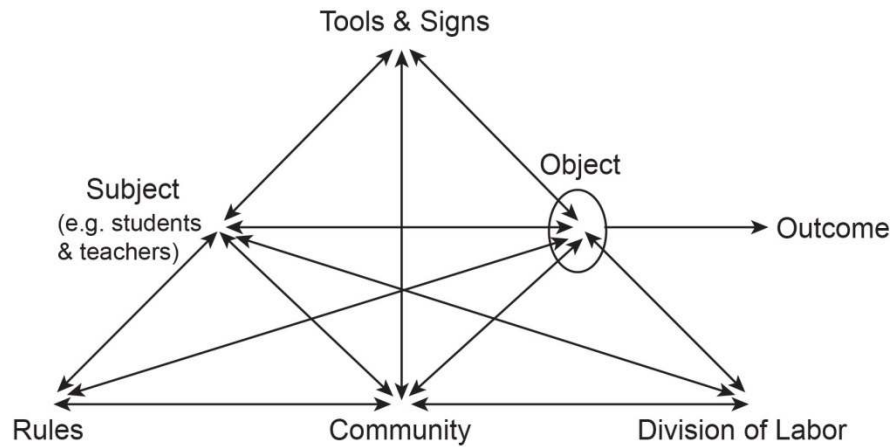
**RQ3: What do youth learn in each setting as they engage in these activities, digital technologies, and social relationships?**

Data Collection	Frequency
<b>Setting: 3 High School Classrooms in urban high schools (one semester each)</b>	
Fieldnotes	8-10 observations per classroom (frequency determined by the study's focus on technology-mediated object-driven activity)
ASOP	5-7 full ASOPs completed per classroom, based on fieldnotes that best answer our research questions
Artifacts/documents	Collected throughout the semester (e.g. assignments, curricular materials, evaluation of student work)
Site-specific records	Grades, credit completion per class, school initiatives, reports
Interview (facilitator)	1X
Youth projects/products	Collected throughout the duration of the program: completed projects collected or documented; in-progress work documented through screenshots and drafts
<b>Setting: 3 Library Programs (2 libraries; 2 six-week summer programs and 1 school-year program)</b>	
Fieldnotes	15-20 observations for year-long programs; 6-10 for shorter programs
ASOP	8-10 ASOPs (longer programs) or 3-5 ASOPS (shorter programs) completed based on fieldnotes
Artifacts/documents	Collected throughout the duration of the program (e.g. curricular materials, evaluation of youth products)
Interview (facilitator)	1X each facilitator
Site-specific records	Collected throughout the duration of the program: Any organization records that indicate what youth are learning (e.g. outcomes as reported to funders, institutional reports)
Youth projects/products	Collected throughout the duration of the program: completed projects collected or documented; in-progress work documented through screenshots and drafts
<b>Setting: 3 Community-based organizations (3 different programs, one at each CBO, duration will vary)</b>	
Fieldnotes	15-20 observations for year-long programs; 6-10 for shorter programs
ASOP	8-10 ASOPs (longer programs) or 3-5 ASOPS (shorter programs) completed based on fieldnotes
Artifacts/documents	Collected throughout the duration of the program (e.g. curricular materials, evaluation of youth products)
Interview (facilitator)	1X each facilitator
Site-specific records	Collected throughout the duration of the program: Any organization records that indicate what youth are learning (e.g. outcomes as

	reported to funders, institutional reports)
Youth projects/products	Collected throughout the duration of the program: completed projects collected or documented; in-progress work documented through screenshots and drafts

Interview (youth)	1X for each of 6 youth (2 from each original study setting)
Fieldnotes	5 observations
ASOP	2X
Experience Sampling Method	2X

**EXCERPT from Appendix D:  
Activity Theory Analysis Protocol (ASOP)**



**Directions:**

Select one activity from your observed activities to complete this ASOP protocol. Bundle and upload your ASOP descriptions with your fieldnotes and any relevant images, video, or audio.

## 1) Description of Activity

Activity description/focus

- What activity is being observed?
- What is the genre of this activity? (e.g. assignment, rules, forms--such as Q&A or brainstorming)
- What assumptions about learning are embedded in the activity? (e.g. youth learn when they are motivated and collaborative)

## 2) Activity Components

*Object or problem space of activity – the larger purpose or motivating problem*

- What is the purpose of the activity? (stated and/or unstated)
- What are the learning goals? (stated and/or unstated)
- How much awareness of learning goals or larger purposes do social actors possess?

### Outcome of activity

- What is the expected outcome of the activity?
  - Short-term (e.g. in class) student-produced work
  - Long-term (e.g. culminating project) student-produced work
- What position did social actors take related to the outcome? (e.g. motivated to complete, resisted completion)



## EXCERPTS FROM:

### Development of Self-Direction in Youth-Program-Family Interaction Systems: Latino and Non-Latino Adolescents

Reed Larson, University of Illinois

#### I. MAJOR QUESTIONS

*“The economic, social, and political order of our society presupposes an individual who is capable of autonomous action. In the emerging heterogeneous global society where job demands and basic life course and life-style decisions are not preconfigured, adolescents need to acquire the motivation and skills to create order, meaning, and action out of a field of ill-structured choices.”* (Larson, *American Psychologist*, 2000, p. 171)

Our program of research is making progress toward understanding how youth develop important competencies for autonomous action or *self-direction*. In a large qualitative study, TYDE (funded by W.T. Grant), we derived preliminary grounded theory on the *processes and pathways* through which ethnically-diverse high-school-aged adolescents develop these competencies within project-based youth programs, and through the collateral transactions with parents. The set of competencies we are studying (responsibility, strategic thinking, teamwork, effort) are *abilities for organizing actions over time to meet commitments and achieve goals*. Recent scholarship suggests that they should not be confused with 19<sup>th</sup>-20<sup>th</sup> century individualism. They entail coordination of personal agency with contextual demands, one’s own actions with others’ (Larson et al., 2002), and, in the family context, autonomy-with-relatedness (Smetana, 2002). Nor is their developmental importance restricted to Western culture. Young people across cultures must navigate ill-structured and changing environments and become able to organize actions to achieve individual and collective goals (Kagitcibasi, 2007; Hardway & Fuligni, 2006). Our proposal is aimed at contributing to the WT Grant Foundation objectives of understanding the processes and practices in settings through which these critical competencies develop.

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*The proposal immediately presents what the researchers want to study and how it builds on prior work.*

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This mixed-methods study will advance knowledge on how self-direction develops across four interconnected interactional systems (Figure 1). First, we will employ *quant* (quantitative) analyses to test hypotheses derived from TYDE about developmental processes in these systems:

#### Within Youth Program Settings

- System 1 is youth’s interactions with the arts, tech, science, service and leadership projects that are the focus of many programs for high-school-aged youth. Our hypothesis from TYDE is that the engine of development is youth’s process of deep cognitive engagement (and struggle) with the demands and strategic challenges of their projects, coupled with learning through feedback on their actions (Larson & Angus, in press – a & b; Wood et al., 2009).

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*The research team introduces a core idea (i.e., four interconnected, interactional systems) around which they organize the proposal.*

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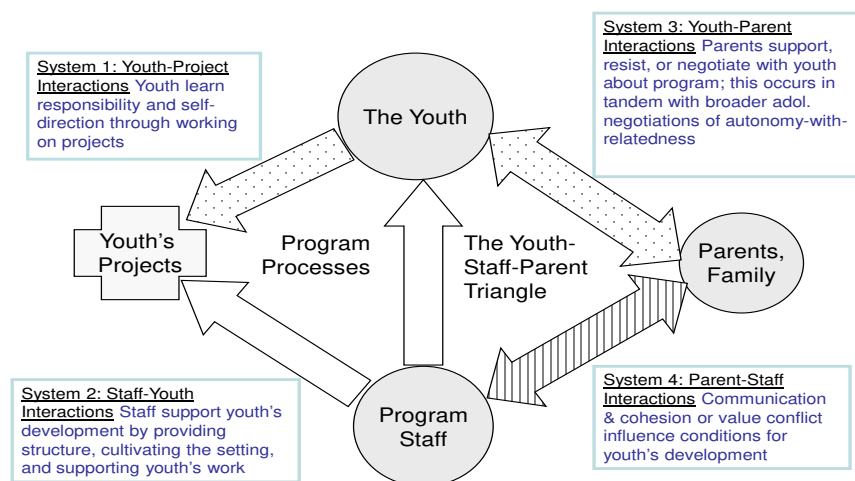
- System 2 is program leaders' interactions with youth, and our hypothesis is that youth's development of self-direction is facilitated by leaders "leading from behind" to provide structures and support for the youth-driven developmental processes in System 1.

#### Within the Youth-Family-Program Triangle

- System 3 encompasses interactions between youth and parents concerning the program, and our central hypothesis is that youth transfer self-directed behavior from the program to home, and that this can stimulate a sequence of negotiations leading to adolescents' increased autonomy-with-relatedness in the family (Larson, Pearce, Sullivan, & Jarrett, 2007).
- System 4 is the meso-system between parents and program. We examine how parent-leader dynamics and leaders' responses to family-related *dilemmas of practice* can facilitate System 1-3 processes, with stakes highest in Latino families (Griffith & Larson, 2009).

For each system, we will draw on data provided by multiple informants to test longitudinal pathways within and across systems.

**Figure 1: Interaction Systems in the New "Pathways" Study**



A figure is offered to accompany the narrative. It nicely illustrates the notion of interconnected interactions that sit at the core of the proposal.

Second, we will analyze embedded *qual* (qualitative) data to better understand how youth, leaders and parents *experience* these pathways. The aim is to extend and deepen our grounded theory about the underlying contextual processes that correspond to the quant findings. This qual component employs an action perspective (Valach et al., 2002) that focuses on how processes are *experienced and enacted over time* by the parties involved (youth, leaders, parents). Across systems, we are interested in the cyclical dynamics between: (a) these parties' experiences of *obstacles, conflicts, and challenges* to their goals, and (b) their use of creative *strategies and negotiations* to address challenges. We ask, How does the experience of these dynamics unfold over time for each party? How do strategies and negotiations in each system address (or fail to address) these challenges? How are these cycles related to youth's process of change and learning? The qual data will help us understand these dynamics in context, from the actors' points of view – and in a form directly usable by practitioners, administrators, and policy leaders (Valach et al., 2002).

In summary, our goal is to test and chart a *dense network* of transactions, paths, and conditions that influence developmental outcomes. The target sample reflects our objective to gain knowledge of the range of processes and pathways related to youth development in an economically and ethnically diverse sample. By studying working class and low income youth, we focus on those who show the largest benefits from programs (Mahoney et al., 2009). By including 50% Latino youth, we will generate information on a growing segment of the U.S. population. Latino children and adolescents represent nearly one fifth (18%) of the under-18 population (Fields, 2003), with 60% of Latino youth aged 12-17 living in immigrant households (Raffaelli et al., 2005). Remarkably little research has been done on Latino youths' experiences in youth programs (Mahoney et al., 2009). The study will address an urgent need for research on processes and practices associated with positive development for diverse youth.

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*This paragraph offers a clear rationale for the population to be studied.*

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## II. NOT INCLUDED.

### III. SPECIFIC HYPOTHESES AND RESEARCH QUESTIONS

For each system we have paired central *quant hypotheses* that will be tested statistically and *qual questions* aimed at extending and deepening grounded theory about the underlying experiential processes. Both sets of analyses focus on paths: the first on statistical paths, the second on verbal descriptions of these paths. In addition, we will ask how processes and pathways differ for Latino and non-Latino youth and families and by other factors (e.g., as a product of gender, age, prior experience with youth programs).

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*This section articulates the quantitative hypotheses to be studied, and, relatedly, the qualitative questions to be asked. This pairing is very effective—although other approaches also work.*

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#### **System 1: Youth's Interactions With Their Projects**

*Quant Hypoth 1:* Youth's increases in self-direction (i.e., responsibility, strategic thinking) will be predicted by significant paths from (a) high ownership, (b) high engagement with challenge and accountability demands in their projects, (c) and feedback on outcomes of their work.

*Qual Question 1:* How do youth who show *high vs. low* increases in self-direction differ in their descriptions of the processes in Hypoth 1: challenges, engagement, strategies, turning points?

#### **System 2: How Leaders And Programs Facilitate the Processes in System 1** (Figure 2).

*Quant Hypoth 2a:* Individual youth's reports of autonomy support from leaders predicts high ownership, engagement, and increases in youth's self-direction (a-c in Hypoth 1).

*Qual Question 2a:* How do youth who show *high vs. low* increases in self-direction describe when and how leaders provided assistance and how that assistance influenced them?

*Quant Hypoth 2b:* Self-direction will increase more in programs that have leaders with high expectations and who provide youth with more opportunities for engagement.

*Qual Question 2b:* How do programs with *higher vs. lower* changes in youth self-direction differ in leaders' initial plans for the year, how these are implemented, and how leaders respond to dilemmas that arise over the year? How do they "balance" competing objectives?

### **System 3: Youth-Parent Interactions** (Figures 2 & 3)

*Quant Hypoth 3a:* Support from parents for youth's program participation (from the beginning, or as a result of parent-adolescent negotiations) predicts a sequence of positive paths leading to increases in youth's self-direction and autonomy-with-relatedness in the family.

*Qual Question 3a:* How is *high vs. low* parental support for the program related to parent-youth experiences concerning the program over the year? How do these experiences differ between youth who showed *high vs. low* increases in self-direction?

*Quant Hypoth 3b:* Parents' ongoing support for youth's participation in the program (and negotiation with youth) will be predicted by youth-parent congruence in goals for the youth (and by other variables); these predictor variables will be more salient for Latino families.

*Qual Question 3b:* How do congruence vs. incongruence (and other factors) play out in these youth-parent interactions?

### **System 4: How Parent- Leader Interactions Influence What Happens in Systems 1-3**

*Quant Hypoth 4:* Processes in Systems 1-3 are more favorable when: a) there is greater goal convergence between leaders and parents, b) programs communicate with and make efforts to involve families, and c) leaders are knowledgeable about and sensitive to families' cultural background and immigrant experiences.

*Qual Question 4:* What strategies do leaders use that are effective in communicating with families and addressing dilemmas involving families from different cultural backgrounds?

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*The hypotheses are organized around the four inter-related systems that lie at the core of the proposal. This presentation makes it easy to understand the motivation for each hypothesis and question. Reviewers can also readily assess the potential contribution of the proposed work.*

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## **IV. RESEARCH METHODS**

### *Study Design: Overview and Rationales*

This mixed methods study will follow youth, their parents, and program leaders at 4 time points across the full duration (typically 9 months, one academic year) of 12 programs (or "program offerings"). All will be high dosage project-based programs for low income and working class high-school-aged youth. Programs selection will be stratified to achieve a sample of youth that is 50% Latino (with at least half of these from immigrant families). Longitudinal questionnaire data will be obtained from all youth in the 12 programs ( $N = 240$ ) and their parents, plus the 1-2 principal leaders in each program. Ongoing qual interviews will be conducted with leaders and with youth and parents in two embedded samples. Observations will also be conducted. Detailed information on sampling, tracking, and assessments is provided below.

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*The opening lays out the study design in broad strokes and highlights what will be done.*

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The study design is guided by several strategic choices suited to a second-generation study aimed at theory testing and development:

- 1) The mixed methods, multi-informant design will permit predictive and descriptive analyses to examine developmental transactions and sequences in complex contexts (Creswell, 2003).

- 2) Inclusion of Latino youth will allow us to study potentially crucial variations in these pathways for a growing and understudied segment of the U.S. population. Although Latino rates of program participation are somewhat lower than other groups (Mahoney et al., 2009), in TYDE we were successful in recruiting programs serving Latinos.
- 3) We focus on high dosage programs (min. of 120 contact hours) in order to maximize observing substantial effects of program experiences on the most engaged youth. Our pilot study (YPED) indicates that we have a high probability of observing significant differences between youth (including within-program) as a function of differing experiences.
- 4) The design prioritizes between-youth differences, due to cost considerations and the greater progress we have made on these differences in our prior research. Obtaining quant data from youth and leaders at 4 time points will allow us to test predictors of individual change in self-direction (e.g., through growth modeling) and explore reciprocal relations and developmental sequences (e.g., through structural equation modeling) (Singer & Willett, 2003). Program differences, nonetheless, are an important secondary focus, and this study is designed to build evidence toward a next stage of research that will evaluate program-level hypotheses.

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*The research team describes key choices in the design of the study and sampling framework. These insights help reviewers understand the rationale for the study design and the project's relevance—to both theory and practice.*

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## **Sample and Procedures**

### **Program Selection**

The selection of the 12 programs will be stratified to obtain diversity among project-based programs. First, to obtain geographical and demographic diversity, the study will include 4 programs from each of three study sites. Researchers at the U of Illinois will work with programs in Chicago and in central Illinois. Researchers at the U of Minnesota will work with programs in Minneapolis/Saint Paul. Second, to obtain a sample that is half Latino youth, we will choose 6 programs that primarily serve this population. Ideally, 2 of the Latino programs will come from each site, but we are not yet sure about programming for youth in the relatively new rural Latino communities in downstate Illinois. Third, we will obtain diversity in program content. All programs chosen will be project-based but we will obtain representation of those in which the projects are in the arts, tech, or science and those in leadership, service, or youth activism.

To maintain balance, we will select paired Latino and non-Latino programs that are approximately matched in project content, as well as whether they are community vs. school-based, the amount of time demanded of youth, and community variables. We are interested in diverse program content in order to increase the generalizability of the findings – at the same time our research and others' suggests that program content and whether a program is school or community based have relatively little impact on quality (Smith, personal communication) and outcomes (Hansen & Larson, 2007).

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*A strong rationale is provided for the selection of "paired Latino and non-Latino programs that are approximately matched in project content."*

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All programs must meet a set of criteria in addition to those described above (e.g., a minimum of 120 contact hours, stable staff, low youth drop-out rates). Finally, programs must enroll at least 20-30 youth and not be highly selective (e.g., of elite youth) or target a single gender.



It should be noted that we will include programs in the study in which youth participate over multiple years (as happens, for example, in a school science club or FFA program). This adds complexities to our data analyses. Novice and veteran youth may start the year at different levels of competency, have different experiences, and show different patterns of change. Nonetheless, we think this multi-cohort mix of youth is an important natural feature of many programs (missed in random assignment studies), because veteran youth pass on a culture and mentor novices. It will allow us to observe these processes and compare novice-veteran trajectories.

### Sample and Data Collection Schedule

The study includes youth, parents, and primary leaders from each program. The data collection schedule for these multiple informants and for two qual sub-samples is summarized in Table 2.

The *Full Sample* will include all youth in each program (expected ages 13-1) and at least one parent or other primary caregiver (estimated  $N = 240$  youth and  $N = 220$  parent-youth pairs, accounting for attrition) plus the 1-2 principal leaders in each program (estimated  $N = 18$ ). The following types of data will be collected from the full sample of participants:

- *Youth.* Questionnaire data will be collected from youth at all four points in time. It should be noted that Time 1 for youth, parent, and leader questionnaires will come in week 2-3 of the program, so that all are able to provide data based on initial experiences (Schochet, submitted).
- *Parents* will provide data at Times 1 and 4. Although mothers are more likely than fathers to participate in studies about their children, either or both parents will be allowed to participate if they so desire.
- *Program leaders.* Leaders will complete structured questionnaires (including rating individual youth) and interviews at each time point. The Time 1 interview for leaders will be completed *prior* to the start of the program.

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*This section of the narrative includes a comprehensive discussion of the sample. For example, the discussion of the full sample includes each group's sample size and the broad strokes of the associated data collection effort.*

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Two embedded sub-samples of youth and their parents will be selected to take part in individual narrative interviews dealing with their experiences, actions, and negotiations in, and in relationships to, the program. Both sub-samples will be stratified by ethnicity and (to the extent possible) other appropriate variables (e.g., gender, years in program, formal role in program).

- *Prospective Subsample:* 24 youth and their parents will be selected following the Time 1 questionnaires to be interviewed at three time points over the study. This sample will be selected to include 10 families in which parents are supportive of the youth's participation in the program and 14 in which parental support is weak or ambivalent.
- *Retrospective Subsample:* A subsample of 40 youth and their parents will be selected for interviews at the end of the study period. These pairs will be selected using a stratification design aimed at achieving representation of youth who showed high vs. low rates of change in self-direction (strategic thinking or responsibility) over the program.

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*The researchers also provide a rich description of the two subsamples.*

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## Recruitment and Tracking

The study team has extensive experience working with youth programs in the various study communities. Drs. Raffaelli and Simpkins have both worked with Latino adolescents and their families. Drs. Larson, Walker, and Wood had leadership positions in TYDE. These experiences will contribute to the success of the proposed study.

**Recruitment.** One key to recruiting programs and participants will be introducing the project in a simple yet compelling way. We have chosen a project name, “The Pathways Project”, that (while not very original) translates well into Spanish and identifies the purpose of the research in a way that is meaningful to program leaders, parents, and adolescents. As in TYDE we will guarantee “safeguards” for study participants and be attentive to the concerns of program staff and families, as well as provide information that is of immediate value for participants (e.g., creating a project newsletter for parents; providing feedback to programs in individual meetings). A bilingual community liaison will be hired at each site to assist with information dissemination and recruitment; this person will also assist with tracking of longitudinal study participants.

After recruiting programs, we will talk to youth about the project and give them information to take home to their parents. To maximize parent participation, we will incorporate recruitment strategies advocated for use with economically and ethnically diverse populations (e.g., Knight et al., 2009; Marín & Marín, 1991). For example, materials directed to parents will be available in both English and Spanish, and the community liaison will be available to discuss the study with parents who prefer face-to-face communication. Latino parents will be interviewed by bilingual interviewers. Incentives will also be structured to maximize recruitment and retention; for example, youth will receive a bonus for completing at least 3 of the 4 assessments.

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*The team describes the nuanced approach they will adopt to meet the needs of potential participants. This level of detail and thoughtfulness helps build confidence that the project is feasible.*

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**Tracking.** The tracking protocol reflects recommendations from published reviews of effective tracking strategies (e.g., Ribisl et al., 1996; Sullivan et al., 1996), procedures used in longitudinal studies of Latinos (e.g., Knight et al., 2009), and team members’ personal experience conducting longitudinal research (e.g., NIMH Multisite HIV Prevention Trial, 1997). At the first data collection, address, telephone, and email information will be obtained, and contact information for at least four different relatives and friends will be requested. In addition, information on planned travel or moves will be gathered. Preferred method of communication will be assessed (e.g., some parents may not be fully literate in either English or Spanish, and may prefer being contacted by telephone or in person instead of by mail). Participants will be provided with postage-paid postcards so they can report address or telephone changes. We will send mailings (e.g., project newsletters, holiday cards) with change of address notification requested, and tracking will begin immediately if mailings are undeliverable or the family has moved. Contact information will be updated at each subsequent data collection point. This information and notes detailing contact attempts will be entered into a central database (Cotter et al., 2002).

**Sample attrition.** Although we will select programs with low drop out rates, we expect some attrition. If youth drop out of the program we will conduct phone follow-up interviews with the

youth and parents. For those who drop out after Time 2, this will include oral administration of the final questionnaire (so they may be retained in the final sample). We will also ask new youth who join the program between Times 1 and 2 to take part in the study. Taking these steps into account, attrition estimates based on TYDE, YPED, and other studies are as follows. Across the 12 programs, we expect 300 potential participants (25 per program). We estimate 270 (90%) will provide consent. After accounting for early drop outs and late additions, we expect that 240 youth and 220 parents will provide longitudinal data. This final sample of 240 youth and 220 youth-parent dyads, represents 80% of youth and 73% of parents across the 12 programs.

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*The issue of sample attrition is openly acknowledged. The research team also offers a detailed plan for how they will handle associated challenges.*

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### **Measures and Interview Protocols**

The data collection will include a mix of quant and qual assessments. These have been selected based on their match with our research questions, prior use with similar populations, and their precision in assessing the phenomena of interest. Many have been used in prior research, and will not require modification; others are being adapted or developed specifically for the new study. Many measures will need to be translated into Spanish, which will be accomplished using a procedure that incorporates translation/back-translation and review by Spanish speakers who are not bilingual and represent diverse educational backgrounds (Knight et al., 2009).

Before starting the main study, we will conduct a pilot study to evaluate the measures and protocols across ethnic/language groups. Approximately 38 individuals similar in age and other demographic characteristics to our target population will be recruited: 16 parents (8 Latino, 8 non-Latino), 16 youth (8 Latino, 8 non-Latino), and 6 program leader. They will be asked to complete and critique the measures. (Formal tests of measurement equivalence are planned once Time 1 data are available, as described in the *Preliminary Analyses* section.)

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*Plans for a pilot study are introduced. The description states the goals of the pilot study, when it will be conducted, who will participate, and how this work will inform the larger project.*

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### **Quantitative Measures**

The quant measures have been selected to test hypothesized processes and pathways. All will come from questionnaires completed by the youth, leaders, and parents (except for the YQPA). Our goal is to select and create measures that assess ongoing occurrences and that are *change sensitive*. To achieve this most of our measures will focus on behavior or experiences “during the last month.” They will also be context specific (in most cases focused on: “in the program,” but for youth and parents, also “at home” and “in schoolwork”). In addition we will ensure that the items in each measure cover the appropriate range of skills or behavior; and when necessary (e.g., when responses to a scale are skewed to the top end of the scale), we will add items aimed at expanding the range of the scales to cover youth at higher and lower levels of competency. This is particularly important for our outcome variables, because our goal is to access upward positive development, both for novice and veteran youth. It is also important for measures of leader support, where the type of support provided to youth may be adjusted according to the ability

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*The team lists their criteria for selecting the quantitative measures.*

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levels of the specific youth. Our research collaborator, Brett Roberts, has extensive experience with item analysis and will be consulted on strategies for item design and assessment.

**Outcome variables.** The central outcome variables will be assessed using existing measures administered at multiple time points to multiple reporters (see Table 3, which also describes measures of secondary outcomes). Because leaders will assess all youth at all 4 time points, they will use the single-item scales employed in TYDE, in which each youth is rated on deciles, relative to other youth (e.g., top 10%, 30-40<sup>th</sup> percentile). These measures have demonstrated: a) good distributions, b) with means and standard deviations that were quite similar across leaders in the 10 programs, c) respectable correlations with youth measures of the same variable, and d) construct validity as demonstrated by preliminary findings that confirmed predictions (Table 1).

Youth and parent reports on outcome variables will be made on multi-item scales that are specific to contexts (Table 3). Primary outcome variables include:

**Individual self-direction:**

- Youth's *Responsibility* in the program, at home, and in schoolwork will be assessed using an adapted 10-item measure developed by our collaborator Brent Roberts, a personality psychologist who has published extensively on conscientiousness. In order to maximize the range, items on the scale have been selected based in part on Graded Response indices.
- *Strategic thinking* will be assessed using a 4-item measure of "strategic planning" (Hansen & Larson, 2009) employed in YPED (alpha = .61;  $M = 2.96$ ,  $SD = .75$ ) on a 1-5 scale.

**Autonomy-with-relatedness in the family:**

- *Family decision-making* will be assessed with youth and parent reports on the Self-Report Decision Making Questionnaire (Smetana, 2004; Steinberg, 1986), which presents respondents with a checklist of categories of decision making pertinent to the child (e.g., curfew, spending money) and asks them to indicate who typically makes the decision.
- A 4-item *Autonomous-Related Self-in-Family Scale* developed by Kagitcibasi (2007) (alpha = .77) will be used as an additional measure of autonomy-relatedness in the family.

**Measures of independent and process variables.** The focal independent variables have been identified in the conceptual model for each of the four major systems, as described in the Rationale sub-sections above. These are described in the respective tables.

- *Youth-Project Interactions and the Role of Staff.* Variables for Systems 1 and 2 include youth's leadership roles, experience of demands, engagement with challenge, and autonomy support from leaders. Some of these measures were drawn from the broader literature and most were piloted in YPED (see Table 4).
- *The Youth-Parent-Program Triangle.* System 3 and 4 variables include those related to parental support for youth's program participation, interactions between parents and staff, and general family features expected to influence these variables (see Tables 5 and 6).

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*The proposal explicitly states the outcome variables and how they will be measured.*

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*The proposal also includes a clear presentation of the measures for the independent and process variables as well as the assessment of program quality.*

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***The YQPA: An observational measure of program quality.*** The Youth Program Quality Assessment (research version 5.2) measures program quality at the point of service. After observing a complete session, observers make ratings on a set of scales that represent best practices in after school programs. These scales have been validated and show respectable reliability (alphas = .62-.82), inter-rater agreement, and stability over time (Smith et al., 2009a). In our study, observations will be conducted at Times 1-3 to identify changes over the program cycle. The YQPA scales include dimensions closely related to our hypotheses: youth's engagement, planning, and reflection; quality of relationships; and various dimensions of program activities. These will allow us to differentiate the 12 program settings on these quality variables for comparative qual and quant analyses. Dr. Larson visited the Weikart Center in August of 2009 and is communicating with Charles Smith and Tom Akiva about conceptual and methodological synergies between our two programs of research.

***Power analysis.*** We conducted power analysis for tests of the predictive power of individual-level independent variables, using results from the YPED study as a basis for estimating effect sizes in a youth program over a one year period. In those analyses we regularly found effects at levels ranging from  $r = .20$  -  $.40$  for relations between the focal independent variables and changes in measures of responsibility (Table 1) and strategic thinking (these analyses controlled for program and the dependent variable at Time 1). To be conservative, in the power analysis we used  $.20$  as the theorized population effect sizes we wanted to be able to detect with statistical significance. The power analyses (Cohen, 1992; Cohen et al., 2003) showed that with a sample of 240 participants, we will have an 88% probability of finding effects with population correlation coefficients of  $.20$  to be significant at the  $.05$  level. Indeed, if our sample size drops as low as 194 (which is extremely unlikely, but is a worst case scenario for the parent data), we still have an 80% chance of detecting such effects for a given analysis.

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*The power analysis provides reviewers with assurances that the sample size is not arbitrary. It also reveals assumptions about anticipated effect sizes and informs reviewers' judgment about the study's ability to detect effects of a given size in a particular situation.*

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### **Qualitative Interview Protocols**

The qual and quant parts of the study are closely linked. Many parts of the qual interviews are aimed at obtaining verbal descriptions of the *same* paths and processes tested in the quant analysis. Specific sections of the qual interviews *are paired with* specific quant tests.

The important contribution of the qual interviews is understanding these processes *in complex contexts as experienced and enacted by the participants* (youth, leaders, parents). What are the obstacles/ challenges/ dilemmas that these parties experienced? What are the strategies/ responses/ supports/ negotiations that account for turning points, surmounting obstacles, and positive change? Also, what conditions prevent these from being surmounted? This study will build on TYDE by employing a second generation of targeted qual interview questions aimed at better understanding

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*The link between the quantitative and qualitative efforts is succinctly reiterated, and additional rationale is offered regarding the importance of the qualitative work.*

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the conscious processes at work – across cultural groups – in a way that both: 1) *facilitates translation of our findings to the complex situations of practice* and 2) *generates new hypotheses*.

The qual interviews will employ the method of “event history calendars” (EHC) to help reconstruct event sequences (Belli et al., 2007). Research shows use of EHC leads to better and more accurate data (Belli et al., 2007). Our focus is on reconstructing both short time sequences around specific events, challenges, and transactions, as well as the overall timeline of program-related experiences across the year. Along with this, we will use the qual technique of examining “turning points.” This involves identifying “consequential shifts” in a person’s experiences, shifts that redirect or alter the flow of movement of their experiences, then asking about the factors or processes that account for these shifts (Lofland & Lofland, 1995).

**Leader interviews.** The leader interviews will play a key role in helping us understand the timeline of each program, including leaders’ initial goals for activities and how these unfold. They will also address questions in System 2 about leaders’ complex task of supporting youth’s developmental processes, both within specific situations and over the arc of the program. The *initial leader interview* (before the program starts) will focus on the leaders’ intentions, philosophy, anticipated schedule, and a priori expectations for youth and for youth’s unfolding experiences (their “espoused theory”; Argyris and Schön, 1974). For example, how do they conceptualize their own role and the role of youth in shaping activities over the months ahead? Do they – and how do they – think about balancing the tension between providing “appropriate structure” and high expectations for youth *with* honoring youth’s voice, agency and personal process of learning self-directions from their own actions (including from mistakes)? Do they have a timeline of how youth’s learning process unfolds?

The *subsequent leader interviews* will then be aimed at filling in the timeline of what actually happens, as experienced and enacted by the leaders (their “theories-in-use”; Argyris and Schön, 1974). How does the unfolding program differ from her/his expectations? What challenges or practitioner dilemmas occurred, how did they respond to them, toward what goals, and how effective was their response? We are interested not solely in dilemmas, but turns of events and opportunities that leaders use to facilitate the goals of supporting youth’s development and self-direction. A particular focus in both the initial and subsequent interviews will be on planned or unplanned interactions with youth’s parents (System 4), as well as any interactions in which families’ ethnicity or immigrant status appear to be a factor.

**Youth and parent interviews.** Youth and parents in the two subsamples will participate in qualitative interviews focused on key issues from our major questions. These interviews will start with filling in an event history calendar of experiences pertinent to the person, the family, and especially to the program (e.g., significant events, milestones, turning points). The *Prospective Interviews* will be structured to elicit accounts of youth’s and parents’ specific ongoing experiences related to the program (challenges/obstacles, strategies/negotiations, parent and leader support for the youth, youth’s learning, changes in the youth-parent relationship). Part of the focus will be on the unfolding of parent support or lack of support and the factors associated with this (e.g., congruence of goals). The *Retrospective Interviews* will elicit reconstructions of these experiences and how they relate to the youth’s change or lack of change on the self-direction variables, as well as how these changes may have fed back on the family.

The interview protocol will be longer for youth, because it will include questions related to their experiences both in the program *and* their interactions with their parents (Systems 1, 2 & 3). We will ask youth to reconstruct the creation of their projects, starting with original goals and plans, then ask about challenges and how they were overcome. They will also be asked about their experiences of struggle/ engagement, change points, receipt of feedback, and assistance from leaders or parents that was or was not helpful. We will ask about the processes related to each change point identified. We will also ask youth about what they learned and how they learned it.

Parents will be asked about their experience of the program, what they observed in youth's behavior, and about any interactions they had with program staff. Both parents and youth will be asked about conversations between them around the program, as well as numerous other questions aimed at understanding how that family's experience did or did not fit the conceptual paths of our preliminary grounded theory, as outlined in Figures 2 and 3.

## V. ANALYSIS PLAN

### Overview

The goal of the analyses is to understand the processes and pathways for the development of self-direction across the 4 systems. For each system, the respective analysis team will use the quant data to test hypotheses for the sample as a whole and for critical subgroups (e.g., Latino vs. non-Latino youth), and draw on the qual data to understand the same processes and paths as “experienced and enacted” by participants. We will also run separate analyses for different outcome variables (e.g., responsibility, strategic thinking). Given space limits, we provide representative illustrations of planned analyses of major questions. For ease of presentation, we describe major quant and qual analyses separately; however, these analyses will be integrated during the process of data coding, analysis, and interpretation (Creswell, 2003; Sells et al., 1995).

### Preliminary Analyses

**Quant data.** Once the Time 1 quantitative data are available, analyses will be conducted to evaluate the study measures. Basic psychometric properties of measures (e.g., factor structure, reliability) will be examined in the entire sample. Cross-ethnic measure equivalence/invariance will be evaluated for core study measures (Knight et al., 2009). We will examine intercorrelations among study variables to ensure they follow expected patterns. In addition, where data from multiple reporters (e.g., parent and youth) or from multiple assessment modalities (e.g., observational and leader interview) are available, information will be compared. Prior to the data analyses, distributions will be checked for normality and transformations performed if necessary. As data from later waves become available, possible effects of attrition will be examined by comparing participants who dropped out to those retained in the sample.

**Qual data.** As interviews are conducted, they will be transcribed and entered into NVivo. We will code into preliminary “descriptive codes” that identify material pertinent to the major topic

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*The analysis plan is tightly aligned with the quantitative hypotheses and qualitative questions (see section III). The consistent presentation of this organizational scheme is a real asset. It allows reviewers to focus on the content of the materials rather than having to hunt for facts.*

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areas of the study (e.g., by System, process, relevance to hypotheses) and undertake other steps of data preparation (Miles & Huberman, 1994).

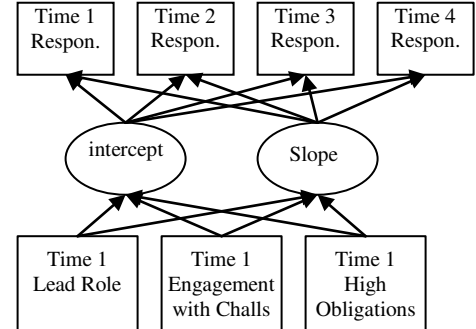
### **System 1: Youth's Interactions with their Projects**

**Quant analysis.** Quant Hypoth 1 identifies experiences in youth's projects that will predict changes in self-direction (i.e., responsibility, strategic thinking). These relations will be tested through latent growth curves in structural equation modeling (i.e., SEM) with MPlus v5 (Muthén & Muthén, 2007). All SEM models will be estimated with full information maximum likelihood (FIML) to include cases with missing data (Schafer & Graham, 2002). The models will also account for the correlated errors among adolescents in this type of nested data (i.e., adolescents nested within programs). The consultant, Sandi Simpkins, has extensive experience with this type of analysis (e.g., Simpkins et al., 2008; Simpkins et al., in press).

*The research team provides enough details for reviewers to assess the merits of the proposed analyses.*

As illustrated in Figure 4, youth's responsibility in the program is expected to be higher at Time 1 and show larger increases from Times 1 to 4 if they have a lead role, experience engagement with challenges, high obligations, and ownership of their work, and if they obtain feedback on their work. This model will be replicated with youth and leader report of youths' responsibility in the program. These relations may differ for novices and veterans; non-Latino and Latino youth. These expectations for moderation will be tested with interaction terms in SEM to obtain adequate power (Curran et al., 2004). Significant interactions in all models will be examined with simple slope analyses (Curran et al., 2004; Preacher et al., 2006). In addition, we are interested in how changes in youth's program behavior (e.g., engagement, responsibility) predict indicators of responsible behavior outside the program (e.g., GPA, health behaviors). To do this, we will use the intercept and slope from a latent growth curve on youth's behavior in the program to predict their behavior outside of the program at Time 4 while controlling for Time 1 behavior outside of the program. Each latent growth curve of youth's program behavior will be examined separately in SEM.

Figure 4: Example latent growth curve for youth responsibility



**Qual analysis.** Just as the goal of the quant analysis is to test the paths in youth's learning process, the goal of the qual analysis is to illuminate these processes as experienced by youth. The qual analysis for System 1 will focus on data from the Retrospective Sample and on comparing experiences for youth who did vs. did not show gains in self-direction. A focal question for responsibility is what accounts for some youth persevering in fulfilling obligations (especially when they become onerous), while other youth back out? This perseverance is the unsolved puzzle in our grounded theory of the developmental process (Wood et al., 2009).

*The plan for the qualitative analysis highlights a few key areas of exploration. The areas identified are informed by prior empirical work and theory.*

For the development of strategic thinking, a key objective is to better illuminate the cognitive process of "engaging with challenges." Is this most

often an individual or group experience? What is the thought process in identifying challenges, generating and choosing alternative courses of action, and modifying strategies based on events? We have speculated that this thought process involves “rational imagination” (Byrne, 2007), but how much is it subject to the cognitive flaws, blind spots, and fallacies that may compromise experiential learning (Byrnes, 2005)? And does youth’s learning include learning to “control for” these flaws and fallacies?

**Synthesis.** The combination of quant and qual analyses are designed to, at once, test our preliminary theory and move it forward. We expect to verify processes and sequences for learning different forms of self-direction. At the same time we expect to better illuminate how these are experienced by youth in the context of their struggles with specific demands and challenges in their projects. These analyses will give particular attention to how the processes may be distinct for Latino youth. We are also interested in differential learning patterns in programs where projects engage youth with adult members of the community (Bouillion Diaz, in press) and for novice as compared to veteran youth (Cumberton & Bouillion Diaz, in press).

## **System 2: How Leaders and Programs Facilitate the Processes in System 1**

### ***System 2a: Leaders’ assistance to youth***

**Quant analysis.** Quant Hypoth 2a examines whether youth’s experience of balanced autonomy support from the leader predicts change in their experiences in the program (i.e., ownership, engagement) and development of self-direction. This hypothesis will be tested through multiple models. First, Time 1 autonomy support will be used to predict separate latent growth curves of youth experiences and responsibility in the program. In each model, Time 1 autonomy support is expected to positively predict each indicator at Time 1 and greater increases from Times 1 to 4. Taken together, Quant Hypotheses 1 and 2a suggest that program experiences will *mediate* the relations between autonomy support and development of self-direction in the program. In these SEM models, we will test if Time1 autonomy support predicts Time 2 program experiences, which in turn predict Time 3 responsibility in the program. Mediation will be formally tested with the Sobel test with bootstrapping to assess the significance and confidence intervals of the effect (Mackinnon et al., 2002). These findings will inform whether autonomy support predicts youths’ program experiences and increases in self-direction over time as well as whether program experiences explain the relation between support and youth self-direction.

**Qual analysis.** We and others have repeatedly suggested the importance of balanced autonomy support (leading from behind) and keeping learners in a “channel” or “zone” that is matched to their ability. It is essential to take the next step of asking what this means in different situations and for different youth (including youth from different cultural backgrounds). We are particularly interested in asking leaders (and youth) to provide examples that show what the *situational guidelines* are for providing assistance vs. stepping back. And, in what situations are these guidelines violated: when, for example, is youth’s sense of ownership diminished by intrusive assistance or by being left to flounder for too long? The System 2 analysis team is generating new items for the leader and youth interviews aimed at identifying the guidelines and strategies associated with appropriate and effective leader

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*This section communicates what will be asked, why this information is important, how it will be used, and contribute to new knowledge.*

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support. Comparison of the narratives of youth who show high and low increases in self-direction will provide a related tool.

### ***System 2b: Role of staff and program-level differences***

***Quant analysis.*** The number of programs in the proposed study (12) will limit our ability to examine program-level effects in quant analyses. However, we may be able to explore how program factors (as indexed by the YQPA) predict different trajectories of change in self-direction. In this way, the study will allow us to generate estimates of program-level effects that we can use to plan future studies. If the findings with 12 programs are compelling, we will consider requesting funds to collect quant data from 8-12 more programs.

***Qual analysis.*** As described above, we have several planned lines of investigation on program-level differences. One involves comparing leaders' initial intent (plans, expectations, timelines for the year) to how that intent is implemented and, then, to youth's experiences in their projects. We expect that discrepancies between intent and implementation will be related to the degree to which youth show gains in self-direction. An additional approach to studying these issues will involve identifying the 3-4 programs with the highest and lowest change in youth's self-direction and/or YQPA scores (with approximate matching of the two groups on other characteristics), then comparing the sequence for each leader's initial plans, how they were implemented, and how these related to youth experiencing the requisite processes for developing self-direction.

A second line of investigation continues our research on dilemmas of practice. As before, we will create a data base of dilemmas experienced by the leaders. Tailored questions in the new study will provide more detailed information on the contingencies, decision process, outcomes, significance of culture, etc. for each reported dilemma. One goal is to better evaluate how the most effective leaders appraise and respond to the variety of dilemmas that occur, including ones involving discrepant cultural goals or misunderstandings. What are differences in responses between programs that are high and low in youth development? Again, one of our interests is to learn about "situational guidelines" and strategies used by the most effective leaders.

***Synthesis.*** Although we have separated the qual and quant in these descriptions, our goal will be to use them together to advance theory (and measurement) dealing with processes and effective practices in youth programs (Larson et al., 2009). Our objective is to obtain preliminary findings on program processes that position us to expand this study, or initiate a new one, aimed at testing setting-level grounded theory about factors that influence program quality.

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*The research team explicitly states how the quantitative and qualitative analyses will be used.*

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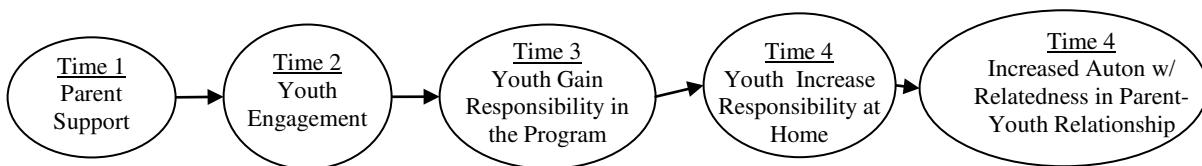
### ***System 3: Youth-Parent Interactions Vis a Vis the Program***

Our central question in System 3 is how families affect (and are affected by) youth's experiences in the program. Hypoth 3a posits that parents' support for youth's program participation predicts a sequence of positive paths leading to increases in youth's self-direction and autonomy-with-connection in the family (a "virtuous cycle"). Hypothesis 3b proposes a set of family variables expected to predict parents' support, and thus the likelihood of this positive sequence occurring.

***Quant analysis for 3a: Pathways of family negotiation and change.*** Figure 5 shows the sequence that we will test for Hypoth 3a. This is the core positive sequence described by families

in TYDE (from the fuller conceptual model for the “Virtuous Cycle” in Figure 2). This hypothesis will be tested through three main analyses. First, we will test the basic model presented in Figure 5. The latent variable for each indicator will be based on reports from multiple respondents (e.g., parent and youth reports of parents’ support at Time 1). Second, we will test the same relations in Figure 5 controlling for prior levels of the youth indicators through path analysis. For example, is youth’s engagement at Time 2 predicted by parent support at Time 1, while controlling for youth engagement at Time 1? These first two sets of models will test whether change in each variable in the sequence predicts change in the subsequent one, including across settings. For example, does the data support the hypothesis that responsibility developed in the program transfers to the family? These analyses will also allow us to verify Scenario B (The Resiliency Cycle; see Figure 3), which predicts that when parents change from being unsupportive to being supportive it influences the subsequent steps in this sequence.

**Figure 5. Pathway of Family Negotiation and Change**



Third, change in the core outcomes will be tested with latent growth curve analyses in SEM. For example, we will test how Time 1 parent support and youth engagement predict youth’s responsibility in the program at Time 1 (i.e., the intercept) and the change in responsibility from Times 1 to 4 (i.e., the slope). These growth curve analyses will assess the concurrent and long-term influence of family factors on the outcome variables (i.e., on the different forms of self-direction). All models for 3a will be tested first for the sample as a whole, then, with interaction terms to test differences in the model for Latino and non-Latino families.

***Qual analysis for Hypoth 3a: How paths in scenarios are enacted and experienced.*** The youth in our study will be a “self-selected” group: teens who had enough family support to join the program (although in TYDE some youth joined *despite parent opposition* or unenthusiasm). Qual data from the Prospective Sample will allow us to follow the experiences of 10 families in which youth had high initial support and 14 in which support was low. We will supplement this with data from the Retrospective Sample for families who had low initial parental support.

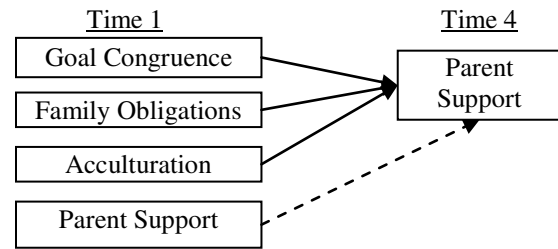
The qual analyses will evaluate youth’s and parents’ descriptions of their actions and experiences related to each of the paths (arrows) in the different scenarios described in Figures 2 and 3. Central questions are: a) How do the words or actions associated with parents’ support (or lack of support) influence youth’s engagement in the program (as reported by youth)? b) What are the youth-parent-program transactions through which parents who were initially unsupportive changed and became supportive (see center boxes in Figure 3) and how did this change influence parents’ actions and behavior? and c) How did youth’s increases in responsibility in the program feed back on to the family: on youth’s responsibilities at home, on parents’ views of the youth, and on family-level changes in the rights, decision-making, and respect afforded to youth?



**Quant analysis for Hypoth 3b: Factors influencing parents' support.**

Under Quant Hypothesis 3b, we test cultural and family factors expected to predict parental support for youths' participation in the program. As shown in Figure 6, the change in parent support will be tested by predicting parent support at Time 4 from the hypothesized factors at Time 1 while controlling for initial support through path analysis in SEM (these analyses will use parent and youth reports at Times 1 & 4). Because youth will report on parent support at Times 1-4, the hypothesized factors will be used to predict the latent growth curve of *youth's reports* of parent support. It is expected that higher goal congruence, lower family obligations, and higher family acculturation will predict higher parent support at Time 1 (i.e., the intercept) and larger increases in support across time (i.e., the slope). In addition, we expect these relations will be stronger for Latino vs. non-Latino youth, given the greater salience of these factors for Latino families. This moderation will be tested with interaction terms in SEM.

**Figure 6. Factors Influencing Parents' Support**



**Qual analysis for Hypoth 3b.** These analyses will focus on the processes accounting for differences found in the corresponding quant analyses. Our aim is to understand how parents from different backgrounds view youth programs (e.g., as potential contexts for development or as distractions from long-term goals and family obligations). We also hope to understand what causes parents' views of programs to change over time. Finally, we will explore how these changes affect parent-youth interactions within the home.

**Synthesis.** Our research recognizes that transfer of learning between contexts is a complex process that depends on the dynamics in the context to which transfer is to occur, in this case, on parents' goals for their children, cultural expectations, and how these are negotiated. Results of the System 3 analyses will illuminate how this transfer unfolds for a high stakes process: how families negotiate youth's increased responsibility, and how this might vary across cultural groups that differ in conceptions of independence, authority, and familism.

**System 4: How Parent-Leader Interactions Influence What Happens in Systems 1-3.**

Most of the analyses for System 4 will follow the quant and qual procedures already described. In some cases the parent-staff variables will be added to those analyses as another predictor variable. The general goal of the System 4 analysis team will be evaluate obstacles to positive parent-staff relationships and factors related to improving them. What proactive policies, procedures, and activities cultivate effective communication and goal consensus between programs and diverse parents? Analysis of practitioner dilemmas related to families (especially Latino families) will be particularly useful in generating knowledge that is directly applicable to daily challenges of practice. What are the variety of situations that novice practitioners must be prepared to respond to, and what characterizes sensitive, culturally appropriate responses?

**Integration of Findings**

Although we have described analyses that are largely within systems, we expect to identify processes and pathways of influence that operate across them (Seidman, 1991). Our ultimate goal is to weave together findings from these analyses to yield integrated insights about the

connections across settings and levels of analysis. For example, unpublished analyses of data from YPED indicate that youth's reports of autonomy support from program leaders and support from parents have significant independent associations to youth's engagement with challenge. But it is important to understand how these two forms of support interface. The proposed study, which involves multiple reporters and time points, will allow us to examine how parent and leader influences operate over time and across contexts to support youth's development. We believe this integrated knowledge will provide valuable information on how to make youth programs effective. The findings we obtain on youth's developmental processes within programs, the role of staff in supporting these processes, and the linkages with processes in the family system will help inform practice, policy, and efforts to improve program quality.

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### YPF Master List of Tables and Figures

Tables	Title
Table 1	Factors Predicting Increases in Responsibility as Rated by Youth and Leaders
Table 2	Design of the data collection
Table 3	Outcome variables
Table 4	Measures of processes and factors in the program (System 1 & 2)
Table 5	Measures for Youth-Family Interactions (System 3)
Table 6	Measures for Parent-Leader interactions (System 4)

Figures	Title
Figure 1	Interaction systems in the new “pathways” study [located in the text of the proposal]
Figure 2	Pathways between youth, parents, and program (Scenario A: Virtuous cycle)
Figure 3	Pathways between youth, parents, and program (Scenario B: Resiliency cycle)
Figure 4	Example latent growth curve for youth responsibility [located in the text]
Figure 5	Pathway of family negotiation and change [located in the text]
Figure 6	Factors influencing parents’ support [located in the text]

**Table 2: Design of the Data Collection**

	Stage in the Program Cycle		
Source & Type of Data Collection	Start of Program Time 1 <sup>1</sup>	Middle Time 2-3	End of Program Time 4 <sup>2</sup>
<b>Youth</b>			
<i>Questionnaires (Full sample N=240)</i>	<i>Background info, data on ind and dep variables; short-answer qual data</i>	<i>Data on ind and dep variables.</i>	<i>Data on dep variables, etc.</i>
Interviews with <u>Prospective Sample</u> (N=24). Selected for families high/low on parent support.	Interview on joining program, parental support	One interview on ongoing experiences with their projects, with leaders, and with their parents	Interview on parental support, effect of program on own self-direction
<u>Retrospective Sample</u> (N=40) Select youth with high vs. low change in self-direction			Retrospective interview on experiences, negotiations, change process.
<b>Parents of Same Youth</b>			
<i>Questionnaires (Full sample N=240)</i>	<i>Background info, data on ind and dep variables; short-answer qual data</i>		<i>Data on dep variables, etc.</i>
Interviews with parents in <u>Prospective Sample</u> (N=24)	Interview on joining program, parental support	One interview on ongoing experiences	Interview on effects of program
Interviews with parents in <u>Retrospective Sample</u> (N=40)			Retrospective interview on negotiations, change process.
<b>Primary Program Leaders</b>			
<i>Questionnaires (N=18)</i>	<i>Background info on program, philosophy, &amp; expectations</i> <i>Rate all youth on dep variables</i>	<i>Rate all youth on dep variables at each time</i>	<i>Summary information on the year</i> <i>Rate all youth on dep variables</i>
Interviews (N=18)	Information on program and plans for the year	Periodic check-ins on program activities, activities for families, dilemmas experienced	Retrospective data on interactions with youth and parents
<b>Observations of Program Sessions</b>	Observe day 1 <i>Administer the YQPA</i>	Observe program events for families <i>Administer the YQPA</i>	Observe concluding events of program (e.g. a showcase, performance)

*Key: Quantitative data collections are in italics*

<sup>1</sup> For Time 1, the youth and parent questionnaires will be in Week 2 of the program and the qualitative interviews with the Prospective Sample will be in Week 3-4. The Time 1 Leader Interviews will be before the start of the program.

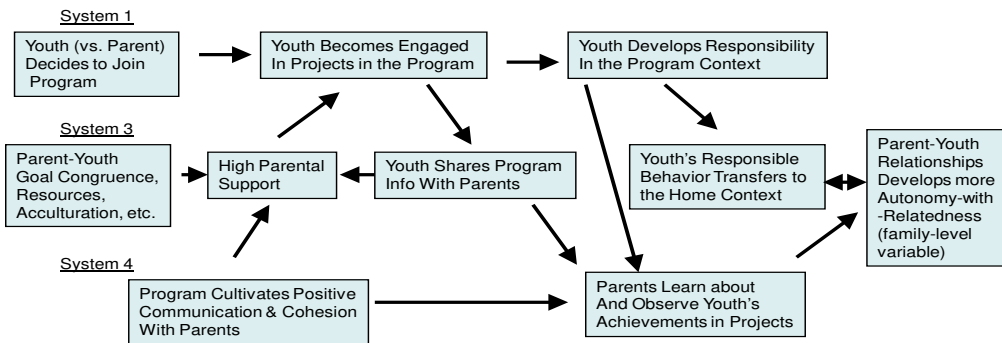
<sup>2</sup> For Time 4, the Retrospective Sample interviews will be after the study is completed.



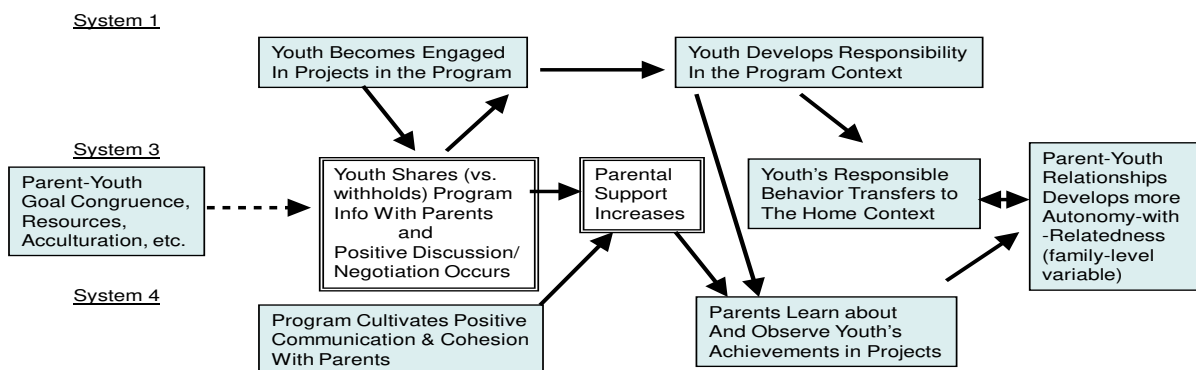
**Table 3: Outcome Variables**

<b>Construct</b>	<b>Measure</b>	<b>Youth</b>	<b>Leader</b>	<b>Parent</b>
<b>Individual Level</b>				
Responsibility in these contexts: 1. In Program 2. At Home 3. In Schoolwork	<u>From Leaders</u> : a 1-item % rating (Wood & Larson, used in YPED) <u>From Youth and Parents</u> : 5-items. Adapted from scale developed by Brent Roberts. Same items will be used to ask about behavior in three contexts.	Prog: T1-4 Hom: T1,4 Sch: T1,4	Prog: T1-4	Hom: T1,4 Sch: T1,4
Strategic Thinking	<u>From Leaders</u> : a 1-item % rating (Hansen & Larson, used in YPED) <u>From Youth and Parents</u> : 4 item scale of strategic planning (Hansen & Larson, 2009; used in YPED)	Prog: T1-4 Hom: T1,4 Sch: T1,4	Prog: T1-4	Hom: T1,4 Sch: T1,4
Teamwork	<u>From Leaders</u> : a 1-item % rating (used in YPED) <u>From Youth and Parents</u> : 5-item scale adapted from Davis (1995)	Prog: T1, 4 Hom: T1,4 Sch: T1,4	Prog: T1,4	Hom: T1,4 Sch: T1,4
Mobilizing effort	<u>From Leaders</u> : a 1-item % rating <u>From Youth and Parents</u> : 5-item scale adapted from Sherer (1982)	Prog: T1, 4 Hom: T1,4 Sch: T1,4	Prog: T1,4	Hom: T1,4 Sch: T1,4
<b>Family Level</b>				
Family Decision Making	18-items; SDMQ from Steinberg (1986); adapted by Smetana (2004).	T1,4		T1,4
Autonomous-Related Self-in-Family Scale	4-items; developed by Kagitcibasi (2007)	T1,4		T1,4
<b>Ancillary Dependent Variables</b>				
Parent-Adolescent Closeness	12-items; IPPA, adapted by Laible, Carlo, & Raffaelli (2000)	T1,4		T1,4
Youth's GPA	1-item	T1,4		
Youth's Health Behavior	10-items, used in YPED	T1,4		T1,4
Career & College Decisions	3-items, used in YPED	T1,4		T1,4

**Figure 2: Pathways Between Youth, Parents, and Programs  
Scenario A: Virtuous Cycle**



**Figure 3: Pathways Between Youth, Parents, and Programs  
Scenario B: Resiliency Cycle**



Notes: Double-lined boxes are what differentiate this Scenario from Scenario A.

**EXCERPTS FROM:**

**Networks of Teachers Affects Children in Transition**

**(PROJECT NTACT)**

**Jill V. Hamm,  
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and  
Thomas W. Farmer  
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The transition to middle school is widely recognized as a time of risk to healthy youth adjustment (Eccles, 1999). Social processes inherent in middle schools contribute significantly to how youth fare during this period. The quality of student-teacher relations, for instance, contributes to student achievement and achievement motivation (e.g., Wentzel, 2002), and features of students' peer group affiliations bear considerable influence over student achievement, achievement motivation, and behavior (e.g., Hamm, Schmid, Farmer, & Locke, 2011; Kindermann, 1993; Ryan, 2001). Yet, influential social processes within the middle school setting may not involve students directly. Teachers' professional relationships with colleagues, known as *networks of collegial interaction* (NCIs), contribute to changes in teacher dispositions and practice (Bidwell & Yasumoto, 1999), and potentially, to changes in student school adjustment. Moreover, external resources intended to enhance student adjustment, such as professional development programs, depend on teachers for their success. Resources are routinely introduced into schools with the expectation and assumption that all teachers will be able and compelled to implement the recommended practices, and that there will be a cohesive uptake of the program that leads to improved student adjustment (Frank, Penuel, Sun, Kim, & Singleton, 2011). Yet, the extent to which individual teachers enact the recommended practices of external resources may depend on features of their NCIs.

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*The opening provides the foundation for the paper. It describes a key idea and how this idea informs the design of programs, then identifies a gap in the knowledge base.*

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The purpose of this proposed project, *Networks of Teachers Affect Children in Transition* (NTACT), is to identify salient NCIs among 6<sup>th</sup> grade teachers, and the extent to which and ways in which features of NCIs are associated with teacher practice and student school adjustment. Moreover, the purpose of this project is to explore aspects of teacher NCIs as mediators of the impact of the Supporting Early Adolescents' Learning and Social Success (SEALS) program on teachers' classroom practices, and school adjustment indicators among metropolitan students in the transition to middle school.

## MAJOR QUESTIONS

The proposed project, NTACT, is embedded within an ongoing study, funded by the U.S. Department of Education's Institute for Education Sciences, to test the efficacy of the SEALS intervention in metropolitan schools. In the context of this large-scale, cluster randomized controlled trial study design, we have the unique opportunity to examine the nature and role of professional networks of sixth grade teachers, as they evolve naturally in control schools, and in relation to professional development delivery in intervention schools. Social networks have *structural features*, such as reciprocity, that reflect the patterns of relationships among members of the group; and *behavioral dynamics*, such as trust among members and social norms, that facilitate and constrain changes to members' dispositions and behavior, and that can facilitate (as well as constrain) the spread of innovation (Coleman, 1988; Gest, Osgood, Feinberg, Bierman, & Moody, 2011). The results of Project NTACT, proposed here, will illuminate the nature of these key features of NCIs; their evolution across a school year, and their relationship to teacher practice and to early adolescent adjustment.

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*The proposed project builds off of a federally funded cluster-randomized trial.*

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Moreover, the findings have the potential to inform how to leverage the effectiveness of professional development interventions through teachers' professional social networks. More specifically, findings from Project NTACT will support an expanded logic model for the SEALS program that includes how changes to and mechanisms within the school social structure are involved in the delivery and implementation of this intervention program. This proposal addresses the following primary questions:

*The team explicates the study's relevance to policy and practice.*

- (1) To what extent and in what ways do structural features and behavioral dynamics of sixth-grade teachers' team-based NCIs change across the school year under typical teaching conditions, and following teachers' participation in the SEALS program?
- (2) To what extent and in what ways do structural characteristics and behavioral dynamics of sixth-grade teachers' team-based NCIs act as a lever of change for the SEALS intervention, to improve teacher practice and student social, behavioral, and academic adjustment?
- (3) To what extent and in what ways are the effects of the SEALS program on the structural and behavioral dynamics of teacher team-based NCIs sustained in the year following their participation in intervention training, as compared to the structure and behavioral dynamics of team-based NCIs in control schools.
- (4) What are the effects of delivery of the SEALS program to team-based NCIs on the voluntary social structure (advice-seeking networks) of teachers?

*The research questions are focused and compelling. They specify who and what will be studied and over what time period.*

## **RATIONALE**

### **Relevance to W.T. Grant Foundation Current Research Interests**

This project investigates teacher Networks of Collegial Interaction (NCIs) as social processes that have the potential to influence teacher classroom practice and early adolescent school adjustment, and as social processes that may be enhanced by resources introduced into the school setting. The focus of the proposed work is directly aligned with the William T. Grant Foundation's priority to understand *how settings work, how they affect youth development, and how they can be improved.*

The proposed work involves mapping the membership, structure, and behavioral dynamics of two types of teachers' professional networks at three points across the school year. Findings from this aspect of the study respond to the Foundation's interest in understanding how settings work, by providing a deeper understanding of how middle school social structure and processes operate. Information on key elements of teacher NCIs, will be generated, including overlap and change over time in membership and mechanisms of influence for different types of NCIs. Moreover, the Foundation's priority to support research that investigates how settings can enhance youth outcomes is addressed by the proposed study's attention to the influence of specific processes within NCIs, on both teacher and student outcomes. A unique feature of the

proposed work is that the operation and evolution of teachers' professional networks will be examined both in relation to the introduction of a professional development program, as well as under business-as-usual conditions (control school settings).

The focus of the proposed study on the extent to which NCI processes and influences change following the introduction of SEALS, responds to the Foundation's desire for research on how social processes in settings can be altered in ways that promote youth adjustment. The larger study within which the proposed work is based investigates the effects of the SEALS program on critical student outcomes, including individual student academic (i.e., achievement, achievement motivation), behavioral (i.e., aggression), and social (i.e., productive peer group affiliations, bullying) outcomes, as well as on setting-level student outcomes such as the peer culture of effort and achievement, and of the school bullying culture. The proposed study, NTACT, builds on the existing SEALS project to investigate teacher NCIs as a setting-level lever of change through which benefits to youth adjustment can be realized following teachers' participation in the SEALS program. Finally, the design of the proposed study permits investigation of the extent to which setting-level changes can be sustained over time, as well as the implications for the larger and naturally-occurring social structure of teachers, which aligns with the Foundation's desire to support research on improving the capacity of settings that serve youth.

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*The proposal includes a detailed rationale about why the proposed research is relevant to the Foundation's research interest (social settings) and offers specific examples to support these claims.*

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The proposed Project NTACT is grounded in the conceptual framework endorsed by the Foundation, for understanding settings and their influences on youth adjustment. Tseng and Seidman's (2007) Systems framework positions social processes, which involve transactions among individuals or groups within a setting, as central to the quality of the functioning of the setting itself, as well as to the adjustment of individuals within the setting. Social processes are influenced by resources extant to, or introduced into a social setting, and they can act as a lever of change for the influence of resources on setting outcomes. In the proposed work, NCIs represent key social processes within schools, and are theorized to influence, through their affiliative patterns, structure, and behavioral dynamics, both teacher practice, and consequently, student adjustment. Moreover, features of NCIs are theorized to be shaped by existing resource allocations in schools (i.e., a team-based structure used in middle schools), as well as by the introduction of an evidence-based professional development program (i.e., Project SEALS) that is delivered to teams of sixth-grade teachers in intervention schools, while teachers in control schools conduct business-as-usual. Figure 1 (see Exhibit A, p. 33) represents these relationships.

### **Teachers' Networks of Collegial Interactions as Middle School Social Processes**

Although classroom teaching has an autonomous and individualistic element, schools have formal and informal social structures that contribute to teachers' practice and student outcomes. Networks of collegial interactions (NCIs) are teacher professional networks that teachers draw on for support, to address teaching challenges with colleagues who share their experiences, through collaboration, advice-seeking, and other types of social interaction (Bidwell & Yasumoto, 1999). Moreover, NCIs filter external demands, such as policy or professional



development content, through their own collective content and pedagogical knowledge, and shared perspective on the local school context (Gamoran, Gunter, & Williams, 2005).

### ***Types of Middle School NCIs***

Multiple types of NCIs constitute the social organization of school faculty. School organizational features necessitate formal, assigned NCIs, by occasioning shared work activities, proximity, and similar problems of educational practice among teachers. In high schools, for instance, NCIs form among members of the same academic departments, and influence teachers' pedagogical beliefs and practices (Bidwell & Yasumoto, 1999). The organization of middle schools reflects an effort by schools to optimize student success at this critical and challenging time. Core content area (i.e., mathematics, social studies, language arts, and science) sixth-grade teachers are typically grouped into teams that share the same students. Within a team, teachers are expected to coordinate their efforts to provide a coherent and supportive experience for their assigned group of students as they transition into the middle school setting (Carnegie Task Force on the Education of Young Adolescents, 1989; Felner et al., 2001; Lipsitz & West, 2006). The social network structure of middle school teachers has not received much empirical attention, but it follows from Bidwell and Yasumoto's (1999) conceptualization that the assignment of sixth-grade teachers to within-grade teams creates formal *team-based NCIs*.

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*The narrative leads reviewers through the logic and conceptual framework guiding the study. Each section unpacks a key idea and grounds it in the literature.*

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At the same time, teachers form voluntary, informal affiliations, or, *advice-seeking networks*, with colleagues perceived to possess valuable expertise or to share similar perspectives. These networks typically transcend organizational structure (i.e., grade level, content area). Similar to formal and assigned NCIs, advice-seeking networks influence teacher practice (e.g., Coburn & Russell, 2008; Frank et al., 2011; Neal, Neal, Atkins, Henry, & Frazier, 2011).

Although both types of NCIs can be found in schools, and both involve social processes through which teachers alter their own practice, advice-seeking and formal NCIs are typically not investigated in the same research study (see Frank & Zhao (2005) for an exception). Efforts to elicit wide-spread change in teacher practice with the aim of enhancing student success typically rely on formal, organizationally-based NCIs for the spread of innovation (Coburn & Russell, 2008). As described more fully below, team-based NCIs are targeted for SEALS intervention delivery. However, both types of NCIs are investigated in the proposed study. Given that advice-seeking networks are a known means through which dissemination of ideas and teacher decision-making occurs, an understanding of how both types of networks operate, and the relationships between the two types of NCIs, would help to inform the efficient design and implementation of interventions such as SEALS, which use teacher collectives as a basis for training.

### ***Social Processes within Teacher NCIs***

NCIs provide a naturally-occurring context within which teachers can engage in the processing and adaptation of knowledge that will convince them to change (or not to change) their own

practice (i.e., Coburn & Russell, 2008; Gamoran et al., 2005; Penuel, Riel, Krause, & Frank, 2009; Spillane, 2006). The potential contributions of NCIs to teachers' practice and other setting outcomes is conceptualized in relation to tenets of *Social Capital* theory. Social capital is found in the relationships that individuals form with others; aspects of the social structure and the social dynamics inherent in these relationships facilitate and constrain the actions of the individuals within the relationship (Coleman, 1988). NCIs contain necessary resources and expertise for problem-solving challenging teaching situations, and for understanding and applying innovation to local classroom contexts. For instance, NCIs may contain a mix of veteran and novice teachers, as well as teachers who have experimented with specific practices or who have specialized expertise relevant to innovation (e.g., Coburn & Russell, 2008; Penuel et al., 2009). Importantly, NCI affiliations enable teachers to access the knowledge and experiences of their colleagues who have similar information and who are operating under similar teaching conditions. Concepts from the field of social network analysis (Gest et al., 2011) can be applied to clarify network-level *structural* and *behavior dynamic processes* that characterize the nature and influence of NCIs.

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*The study is novel in that it tests a hypothesized—yet largely untested—mechanism linking school-based interventions to student outcomes (e.g., the suggestion that education interventions work in part through their effects on teachers' relationships with one another).*

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**NCI Structural Features.** Structural features reflect the “patterning of social ties among members of the network” (Gest et al., 2011, p. 2). Strong ties among members of a network are vital structural components, as they help to create a context of support and emotional safety, which makes changing one's behavior, or adopting novel and potentially risky innovation more likely (Valente, 1995). In advice-seeking networks, patterns of nominations can be used to determine the extent to which members of a group are connected to one another, to generate additional informative social network characteristics such as centrality, density and reciprocity, which reflect the richness of interconnections within networks (Gest et al., 2011). Formal, organizationally-based NCIs such as team-based NCIs are assigned, rather than defined by nomination processes. In the current study, strong ties within team-based NCIs are conceptualized as the extent to which members of an assigned team nominate one another as members of their advice-seeking networks.

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*The investigators clearly define key constructs and related terms. They also demonstrate why these ideas matter to the current project.*

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NCIs have numerous structural features that can be determined from the nomination patterns of individuals affiliated with the NCI (see Gest et al., 2011). Specifically, NCIs can be characterized by their *density*, which reflects the proportion of possible advice-seeking nominations that exist within the NCI, and *reciprocation*, which reflects the extent to which nominations into advice-seeking networks are reciprocated. Individual members of an NCI have an *in-degree centrality*, which reflects their “popularity” within the network, in terms of the number of nominations as a key source of advice they have received from other members of the network (Gest et al., 2011; Snijders, van de Brunt, & Steglich, 2010).

**NCI Behavioral Dynamics.** Network behavioral dynamics help to explain how dispositions and behaviors are diffused among members of NCIs (Gest et al., 2011). NCIs provide *exposure to*

*individuals* who have implemented targeted practices, which enhances the likelihood that individual teachers will adopt practices themselves, as teachers can learn how to translate new ideas into their local context, and can observe processes through which similar colleagues successfully changed their own practice (Coburn & Russell, 2008; Frank et al., 2004; Frank et al., 2011; Penuel et al., 2009; Valente, 1995).

The *quality of social ties* within a network has the strong potential to influence members' behavior as well (Coleman, 1988). The frequency of interaction among members, and the perceived closeness and trust within the network, in particular, contribute to changes in teachers' practice (Coburn & Russell, 2008).

Collectively, NCIs have a *normative context* that reflects the salience and prevalence of the dispositions or behaviors of members in the group. NCI normative contexts provide a lens through which teaching challenges are interpreted and recommendations and feedback are offered (Penuel et al., 2009). Teachers evaluate their own practice within this interpretive context and comply with network norms because they share beliefs about schooling and students with others in the group. Moreover, network members impose sanctions, and members expect consequences, when their own practice deviates from the normative context (Cialdini, Reno, & Kallgren, 1991; Gamoran et al., 2005). Influential network norms can be behavioral or dispositional in nature; in one study, for instance, shared pedagogical norms among mathematics teachers in departmentally-based NCIs predicted changes to members' instructional practices (Bidwell & Yasumoto, 1999). Gest et al. (2011) recommend determining *norm salience* within networks, which reflects the behavior or disposition characteristic of members of the group, as well as the extent to which the behavior is endorsed by prominent members of the group (i.e., members with greater in-degree centrality).

### ***NCI Social Processes and Setting Outcomes***

From a conceptual and practical standpoint, the literature tends to focus on the contributions of NCI social processes to teacher practice. That is, from a Social Capital perspective, what is enhanced when teachers tap into the structure and behavioral dynamics of their NCI affiliations is their own potential to act. In the proposed Project NTACT, however, we expand this perspective to link features of NCIs to student academic, behavioral, and social adjustment during the middle school transition year. Our conceptual basis for this is two-fold. First, the SEALS logic model, presented in Figure 2 (see Exhibit B, p. 34) and discussed below, posits that teachers' practice influences student school adjustment. This linkage is based on theory and research that demonstrates that when teachers adopt classroom practices that provide greater socioemotional, instructional, and behavioral support, student academic, social, and behavioral benefits are likely to follow, given students' responsiveness to the instructional and relational context that teachers create (Eccles & Roeser, 2010; Pianta & Hamre, 2009). Thus, to the extent that teacher practices change, changes to student adjustment are hypothesized to follow.

Second, although there is little study of the relationship between adults' social networks and children's adjustment, research on families demonstrates that when parents develop significant social capital through their own social ties, adolescents experience enhanced academic, social, and behavioral adjustment (Furstenberg, Cook, Eccles, Elder, & Sameroff, 1999). One means

through which students may experience the effects of their teachers' social capital is through a greater coherence within the learning environment. Newmann, Allensworth, and Bryk (2001) argued that coherence increases as curriculum, teaching practices, and dispositions align among teachers and school personnel. Moreover, student achievement gains result when students experience greater coherence (Newmann et al., 2001). Newmann et al. speculated that students experience greater success in schools with higher levels of coherence, because students' experiences across their classes build on, rather than compete with one another, and because student engagement is enhanced when students experience consistency and predictability in their learning environment. Students are more likely to experience coherence from their teachers' team-based NCIs than their teachers' advice-seeking NCIs, given that students take their classes with all the teachers involved in a team NCI but not necessarily with teachers nominated as key providers of advice.

### **SEALS Program as a Resource Introduced to Middle Schools**

SEALS is a universal intervention program designed to help sixth-grade teachers improve their capacity to create supportive learning environments for early adolescents (Farmer, Hamm, Hall, Murray, Lee, Sutherland, & Lane, 2011). Project SEALS, a randomized controlled trial study awarded by the U.S. Department of Education, Institute for Education Sciences (IES; R305A11079) to Farmer, Hamm, and Lee, began on July 1, 2011 to test the efficacy of the SEALS model for promoting metropolitan students' school adjustment. The SEALS logic model (see Figure 2, Exhibit B, p. 34) proposes that teachers' participation in the program enhances student achievement and school adjustment through changes to teachers' classroom practice, and corresponding changes to the peer environment and student capacity. The logic model does not currently address mechanisms through which teachers change their practice.

The SEALS Model builds from three complementary theoretical perspectives pertaining to early adolescent school adaptation. Adapted from the *stage-environment fit hypothesis*, which centers on the developmental challenges that youth experience as they transition to middle school (Eccles, 1999), teachers learn instructional and classroom management strategies responsive to the needs of struggling youth and that focus on structuring classroom contexts in ways that teach early adolescents how to be successful students. The second framework, *developmental science*, focuses on how processes in key domains of development coalesce to contribute to individual functioning, adaptation, and growth (Cairns & Cairns, 1994). The SEALS model recognizes the holistic nature of early adolescent development and coordinates intervention across the academic, behavioral, and social domains of adjustment. Teachers learn to promote the adjustment of early adolescent learners by fostering their competencies across these three domains in an integrated and synchronized manner. These two frameworks come together in an *ecological intervention* framework, which emphasizes intervention strategies intended to organize and structure the environment to foster the development of new skills, opportunities, and social roles that help to sustain productive patterns of adaptation and growth (Cantrell & Cantrell, 2007; Farmer, Farmer, & Brooks, 2010; Hobbs, 1966). The SEALS program consists of

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*The investigators conceptually justify and describe the key strategies of the intervention. A figure is also included to illustrate the theory of change.*

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three complementary interventions: *Academic Engagement Enhancement*, *Social Dynamics Management*, and *Competence Enhancement Behavior Management*. Each component is designed to contribute to and support the effects of the other components, corresponding to the view that academic, behavioral, and social adjustment operate as a correlated system and that interventions in one domain should correspond with interventions that address correlated domains (Farmer, Quinn, Hussey, & Holahan, 2001).

We (Farmer and Hamm) conducted an initial assessment of the efficacy SEALS program as part of the IES-funded National Center for Research on Rural Education Support (NRCRES). Project REAL (Rural Early Adolescent Learning) was a randomized controlled trial study that implemented the full SEALS model in 18 pairs of rural schools located across the United States. Findings from multiple studies from Project REAL provide compelling evidence that teachers' participation in the SEALS program enhances students' academic achievement, while promoting a school context that fosters in students a productive sense of belonging, greater valuing of school, and a reduced sense of social and emotional risk. Moreover, teachers trained in the SEALS program create a more positive learning environment for students, demonstrate a better understanding of school social dynamics, and maintain greater efficacy in meeting the needs of at-risk students (Farmer, Hall, Petrin, & Hamm, in press; Farmer, Hall, Petrin, Hamm, & Dadisman, 2010; Farmer, Hamm, Petrin, Robertson, Murray, Meece, & Brooks, 2010; Hamm, Farmer, Lambert, & Gravelle, 2011; Hamm, Farmer, Dadisman, Murray, & Gravelle, 2011; Hamm, Farmer, Robertson, Dadisman, Murray, Meece, & Song, 2010). The study in which the proposed NTACT study is embedded focuses on student academic, behavioral, and social outcomes, but also on the quality of the classroom environment created by teachers, in terms of the provision of emotional and instructional support, and classroom organization (Pianta & Hamre, 2009) as setting outcomes that yield improved student adjustment.

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*References to the team's earlier work help to establish their capacity to conduct the proposed work. It also builds confidence that it is reasonable to expect that the mechanisms (e.g., teacher networks) will function as proposed.*

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Delivery of the SEALS training program involves a site-visit with school personnel during the spring prior to the intervention year; two days of a traditional workshop format immediately before beginning of the school year; completion of eight internet-based self-guided training modules by individual teacher participants; and directed consultation through eight sixth-grade team meetings that correspond to teachers' completion of the internet training modules. The SEALS program is designed to capitalize on recommendations for effective professional development (i.e., DeSimone et al., 2002); through participation in the inservice and on-line module components, the program provides teachers with specific, evidence-based strategies to implement in their classrooms.

The delivery of the SEALS training program is intentionally aligned with the organization of metropolitan middle schools. Individual teachers are encouraged to connect and apply the strategies they learn in the summer institute and on-line modules to their own classroom settings, but the collective nature of teacher decision-making is realized in the directed consultation component, that draws teachers together with their team-mates and the SEALS intervention



specialist. This approach is intended to maximize the potential for teachers to adapt the evidence-based strategies to their own classrooms.

### **Team-based NCIs as Social Processes under SEALS vs. Naturally-Occurring Conditions**

Implementation of the SEALS program assumes that team-based NCIs are the optimal grouping of teachers through which to promote the dissemination and adoption of SEALS strategies across 6<sup>th</sup> grade teachers. First, delivery of the directed consultation through team-based NCIs ensures that all core 6<sup>th</sup> grade teachers will be included in this vital component of the SEALS program. Second, team-based NCIs have naturally-occurring support features, such as familiarity among members and scheduled planning periods, which facilitate intervention delivery. Moreover, the shared responsibility for the students in their team is likely to promote a willingness among teachers to help one another, as their collective implementation stands to benefit their shared group of students and thus, to improve their own work experience (Frank et al., 2004). These assumptions have not been tested directly. The proposed study occasions the opportunity to examine the implications for the social structure of teachers, teacher practice, and student adjustment that arise when a professional development program that targets formal NCIs is introduced into the school setting. Moreover, the cluster randomized controlled trial design allows for attention to the nature of, changes to, and influences of team-based NCIs under typical teaching conditions, as well as in intervention schools.

Longitudinal designs have been used to study the contributions of NCI characteristics to teacher practice, but not typically to examine how aspects of the faculty social structure change as teachers progress through the school year, or as they respond to innovation introduced into their schools. Team-based networks do not change in membership across the school year (unless faculty are reassigned by administrators), but social networks in general are dynamic settings that are expected to change in structure and behavioral dynamics as members change and as the context in which they are embedded changes (Gest et al., 2011).

**(PAGES OMITTED)**

### ***The Role of Team NCIs in the Diffusion of the SEALS Intervention to Advice-Seeking NCIs***

The longitudinal design of Project SEALS affords the opportunity to explore the extent to which diffusion of the SEALS intervention to team NCI structural and normative characteristics, and teacher practice, extends to teachers' advice-seeking networks. Advice-seeking NCIs are expected to include some 6<sup>th</sup> grade teachers, but are expected to include 7<sup>th</sup> and 8<sup>th</sup> grade teachers as well (Frank & Zhao, 2005). These teachers will not have been exposed to the formal content of the SEALS program, but may have exposure to the ideas and practices through their association with the 6<sup>th</sup> grade teacher(s) who identified them as part of their advice-seeking network. The design of the study presents the opportunity to add teacher participants who were nominated as advice-seeking NCI affiliates, and to examine the extent to which the SEALS innovation spreads through advice-seeking NCIs. Innovation spreads initially by working its way through subgroups that

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*The latter sections of the literature review apply the theories previously discussed to the intervention and study at hand.*

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have concentrated exposure to ideas (i.e., within 6<sup>th</sup> grade team-based NCIs), but subsequently moves between and across networks within the larger social structure (i.e., 6<sup>th</sup> grade teachers' advice-seeking networks) (Valente, 1995). The involvement of 6<sup>th</sup> grade teachers in advice-seeking NCIs that include teachers who were not part of the SEALS training may result in changes to the structure and behavioral dynamics of advice-seeking NCIs, thus enhancing the capacity of the school to support early adolescent school success.

The extent to which diffusion of innovation occurs through advice-seeking networks will depend on structural features of the advice-seeking NCI and the social position of the 6<sup>th</sup> grade teacher within the advice-seeking NCI. Social network *reciprocity* reflects the extent to which nominations are reciprocated among members; networks in which members share the perception that they offer advice to one another are more likely to be receptive to influence from other members (Gest et al, 2011). In addition, more influential members of a network are individuals who have greater in-degree centrality, within the network. Thus, the extent to which 6<sup>th</sup> grade teachers possess this status within the advice-seeking network will shape the extent to which they can spread the innovation.

Additional factors may contribute to diffusion across NCIs. Diffusion of effects of an intervention through social networks is affected by the proportion of members of the network who were exposed to the innovation (Kiuru, Koivisto, Mutanen, Vuori, & Nurmi, 2010). Thus, advice-seeking NCI behavioral dynamics and members' practice are expected to be enhanced as the proportion of members of the advice-seeking NCI who are 6<sup>th</sup> grade teachers who took part in the SEALS program increases. Finally, "actor" effects (Snijders, van de Bunt, & Steglich, 2010), such as the dispositions of the 6<sup>th</sup> grade teacher(s) providing the link to the advice-seeking network, or the dispositions of others in the network, can contribute to the extent to which influence passes from individuals in one network to another.

## RESEARCH METHODS

### *Research Design*

Project NTACT will be embedded in the Project SEALS research design, and will draw on the research participants and data collected for Project SEALS. Project SEALS is a funded, on-going cluster randomized controlled trial (CRCT) that involves two cohorts of a total of fourteen matched pairs of schools (28 schools in total). Intervention condition is assigned at the school-level; the primary unit of analysis for Project SEALS is students, as they move through the middle school transition (spring of 5<sup>th</sup> grade to spring of 7<sup>th</sup> grade). Schools are blocked within districts, as there are homogeneous pairs of schools located within each district on key constructs of interest, and variability across districts on these same constructs. Cohort 1 involves students and their teachers in 7 intervention-control matched pairs; Cohort 2 includes students and their teachers in 7 different intervention-control matched pairs. Within each matched pair, one school is randomly assigned to the intervention condition. In intervention schools, the SEALS program is implemented with all sixth-grade teachers during the year that students are in sixth grade. Control schools serve as an

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*The team provides a succinct description of the research design and enough detail for reviewers to evaluate its scientific merit.*

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ecological comparison; teachers in conduct business as usual. Student participants in each cohort and in both intervention and control schools, are assessed in the spring of 5<sup>th</sup> grade (baseline data), and in the fall and spring of 6<sup>th</sup> and 7<sup>th</sup> grades. Sixth-grade teachers are assessed in both intervention and control schools, through classroom observation (fall, winter, and spring) and survey data completion (fall, spring), during the intervention year, when student participants are in the sixth grade.

The research design of NTACT is a CRCT with teachers as the unit of analysis, involving two cohorts of teachers. Cohort 1 includes the Project SEALS sixth-grade teachers from 14 schools (7 intervention-control matched pairs), starting in the Fall of 2012 and followed through the Spring of 2014; Cohort 2 includes the Project SEALS sixth-grade teachers from the remaining 14 schools (7 intervention-control matched pairs), starting the Fall of 2013 and followed through the Spring of 2014. As part of the SEALS project, in both intervention and control schools, sixth-grade teacher classroom observation data are scheduled to be collected in the fall, winter, and spring, and survey data are scheduled to be collected in the fall and spring. For Project NTACT, social network and additional survey data will be collected from the sixth-grade teachers at the fall and spring of the school year. For Cohort 1 teachers only, social network and survey data will be collected from 6<sup>th</sup> grade teachers in the following year, and a single classroom observation will be completed of these teachers in the winter of this year (no data from 6<sup>th</sup> grade teachers are collected as part of Project SEALS during this year, as participating students have moved on to 7<sup>th</sup> grade). Table 1 (Exhibit C, p. 35) displays the integration of the existing SEALS data collection with the data collected for NTACT.

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*The unit of analysis is clearly specified.*

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### ***Sample***

Project NTACT will draw on the sample for Project SEALS. The sample includes 28 schools, which is the number of schools required to provide sufficient power to detect SEALS program effects on student adjustment indicators, including achievement. This project will be conducted in numerous metropolitan school districts in North Carolina, which include middle schools with at least 250 students per 6<sup>th</sup> grade. These districts serve Metropolitan Statistical Areas with populations ranging from 150,000 to 1,000,000 and include the cities of Charlotte, Greensboro, Raleigh-Durham, Wilmington, and Winston-Salem. The ethnic composition of these schools is highly diverse and ranges from 20-80% African American, 10–70% Caucasian, 5–25% Latino, and 2–10% Asian. School recruitment is currently underway for the SEALS project.

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*The research team defines each sample (e.g., schools, teachers, and students) and offers some relevant descriptors.*

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Approximately 540 teachers are anticipated as participants. This number includes the total number projected as participating 6<sup>th</sup> grade teachers in SEALS (approximately 420 teachers), as well as teachers who are invited to participate solely in Project NTACT (approximately 120 teachers), because they have been nominated as a member of a SEALS teacher participant's advice-seeking network. Nominated teachers could be any teacher within a participating school (core and elective teachers). Teachers will range in age from approximately 23–65 years and are expected

to represent a diverse array of ethnic backgrounds and gender that reflects the distribution of their district as a whole.

For each participating school, we project a minimum of 175 consented students in the Fall of 6<sup>th</sup> grade. Sampling of students begins in 5<sup>th</sup> grade, in feeder schools; feeder schools will be over-sampled to ensure that all 5<sup>th</sup> grade students who transition into a participating middle school are invited to participate. Based on our previous work, we expect participating middle schools will contain a small number of students (less than 3%) who originate from outside the feeder schools.

### ***Measures***

This study will use a variety of outcome and process assessments from multiple respondents (teachers, students, peers, trained observers). Teacher network affiliations are the focus of data collection for Project NTACT; indicators of teacher practice and student school adjustment are aligned with the SEALS model's theory of change and are scheduled for collection as part of Project SEALS. Measures unique to Project NTACT are detailed first, followed by measures that are already planned for collection as part of Project SEALS. The constructs of interest include: (a) teacher NCI affiliations and mechanisms; (b) classroom observations of teacher practice; (c) indicators of student school adjustment; and (d) students' academic outcomes. The measures are described below, followed by a summary of data reduction procedures.

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*The team reminds readers of the key constructs to be measured.*

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### **Teacher Network Affiliations and Mechanisms (Measures Unique to Project NTACT)**

- *Teacher team NCIs.* Team-based NCIs are defined as the core teachers who constitute a 6<sup>th</sup> grade team. Across middle schools, the number of teachers per team is approximately 3–4, and the number of team NCIs per school ranges from 2–5.
- *Teacher advice-seeking NCIs.* Advice-seeking networks will be identified through a sociometric nomination procedure that asks teachers to list the teachers in the school that they turn to regularly for advice about teaching (e.g., Neal et al., 2011). Frank's (1995, 1996) algorithm will be used to identify non-overlapping, within-school NCIs. Advice-seeking networks are expected to average 3–4 teachers per network and are expected to include 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> grade teachers.
- *Quality of tie strength.* Following Coburn and Russell (2008), for both Team and Advice-Seeking NCIs, participants will be asked to rate how frequently (How many times per week?) they talk with the teachers in their Team and Advice-Seeking NCIs, and to rate how close they feel to the members of each type of NCI, measured as not at all close (1) to very close (5). Closeness of ties will be assessed for both Team NCIs and Advice-Seeking NCIs. For each network, responses will be standardized within school; standardized scores will be averaged into a composite.

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*The measures are appropriate and clearly presented.*

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- *NCI normative contexts.* NCI descriptive normative context indicators will be calculated as the mean score of the members for the construct, and will be calculated for both advice-seeking and team NCIs. As recommended by Gest et al. (2011), norm salience for this construct will be calculated for each network, as the correlation between members' dispositions and their in-degree centrality.
  - *NCI normative beliefs about early adolescents* will be measured by members' scores on the Stereotypes of Adolescents scale (Buchanan & Hughes, 2009). This scale measures teachers' beliefs and expectations about early adolescents' personality and behavioral attributes. The measure includes 44 descriptors (e.g., "awkward," "rebellious," "conforms to peers"). Teachers indicate the probability that a typical early adolescent possesses a particular characteristic or displays a particular behavior on an 11-point scale ranging from 0% ("definitely no") to 100% ("definitely yes"). Scores for two subscales can be reliably calculated: *Risk-taking/Rebellious* (takes risks, tests limits, rebellious, reckless, stubborn, rude, impulsive, restless, selfish) and *Internalizing* (awkward, anxious, insecure, confused, emotional, depressed). Buchanan and Hughes (2009) report acceptable internal consistency reliability (Cronbach's coefficient alpha > .75), and convergent and construct validity.
  - *NCI perceptions of collective efficacy* will be the average of network members' scores on a modified version of the 7-item Perceived Collective Teacher Efficacy scale (Skaalvik & Skaalvik, 2007). Items are worded to capture teachers' perceptions of what "teachers on my team" can do in terms of instruction, motivation, controlling student behavior, addressing students' needs, and creating a safe environment. A sample item includes, "As teachers on this team, we can get even the most difficult students engaged in their schoolwork." Response options range from false (1) to true (5). This scale was recommended in a recent review of the constructs of teacher efficacy and collective teacher efficacy (Klassen, Tze, Betts, & Gordon, 2011). Skaalvik and Skaalvik (2007) report a Cronbach's coefficient alpha of .79 for the scale as used with elementary and middle school teachers reporting their school-level collective efficacy.
  - *Exposure to members who have implemented the innovation.* Following Frank et al. (2011), this network norm is defined as the average CLASS-S score (for each CLASS-S dimension, see below) of network members.
  - *Within-network trust.* Teachers' perceptions of trust and respect among the members of their advice-seeking and team NCIs will be assessed by the Teacher-Teacher Trust scale (Bryk & Schneider, 2002), with wording adapted for networks rather than schools. The scale includes six items that tap into teachers' sense of care, trust, and regard for one another, such as "It's OK in this [network] to discuss feelings, worries, and frustrations with other teachers." Internal consistency of the scale is reported to be .82 (Rasch person reliability).

## **Teacher Measures (Measures In-Place for Project SEALS)**

- *Classroom Assessment Scoring System-Secondary (CLASS-S)*. The CLASS-S is an observational instrument used to assess middle and high school classrooms. Measured dimensions focus on the quality of teachers' organizational, instructional, and emotional interactions with students. The CLASS-S has been validated in several large studies, demonstrating that youth make more academic progress in classrooms characterized by positive interactions among peers and teachers, effective organization of time and behavior, and consistent instructional feedback (e.g., Pianta & Hamre, 2009). The CLASS-S has been adapted to represent the dimensions that are most salient to adolescents and includes a Student Engagement dimension. For Project NTACT, the CLASS-S will serve as the indicator of teachers' practice.

### **Student Indicators (Measures In Place for Project SEALS)**

- *NC Standard Course of Study End-of-Grade (EOG) Assessments*. North Carolina schools are required to administer, annually, EOG tests to measure student performance on mathematics and reading for grades 5–7. For each grade level and test, developmental scale scores, percentile scores, and achievement level results are reported for each student. Although different content is tested across 5<sup>th</sup>–7<sup>th</sup> grades, the scoring/reporting system reflects the same process. Multiple reporting formats allow for assessment of student growth, test-to-test comparisons, comparison of student performance relative to pre-determined criteria, and student performance relative to other students in NC who completed the test the same year.
- *End-of-Course (EOC) Grades*. For all participating students, end-of-course grades will be collected annually for mathematics, science, social studies and English. End-of-course grades will be obtained and calculated (where F = 0 and A = 4) and will be averaged to create an overall numeric grade for each participant.
- *Interpersonal Competence Scale-Teacher (ICS-T)*. The ICS-T will be completed for each participant during first period classes. The ICS-T yields scores on student social relations, antisocial behavior, academic performance, and internalizing problems (Cairns, Leung, Gest, & Cairns, 1995). Three week test-retest reliability is moderately high; median test-retest correlation for the underlying factor structure is .81 for girls and .87 for boys (Cairns et al., 1995). The ICS-T has convergent validity with direct observation, student records, and peer nomination measures (e.g., Cairns & Cairns, 1994; Cairns et al., 1995; Leung, 1996; Rodkin et al., 2000).
- *Sense of Belonging* will be measured by Hagborg's (1998) Psychological Sense of School Membership-Brief (PSSM-B) scale. A shortened version of Goodenow's (1993) PSSM scale, the PSSM-B focuses on the ties students feel toward their schools. Students rate their agreement with statements such as "I am treated with as much respect as other students." Cronbach's alpha for the scale is acceptable for diverse samples of adolescents (Hagborg, 1998; Hamm et al., 2010); strong test-retest reliability

Where possible, the team proposes using well-established measures with sound psychometric properties.

and construct validity with strong correlations with motivation variables have been shown (Hagborg, 1998).

- *Emotional Risk* measures student perceptions of the emotional risk associated with academic participation (Hamm & Faircloth, 2005). Students rate their agreement with items such as "...other students will think I'm not smart" in response to the prompt, "If I give a wrong answer to a question in my classes, the following happens:" Studies of diverse early adolescents report acceptable Cronbach alpha (Hamm & Faircloth, 2005; Hamm et al., 2010).
- School record data will be collected from school databases at the end of the school year, including: final academic grades, standardized achievement scores on state-level tests, absences, discipline referrals, suspensions, expulsions, and special education status.

### ***Data on Intervention Implementation***

Several instruments and data sources will be used to obtain information on intervention implementation. All have been used in assessing implementation in previous research and are part of the planned data collection for Project SEALS.

- *Teacher Participation in Intervention Training.* Intervention records will be kept for all teachers in the intervention schools. This will include hours of attendance at the summer institute, completion of the self-guided web-based training modules, and hours of teacher attendance in the directed consultation sessions and activities.
- *Teacher Intervention Logs.* Teachers in intervention and control schools are asked to complete monthly logs of their use of academic, behavior management, and social intervention strategies. This involves completing a scale for each strategy with the following response choices: infused throughout daily instruction; a few times daily; once a day; once or twice a week; and never.
- *Classroom Observation Form.* This instrument assesses teachers' use of intervention practices in instruction, classroom behavior management, and social dynamics management. The observer assesses teachers on the following constructs: instructional protocol, classroom expectations and structure, feedback given to students, behavior management, motivation, communication with students, and use of groups and social dynamics. The instrument uses indicators that parallel other classroom observation measures (e.g., La Paro, Pianta, & Stuhlman, 2004; Pelham et al., 2008), and the rating procedure follows the format of established and psychometrically validated classroom observation protocols (Weiss, Pasley, Smith, Banilower, & Heck, 2003). After observing classrooms for a continuous 50-minute period, observers rate indicators for each construct using the following scale: 1 (construct is absent and necessary), 2 (construct is present but teacher orientation is negative), 3 (construct is present and used favorably but inconsistently), 4 (teacher behavior directly reinforces construct), and 5 (teacher behavior

Measures are also included to gather information about the implementation of the intervention.



is not present because it is not necessary). Ratings of individual items for each construct are used to calculate an overall rating of the teacher's adherence to the construct. Interrater agreement (kappa) has been found to be high, ranging from .86–.93 across constructs (Hamm et al., 2011).

### ***Data Collection***

Data collection procedures with teachers will involve online survey completion at the fall, winter, and spring, through Qualtrics software. Estimated time for completion of survey materials (for both Project SEALS and NTACT instruments) is 2.5 hours. In addition to compensation provided for completion of the materials as part of Project SEALS, teachers will be paid for each assessment period for completing Project NTACT measures. Classroom observations will be conducted by trained staff, and include four 50-minute observations (2 CLASS, 2 COF) in classrooms during the fall and spring in both intervention and control schools. Teachers will be paid for NTACT CLASS-S observations that are not already compensated by Project SEALS. In addition, as part of Project SEALS, school record data will be collected annually for each participant from the student information system operator. Schools are compensated for their participation in Project SEALS. School liaisons will be identified and compensated annually for their assistance in coordination teacher participation and data collection for both Project SEALS and Project NTACT.

Data collection procedures used to obtain data from students as part of Project SEALS will follow well-established protocols that have been used by members of this research team for more than two decades. Data collection teams will include both UNC-CH and Penn State research staff and each team will be led by a team leader who has extensive experience in these data collection activities. Survey data collection with students will involve paper measures. Student report measures will be collected using group administration procedures (e.g., Farmer et al., 2003) that involve gathering participants in the school cafeteria and seating them so that no one is immediately beside or across from another participant. Teachers will remain in the cafeteria, but will not be involved in the administration. Behavioral expectations and expectations for completing the survey will be reviewed by the survey administrator. The administrator will then read all items and scoring instructions while additional research staff will provide mobile monitoring. We have repeatedly used this procedure with over 200 middle school students at a time. With this format, the survey administration can be completed in one hour, including the time to move from and back to the classroom.

For Project SEALS, student survey data and teacher assessments of participants will be collected in spring 5<sup>th</sup> grade as well as in subsequent data waves in fall and spring of 6<sup>th</sup> and 7<sup>th</sup> grades. Because we are interested in patterns of adjustment and adaptation for individual students as they progress through the transition to middle school, we will have linked student data across all data waves from 5<sup>th</sup> through 7<sup>th</sup> grades. Thus, for Project NTACT, student adjustment indicators can be tracked and accounted for over time.

### ***Data Management and Data Reduction***

Standard procedures have been established for securing data at research sites, logging data at the research lab, and preparing data for analysis and storage. Data will be prepared for analyses by proceeding through a series of steps (e.g., coding checks, identifying outliers, descriptive statistics) to clean and ensure reliability of datasets. Data reduction procedures for student adjustment indicators will be accomplished as part of Project SEALS.

## ANALYTIC PLAN

As indicated above, Project NTACT addresses four research questions.

1. To what extent and in what ways do structural features and behavioral dynamics of sixth-grade teachers' team-based NCIs change across the school year under typical teaching conditions, and following teachers' participation in the SEALS program?
2. To what extent and in what ways do structural characteristics and behavioral dynamics of sixth-grade teachers' team-based NCIs act as a lever of change for the SEALS intervention, to improve teacher practice and student social, behavioral, and academic adjustment?
3. To what extent and in what ways are the effects of the SEALS program on the structural and behavioral dynamics of teacher team-based NCIs sustained in the year following their participation in intervention training, as compared to the structure and behavioral dynamics of team-based NCIs in control schools.
4. What are the effects of delivery of the SEALS program to team-based NCIs on the voluntary social structure (advice-seeking networks) of teachers?

**Power analysis.** The sample sizes of students, teachers, and schools for the larger Project SEALS, in which Project NTACT is embedded, were determined following power analyses for a simple two-level CRT design, using the Optimal Design (Spybrook, Raudenbush, Congdon, Liu, & Martinez, 2011). Power for student outcomes was calculated to account for projected student attrition across 5 waves of data collection. Power for teacher outcomes (i.e., CLASS-S) was calculated assuming a minimum yield of 10 teachers per school. Following these assumptions, Project SEALS includes student, teacher, and school samples that provide sufficient power to detect intervention effects. Our current recruitment efforts with schools suggest that we will likely yield a greater number of teacher participants per school—a total of approximately 540 teachers—for Project NTACT.

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*The power analysis provides reviewers with assurances that the sample size is not arbitrary. It also reveals assumptions about anticipated effect sizes. Although not included, if available, it also helps to include typical effects sizes from similar interventions.*

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There is little research that guides power estimation for the focus on NCIs for Project NTACT, but our power analysis results using Optimal Design (Spybrook et al., 2011) indicate that our anticipated sample of 540 teachers within 56–140 team NCIs from 28 schools will provide .80 power to detect an effect size of .40 (Glass's  $\delta$ ) in the teacher outcomes, with school-level  $R^2$  of

.50, and NCIs team- and school-level intraclass correlations (ICCs) of .15 corresponding to the lower bound of typical range in the U.S. data on academic achievement (Raudenbush, Spybrook, Liu, & Congdon, 2006). Under the same settings and assumptions, our expected sample of 175 students per school will achieve .80 power in detecting the intervention effect as small as .38 in the student outcomes, with 20% of attrition rate. According to convention (Cohen, 1977), an effect size of this magnitude falls in the small to moderate range. Given that in meta-analyses of interventions in schools effect sizes are usually in the moderate to large range (Lipsey & Wilson, 1993), our samples of participating teachers and students will provide adequate power for addressing the proposed research aims.

**Data analysis.** An important analytic issue for our research is the nested nature of the data; longitudinal data will be collected from students and teachers/networks that are nested within schools. When nested data are analyzed without regard to the lack of independence within a setting, Type I error is inflated leading to unwarranted rejection of the null hypothesis (Dorman, 2009; Hedges, 2007). Thus, we will use multilevel modeling approaches that can account for interdependency (i.e., ICC) among the data to accurately evaluate intervention effects—hierarchical linear modeling (HLM) analysis (Raudenbush & Bryk, 2002); and multilevel longitudinal social network analysis (Snijders & Baerveldt, 2003), which estimates a common stochastic simulation model separately for each school and then aggregates the model estimates using meta-analytic techniques. Analyses will be conducted with the support of Dr. Todd Little and colleagues, experts in multilevel, longitudinal, and social network analysis, at the Center for Research Methods and Data Analysis (CRMDA), at the University of Kansas. Additional analytic support for social network data will be provided by Dr. Kenneth Frank, at Michigan State University. Dr. Little’s and Dr. Frank’s curriculum vita are found in the curriculum vita file for this proposal; their letters of support and documentation of resources and expertise (CRMDA) can be found in Exhibit D (pp.36-41).

**Research aim 1.** The first research aim involves describing the network characteristics of team-based NCIs, and assessing the extent to which team-based NCI structure and behavioral dynamics change following teachers’ participation in the SEALS program.

Changes to setting-level processes in team-based NCIs in SEALS versus control schools will be addressed under this aim (changes to advice-seeking NCI processes are addressed under aim 3). Team-based NCIs are assigned in membership, which means that team-based NCI membership is stable across the school year. Analyses will focus on changes to the structure (i.e., density and reciprocity of advice-seeking nominations among team members) and behavioral dynamics (i.e., exposure to individuals, perceived closeness, collective efficacy, perception of early adolescents) of team-based NCIs across the fall, winter, and spring of the school year. Structural and behavior dynamics variables will be calculated for each network. More details about calculating structural variables via social network analysis appear in aim 4. Analyses to assess the extent to which network characteristics change across the school year will involve estimation of a series of HLM models that demonstrate the change (growth) patterns of networks (level-2) nested within schools (level-3) over time (level-1).

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*The analysis plan is described in terms of each research aim. Key variables are specified and analysis plan is outlined in enough detail for reviewers to assess the appropriateness and rigor of the proposed approach.*

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Specifically, we will first estimate a fully unconditional model with no covariates (unconditional means model; Singer, 1998) to determine the extent of variation occurring within and between networks and schools. A proper error covariance structure for the repeated measures of structural or normative context will also be determined based on the model fit measures including model likelihood, Akaike Information Criterion, and Bayesian Information Criterion. Then, modeling will proceed to estimate the initial status (intercept) and (linear, quadratic, cubic, etc.) growth rates of the structure or behavioral dynamics indicators. If we find significant variation in the initial status and growth rates, we will then include appropriate network- and school-level covariates (e.g., size) into the model. Lastly, analyses to examine the extent to which NCI contexts change in relation to SEALS participation will involve contrasting the SEALS intervention versus control schools and, if desired, estimating the differences in growth rates between the two school groups (i.e., growth patterns  $\times$  dummy-coded SEALS participation, cross-level interactions). Because the SEALS research design includes matched pairs of schools, analyses will include procedures for testing intervention effects in cluster randomized controlled trial (CRCT) designs (see Brown, Jones, LaRusso, & Aber, 2010), with dummy-coded blocking variables corresponding to each matched pair included at the school level. The worst matched pair will serve as the referent.

**Research aim 2.** The second research aim addresses the extent to which structural and behavioral dynamic features of team-based NCIs are explanatory mechanisms for the effects of SEALS participation on teacher practice, and on student adjustment indicators. Analyses will involve testing mediation relationships among these variables (MacKinnon, 2008).

First, we will use three-level HLM (teachers/students nested within team NCIs nested within schools), to establish whether the presumed mediators—changes in structure and behavioral dynamics of teachers’ team NCI affiliation—and the outcomes—changes in teacher practice or student adjustment indicators—are affected by the SEALS intervention. Second, we will determine whether a change in that mediator was related to a change in a particular indicator of teacher practice (i.e., CLASS-S scores) or student adjustment (e.g., achievement), with the teacher or student outcome as the level-1 dependent variable. If the relation between the mediator and the outcome is statistically significant, controlling for intervention status, we will be able to conclude that a change in that presumed mediator was related to a change in the teacher or student outcome (Krull & MacKinnon, 2001). By calculating asymmetric confidence intervals, we can test whether this mediation effect is different than zero (Sobel, 1986). We will repeat this process for different team NCI mediators (i.e., density and reciprocity of advice-seeking nominations among team members, exposure to individuals, perceived closeness, collective efficacy, perceptions of early adolescents) and teacher practice and student adjustment outcomes. As illustrated in the explanation for aim 1 analyses, dummy-coded blocking variables corresponding to each matched pair will be included at the school level.

**Research aim 3.** This aim addresses the extent to which SEALS program benefits to features of team NCIs and teacher practice continue beyond the training year.

To address this aim, we will conduct three-level HLM analyses for CRCT designs (repeated measures for team NCIs nested within schools and teachers nested within schools). First, an unconditional means model will be fitted to the second year data to determine the extent of

variation occurring within and between teachers/networks and schools and the error covariance structure for repeated measures. Following inclusion of blocking variables associated with the matched pairs, relevant teacher, network, and school covariates will be entered into the model, including prior year scores on the outcome variable. The school-level dummy-coded SEALS participation will be included in a subsequent model, to assess differences between intervention and control schools in NCI structure and behavioral dynamics, and teacher practice (i.e., CLASS-S indicators).

**Research aim 4.** This aim addresses changes to the advice-seeking networks nominated by sixth-grade teachers in SEALS intervention versus control schools. Analyses will focus first on changes to the membership of advice-seeking networks across the year, under SEALS intervention versus control conditions. With the consultation of Dr. Frank, we will use Frank's (1995, 1996) KliqueFinder algorithm to identify the advice-seeking NCIs within each school and to determine the extent to which membership of advice-seeking networks reflects the formal team structure of the school across the school year and in relation to SEALS participation at each time point (fall, winter, spring).

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*More details are offered to describe areas where more novel analyses are being proposed. The additional detail demonstrates the team's capacity and expertise.*

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Advice-seeking NCIs are dynamic networks for which the ties among individuals change over time. Thus, analysis of changes to advice-seeking networks in SEALS versus control schools will involve stochastic actor-based modeling (Snijders, van de Bunt, & Steglich, 2010), with sixth-grade teachers as the actors. A common stochastic actor-based model will be identified and fitted in each school separately and the model results will be combined via meta-analysis (see Snijders & Baerveldt, 2003).

Initial models will estimate the *objective function* (Snijders et al., 2010), which is the likelihood that a sixth-grade teacher will nominate teammates as members of their advice-seeking networks. Structural characteristics of the advice-seeking network (i.e., reciprocity), will be investigated, as will various sixth-grade teacher characteristics related to their position in the advice-seeking network (i.e., in-degree centrality) and their characteristics (i.e., perceptions of collective efficacy, dispositions toward early adolescents). Moreover, because social network ties tend toward similarity, the extent to which sixth-grade teachers who possess more favorable dispositions or behaviors (i.e., toward early adolescents; classroom practice) nominate teammates who possess more favorable dispositions and more similar practice will be in these models. Differences in these effects will be examined by testing for SEALS intervention  $\times$  actor or network structural effects.

In subsequent models, the *rate function* will be estimated (Snijders et al., 2010), as the rate at which sixth-grade teachers nominate teammates into their advice-seeking networks across the school year. Differences in the rate function between SEALS intervention and control schools will be examined; changes to the rate function will also be examined as a function of structural characteristics of the advice-seeking network, position of the actor (teacher) within the advice-seeking network, and teacher characteristics. Differential effects of these factors by SEALS condition will be examined by testing for interaction effects.

Such analyses will provide insight into the implications of a professional development program delivered to team-based NCIs, on the voluntary social structure of teachers, as well as conditions under which advice-seeking NCIs are altered. The data collected for this study, on the dispositions and behaviors of sixth-grade teachers as well as for the colleagues nominated as members of advice-seeking networks, will support numerous analyses on selection and influence processes, using stochastic actor-based modeling. Such analyses will expand current understandings of the potential for innovation such as the SEALS program to spread (or be stalled) from teacher to teacher, through network ties.

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*The references come from a variety of disciplines, journals, and methodological perspectives. This helps demonstrate the team's expertise and deep understanding of the proposed area of research.*

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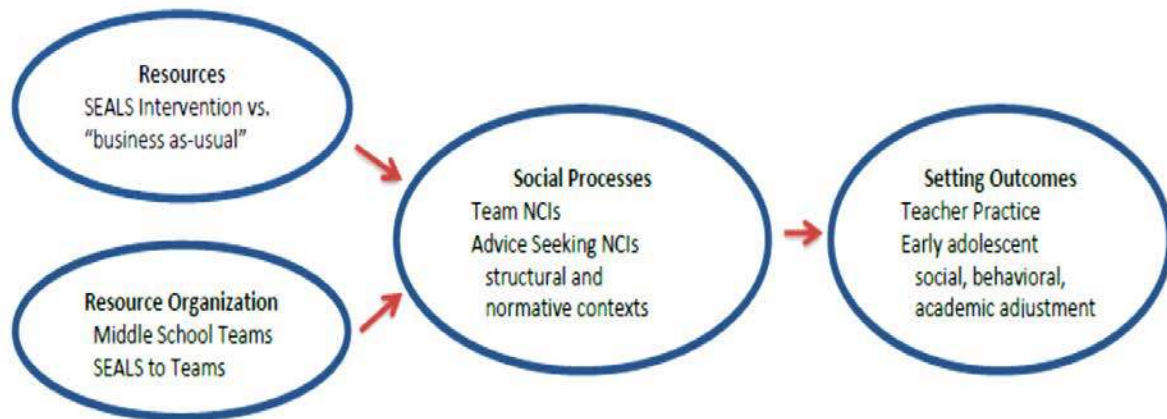
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## Exhibit A

**Figure 1. NCIs as social processes in schools, shaped by school resources and affecting setting outcomes. Adapted from Tseng & Seidman's (2007) Settings Framework.**





## Exhibit B

Figure 2. The SEALS logic model and intervention components.

