Design Experimentation and Mutual Appropriation: Two Strategies for University/Community Collaborative After School Interventions

Deborah Downing-Wilson, Robert Lecusay, & Michael Cole

Laboratory of Comparative Human Cognition, U.C. San Diego

In this paper we contrast two strategies for designing, implementing, and seeking to sustain collaborative intervention programs located in community settings during the after school hours. Both systems involve cooperation between university groups (undergraduate and graduate students as well as professors) and community organizations (children and adult caretakers). Both are intended to create new forms of activity, the motive of which is to promote the development and well-being of the participants and the organizations from which they come. Both instantiate a variety of principles of learning, development, and instruction derived from the work of Vygotsky and his followers working in the tradition of Cultural-Historical Activity Theory (CHAT).

Our focus will be upon the ways in which the two strategies differ with respect to how the relationships are established, how they are structured, and how the activities are organized in response to the needs of the respective communities, the participants involved, and the resources available. The first strategy adheres most closely to what has come to be called "*design experimentation."* The second strategy follows a logic which we refer to as "*mutual appropriation*." We argue that both approaches have their merits and their challenges. Through the creation of functional systems of interactions appropriate to their historical- socio-cultural-ecological circumstances (local and global) they require us to focus on culturally organized activities in their institutional settings as units of analysis. Both provide useful ways to bridge the gap between standard, laboratory-style

experimentation and situations-of-use, which include the broader socio-cultural environment beyond the immediate circumstances under investigation.

Design Experimentation

Beginning in the early 1980s Ann Brown and her colleagues embarked on a series of classroom-based studies focused on guided instruction and assessment in social contexts. These studies challenged mainstream psychology and education research, creating what Brown and Campione called "… a sea of change in theories of learning…an awakening to the fact that real-life learning is intrinsically entangled with situations" (Brown & Campione, 1998, p.154). Brown (1992) and her colleague, Allan Collins (1992), referred to this new methodology as "design experimentation." They viewed design experiments as a serious alternative to, or supplement to, randomized , tightly controlled research paradigms. In recent years the idea of design experimentation has been taken up by a number of researchers interested in advancing theories of learning and development (see the special issues on this topic in the *Educational Researcher,* 2003*; and Journal of Learning Sciences,* 2004). Despite differences among them, proponents of design-based research are likely to agree with three principles that will be central to our discussion:

1. "The metaphor of ecology is used to emphasize that designed contexts are conceptualized as interacting systems rather than a collection of activities or a list of separate factors that influence learning. Ideally design experiments offer a greater understanding of a learning ecology by designing its elements and observing how these elements work together to support learning. Components of a learning ecology typically include the learning activities or achievement goals that are set for the students, the types of discourse and ways of participating that are encouraged, the material artifacts

provided, and the practical means through which relations among these elements can be orchestrated." (Cobb et al., 2003, p. 9).

2. For design experiments to achieve its goals, it is necessary to conduct iterative embodiments of the designed pedagogical activity. Collins and his colleagues (2004, p. 18) summarized this aspect of the approach as follows:

> "Design experiments were developed as away to carry out formative research to test and refine educational designs based on theoretical principles derived from prior research. This approach of progressive refinement in design involves putting a first version of a design into the world to see how it works. Then, the design is constantly revised based on experience, until all the bugs are worked out."

3. Those who adopt design experimentation as a method also argue that it is important to study a wide variety of "authentic" (DBRC, 2003) or "natural" settings or "contexts" (Barab and Squire, 2004; Cobb et al., 2003).

The first line of research we discuss was carried out very much in the spirit of design experimentation as characterized above, although, with a somewhat different orientation both toward the relationship between tasks and their settings and with respect to expectation that "all the bugs" would be, could be, or should be worked out.

Intervention Through Mutual Appropriation

In a follow up paper on design interventions Brown and Campione (1998), having by this time had several more years of experience implementing their idea of "communities of learners", introduce the idea that not only do design experiments *seed* the environment with ideas and concepts that *take root* in the community, *migrating* and *persisting* over time, but participants *appropriate* these ideas and concepts, reshaping and deploying them in unpredictable ways through personal interpretation and experience. They used the term, *mutual appropriation* (a term they attribute to Newman, Griffin & Cole's, 1989) to describe this transformation of the original design experimentation concept. In using the term mutual appropriation as an explicit alternative to the idea of design experimentation, we should note that we are applying the idea at a different level of analysis than that deployed by Newman et al. who were seeking to describe the bidirectional quality of participant learning in a zone of proximal development (Newman, Griffin, and Cole, 1989). In the present context, "mutual appropriation" is used to characterize the interactions between organizations representing those who are doing the intervening and the partner organization in which, in the spirit of Long's (2001) work on "developmental sociology" both university and community participants attend to each others' attempts to "appropriate, manipulate, subvert or dismember" particular new initiatives introduced by their partners in the process of their ongoing joint activity. However, contrary to the usual negative implications of such terms as "subvert" and "dismember," our experience, following our own version of a "mutual appropriation" approach, sees these features of the intervention process as perfectly normal and healthy. They are required for reciprocity, in which the both sides of the interaction (organizationally speaking) are doing their best to achieve the common goals that anchor their continued interactions, while staying focused on their individual activities which may or may not mesh perfectly with those of the other participants.

Resisting Dichotomizing: Some Common Principles of Our Two Interventions

Up to this point we have been focused on drawing a distinction between the two strategies of intervention research for purposes of setting up a useful comparison. But it would be foolish, in our view, to draw too clear a distinction between the two approaches as we have experienced them. The distinctions matter, but the two interventions, despite important differences (perhaps unsurprisingly because they were carried out by the same research group) share certain theoretical assumptions concerning the nature of desirable environments for promoting development of children and undergraduates as a result of collaborations, under either of the two contrasting interventionist banners. Consequently, before digging more deeply into the differences between the two intervention strategies as we have practiced them, we stop to consider the assumptions common to both lines of research. These assumptions played out differently in the two research projects, but as ideals to be sought for, they are shared presuppositions on our parts, even though they were differentially shared with our community partners, who have their own ideas on the subject.

1. The intervention strategies reported on here are both joint undertakings between a university and a community institution. In both strategies the university brings theoretically guided experience and expertise at building activities and artifacts that promote learning and development, as well as supervised undergraduates to the community institution as labor. The community institution furnishes local experience, children, space, equipment, and supervision of the activities to provide the students with a valuable research experience.

2. The programs are mixtures of "leading activities" (as proposed by cultural historical activity theorists, e.g., Elkonin, 1999) including affiliation, play, learning, peer interaction, and work. The physical location can be crucial to shaping how play, learning and other leading activities are

combined. For example, rules of decorum in a school or library encourage quiet attentiveness but discourage play. Rules of decorum at a Boys and Girls Club or a HUD Learning Center may afford a great range of possibilities for engagement, play being one prominent possibility, but also offer constant invitations to become distracted from the task at hand.

3. Whenever possible, participant structures are designed to minimize power differentials between the participants, particularly the undergraduates and the children with whom they work. The issue of participation structures and power differentials is also greatly affected by the combination of sponsoring institutions and the concrete activities that are the focus of the collaboration. In both of the cases we examine, formal education, in the form of homework, was considered mandatory by the local community participants, and the rules for "homework time" were different than those for "enrichment time." Parents from different ethnic backgrounds may demand from their children higher levels of deference to adults and educators than we are accustomed to. In addition, the age of the children involved interacts with both the nature of the institution and the parental cultural expectations to shape authority relations.

4. Heavy emphasis is placed upon the value of communication in a variety of media including computers, conversation, and writing in the service of solving goals that are provided within the activity setting. Not only is "the thought completed in the word" but in other forms of externalization that enable the transformation of sense into meaning (Vygotsky, 1987). Consequently, the principle of forefronting the use of a variety of communication means is one of the central principles governing our pedagogical intervention research. The ways in which this principle is embodied in the activities varies enormously, depending on the institutional venue, the availability of computers and other digital technology resources, the age of children involved, and the expertise of the participants, both local and from the university.

5. Participation by the children is voluntary. Children are free to leave at any time. Consequently, the games and other activities that participants engage in must adhere to goals that the children find compelling. In practice, the principle that children should not be forced to engage in the activities is routinely breached at times when homework is mandated by the local adults representing the community organization. Nonetheless, this norm is maintained in as many activities as possible and routinely produces strong affective bonds after as few as nine weeks.

The Design Experiment Intervention: The Fifth Dimension

The 5th Dimension is an after-school activity system designed for elementary school-aged children. University students enrolled in a course that focuses on fieldwork in a community setting visit these after school sites to play, work, and learn as the children's partners. A detailed account of the history, design and implementation of the 5th Dimension model can be found in Cole & the Distributed Literacy Consortium (2006).

The activities at these sites are designed to instantiate the principles summarized above. This is done using a variety of artifacts including educational computer games, written instructions for playing these games in a goal-oriented, collaborative manner, artifacts for distributing the children's and the university students' use of the games, and imaginary figures (instantiated via letters, email, or electronic chat) that interact with the participants to encourage them to externalize their thinking and critically reflect upon their joint activities.

Evaluating the 5th Dimension Interventions

A variety of analytical methods have been specially designed to evaluate the usefulness and shortcomings of the Fifth Dimension principles and the resulting activities and programs (Blanton et

al., 1997; Cole and the Distributed Literacy Consortium, 2006; Mayer, Schustack, & Blanton, 1999). The specific data sources used by different implementers of a Fifth Dimension (approximately 40 different research groups from different parts of the world) depend heavily upon the expectations of their local communities, the professional criteria of the academic disciplines they answer to, the specific interests of the investigator, the social ecology of the activity and the resources available to them. Evaluations have included videotaped records of Fifth Dimension participant interactions, data mining of student fieldnotes, questionnaires, on-site observations by third-party spectators, and indices of the monetary support provided by both the University and Community institutions.

Looking first to the Fifth Dimension activity systems as an ensemble, perhaps the most striking result is that both the particular combination of activities and the form of the individual activities that evolve from the initial design are highly sensitive to local constraints and resources. No two Fifth Dimensions, even when implemented by the same researcher with the same group of undergraduates in two community organizations of the same kind in highly similar communities, behave like replicas of each other. Within a period of months, if not weeks, each system takes on its own characteristics, a blend of values, norms, and practices characteristic of the local institution (its staffing, architectural structure, its location in the community, etc.) and its university partners (who may be from backgrounds in a variety of social science disciplines, sophomores or seniors, predominantly of one ethnic group or several, etc.).

Tracing implementations in widely disparate conditions quickly reveals that some Fifth Dimensions have failed to survive initial meetings between universities and potential community sponsors. Others have been implemented and run successfully, only to cease operation after less than a year as a result of inability to satisfy institutional imperatives that went undetected in the startup phase.

Some Fifth Dimensions have continued to a point where the two collaborating institutions discover that they do not really share a common vision of a good developmental environment for children. Some have been forced to close when the level of continuity in staffing (on either the university or community side) is inadequate, degrading the quality of the ensuing activity. Still others have continued for several years, but coincidence of several "risk factors" (decreased funding, loss of key personnel in two or more parts of the system) have led to their demise despite their recognized value. Finally, many implementations prosper and increase in scope, sometimes "giving birth" to new generations of Fifth Dimensions. At the time of this writing, 30 years after the experiment began, dozens of Fifth Dimensions and their associated university-community superstructures are in operation.

Evaluated in terms of a study of sustainablility, the form of design experiment represented by the Fifth Dimension can be summarized as follows: 1.) Provide a "starter tool kit" consisting of artifacts, rules, and standard roles as resources for creating the joint activity system. 2.) Begin with a central structure and core activities and watch them change over time in relation to the local setting. 3.) Seek to sustain the activity system as long as possible, focusing on the factors that threaten sustainability and the measures that are successful in extending the life of the ever-changing experimental design. 4.) Identify the factors precipitating the death of the program.

From this summary, it is clear that the Fifth Dimension is a kind of "upside down" form of design experimentation. Instead of seeking to "fine tune" a single design until the experimenter has "gotten it right," the interest is in how a system of activities that has been shown to "get it right" when faithfully implemented, is pulled apart, rearranged, and melded with its social ecology (or expelled) in the course of joint activity between the partner institutions over a long period of time.

The Beach Boys and Girls Club: A concrete example

In the spring of 2006, the partnership between the Laboratory for Comparative Human Cognition (LCHC) at UCSD and the Beach Boys and Girls Club (BGC) was the oldest in the UCLinks program and served as the prototype upon which a number of subsequent Fifth Dimension programs were modeled (see Cole and the Distributed Literacy Consortium, 2006 for details). At the time this project began (mid-1980's), the research team was determining to what extent new communication technologies could provide effective tools and legitimate motives for children to engage in reading, writing and problem solving, and whether such technologies could also unite researchers with each other, universities to their communities, and different communities with each other. The team was also concerned with working out a means of *in situ* evaluation that would justify the amount of resources necessary to maintain such a program.

The BGC was located in a relatively affluent San Diego suburb. It sat next to a public middle school and across the street from a public elementary school. However, while the neighborhood's population was mostly middle-class Anglo-American, there was a sizable working-class Mexican-American minority. Among the school-age children, the Mexican-American population was considerably higher than it was among the adults, and many of these children attended the after school program at the club. The BGC charged a nominal fee for participation, but children from families who could not afford the fee were given scholarships.

Insert Figure 1 about here

Figure 1 presents a schematic overview of the local ecology provided by the building in which the Fifth Dimension was housed. The Fifth Dimension was separated from the entrance hall/"control center" of the club by a large window wall, making the Fifth Dimension activities visible from most everywhere in the building. The opposite wall of the Fifth Dimension room had big windows that looked out on a large swimming pool which was in constant use. The doors of the Fifth Dimension were always kept open, so children could come and go at will, as was true in the rest of the Club. At any given time most of the areas of the Club were populated by children engaged in a wide range of activities. Club policies changed slightly in keeping with the priorities of the current directors. At times the large central area would be blaring with rock music and children playing hopscotch, while at other times the current director would see that the children were engaged in one of the specialized activity rooms and the central area was more quiet.

The Fifth Dimension program operated Monday through Thursday afternoons, competing on a "come as you choose" basis with other BGC activities. On any given, day five to eight undergraduates[1] and one or two graduate students, plus a "Fifth Dimension coordinator" were present to interact with the children. Daily attendance at the BGC fluctuated between thirty and forty elementary and middle school children. Typically ten to twenty of these children participated in the Fifth Dimension program at some point in their afternoon stay.

In the early 1990s the partnership was structured so that the BGC provided the space and the administrative support associated with the running of the club, while the LCHC paid for most of the Fifth Dimension activities by employing a site coordinator, sharing in the cost of computers and

[1] Undergraduates attended twice a week in addition to attendance at class on campus twice a week where they read academic texts deemed relevant to their site participation.

software, and generally providing and maintaining the supplies necessary for the day-to-day running of the Fifth Dimension program. Unfortunately, the BGC experienced chronic staffing problems and the high turnover of BGC employees became an ongoing challenge for the Fifth Dimension program. In the Fall of 1996, by prior agreement, the BGC hired and paid a site coordinator to run the Fifth Dimension, but the funding was insufficient to support a permanent employee. At times, former university students who had participated in the practicum served as coordinators for a school term, or a school year after graduating, but more often the club hired someone new, who was then trained on the job by Fifth Dimension staff.

Tracking Changes in the Fifth Dimension as a Learning Ecology

BGC events showcased the friendly and relatively stable relationship between UCSD and the BGC. For example, children from the Fifth Dimension were recognized publicly on awards nights at the club, and at the end of each quarter a sort of going away party was held as a ritual way of thanking the undergraduates and easing the pain of separation for both the undergraduates and the children, who often had formed strong bonds of affection. In addition, the BGC regularly advertised the presence of the Fifth Dimension in its publications. The relationship was also reflected in the BGC budget, which showed an increase over the years in the number of hours and the salary for the site coordinator, who also served as the computer room staff member when the Fifth Dimension was not in session. On the university side of the partnership, the changing organizational arrangements for the practicum course provided opportunities to study issues of sustainability that few had anticipated in the beginning.

During the years of its operation, the Fifth Dimension morphed well beyond its initial design, although the "core of the activities" remained relatively unchanged: undergraduates and children played an ever-changing variety of computer games together, children advanced through the individual

games on their way to the role of "Young Wizard's Assistant" and various unobtrusive ways of assessing children's academic progress were studied. After many years of instability, the University had built hiring of temporary teaching staff into its budgetary and curricular regime, while the BGC had hired an extremely effective Fifth Dimension site coordinator, and the undergraduate students flocked to participate.

The inclusion of a variety of BGC activities, including arts and crafts, board games, and outdoor sports achievements within the Fifth Dimension's regime of interaction, served to infuse the 5thD program into virtually all of the BGC activities. As a result, the 5thD program became the best attended part of the programming offered by the BGC. However, in the summer of 2006, the BGC closed for renovation for a period of two years and the Fifth Dimension program ceased operation. An attempt was made to open a Fifth Dimension in a nearby BGC, but at that institution, the program was not welcomed by staff who had worked out their own regime of activities. Unlike the Beach BGC, the children at the new club did not qualify as an underserved population, making efforts to sustain the partnership difficult to justify from the perspective of the university. When the Beach BGC did reopen two years later, the Fifth Dimension program was not reinstituted. So, while Fifth Dimensions continue to exist and prosper in many locations, this particular design, effective by many criteria, could not be sustained.

Using the Mutual Appropriate Strategy: Town and Country Learning Center

In early 2007 the Director of Education of the San Diego Supercomputer Center (SDSC) approached members of LCHC about establishing a Fifth Dimension style, university-community

partnership in a local after school community center. Together, members of LCHC and SDSC met with the California Neighborhood Networks Consortium (CNNC), a group of affordable-housing service providers. The CNNC is federally mandated to build community learning centers in each of the housing complexes it manages. LCHC and SDSC came to an agreement with CNNC to pilot test a version of LCHC's after-school activity model at the learning centers in one of these complexes.

The site chosen, Town and Country Learning Center (T&CLC), is housed in a federally-subsidized, 144 unit apartment complex called Town and Country Village. The complex is located in a neighborhood of south central San Diego where the majority of the residents are African-American. Two adjacent apartments inside the complex have been converted to serve as a community/learning center for the exclusive use of the residents.

From the beginning it was clear that applying the Fifth Dimension model at T&CLC would be difficult, if not impossible. Federally-mandated learning centers like T&CLC are built for the purpose of providing free educational and social resources for all of the residents in their respective housing complexes. Adults and children use the internet-ready computers for emailing, job searches, school work or playing games. Neither the geography of the local (see Figure 2 below) nor the expectation that adults as well as children could use the limited computer facilities, afforded a child-centered, relatively closed space that could serve as the hub of Fifth Dimension activities.

Insert Figure 2 about here

An added consideration was the program of structured educational and enrichment activities for the children and adolescents already in place. These activities were primarily organized by the site

coordinator, Ms. V, and were geared toward helping the children and adolescents negotiate their personal as well as academic lives (e.g. book clubs, teen service projects). On occasion, Ms. V also organized nutrition and exercise activities for the adult women at the center.

In the process of familiarizing ourselves with the circumstances on the ground, we simply joined in and tried to help Ms. V with whatever it was she was already doing. Help was needed with homework, we helped with homework. The computer network was unstable, one of our number with a computer science background helped stabilize the network. A tea party to help young girls learn what it meant to "act like a lady" was planned, a group of undergraduates joined in to help with the preparations.

During this time we kept in mind the possibility that individual activities that had proven successful in the 5thD system could be adapted for use in the T&CLC program. Of equal importance, we hoped that lessons from our past university-community partnerships could be applied in developing our relationship with the T&CLC community, including the children and youth who participated and Ms. V, who was responsible for the entire activity system. It was out of these circumstances that the approach we are referring to here as mutual appropriation was born and is evolving.

What is emerging is a reflexive way of collaborating on the design of activities at the T&CLC that privileges and builds upon the already established practices at the site. For purposes of exposition (since all of the resulting changes were linked in various ways to each other, not only in our activities at the site but in the way we organized the corresponding course at UCSD) we can crudely distinguish three parts to the mutual appropriation strategy that have resulted thus far:

1. Pre-existing activities which underwent changes because of the addition of 10-12 UCSD undergraduate students to the daily program.

2. Hybrid activities that arose from discussions among LCHC participants, Ms. V, and the children/youth at the site.

3. New activities introduced by LCHC that could fit into the ongoing structure of T&CLC but which depend critically on the presence of LCHC and the special resources it brings to the site in the form of technology and expertise.

It is this more or less horizontal mixing of approaches, where leadership is exercised by both sides of the partnership, that motivates our use of the term *mutual appropriation*. We have some history with the phrase, as discussed earlier in the paper, and the mindset that fosters the approach we describe can be traced to Dewey, Addams, Rogoff, Matusov and others, but here we've begun to think about mutual appropriation in new and specific ways. Not only do the partners in this project *mutually appropriate* the activities and the activity system in ways that further their own goals and the overarching goals of the program (in this case, to promote the development and well-being of all those involved) but the participants also strive to act in ways that are *mutually appropriate*, support, or at very least do not subvert, the efforts of the other players. Through mutual appropriation, so conceived, a yours-mine-ours activity system is able to spawn hybrid activities that neither of the original players could have conceived on their own.

Tracking changes in the T&CLC mutual appropriation model

Before we began our collaboration with the T&CLC community, Ms. V, as the sole site coordinator, had the difficult task of organizing activities for a group of 20-40 participants who varied

widely in age, interests, and consistency of attendance. She had to be strategic about the kinds of activities she developed, as it was impossible for her to supervise every one of these activities at the same time. In order to monitor the flow of kids in an out of the center, she locked all entrances except the one door that was in her line of sight as she sat at her desk. She distributed activities throughout the center according to age and proximity to her office, placing the younger children engaging in school work in the areas closest to her, while the presumably more mature, self-reliant teenagers were allowed to work independently at the far side of the center.

Ms. V had organized activities to address age-specific issues: an etiquette club for the younger girls; a book club for the junior and high school boys; a teen council where community service events, fund-raisers and end-of-semester trips were planned. She also assigned collaborative projects to teach social and financial responsibility. A key activity was the food sale, held regularly as way of raising funds for basic supplies for the center. But homework was Ms. V 's first priority. Until the school work was finished all other activities were put on hold.

Pre-existing Activities

As noted earlier, we began our partnership by helping out with the programs that were in place when we arrived. We started with homework – something we knew a lot about, but soon found that we would need to make some fairly substantial adjustments in our approach. In our Fifth Dimension experience, undergraduates assisted kids with their homework *when they asked for help*, but more often than not this was seen more as an opportunity to evaluate the child's learning level in order to guide the undergraduate to appropriate supplementary computer games and activities. The primary responsibility for seeing that the homework had been accomplished remained with the parents. At T&CLC, believing on the basis of prior experience that the parents were unlikely to

provided help or guidance, Ms.V took on this homework-overseeing position in the kids' lives. We in turn also had to adopt this position if we were to be of help.

Ms. V could not, as a practical matter, offer a great deal of individualized homework assistance, so in general her activities were concentrated on seeing that the children completed assignments to the best of their ability. Once undergraduates were present, the nature of homework help naturally changed. In our experience, the undergraduates are resourceful not only in teaching the children more effective ways to think about their assignments but in motivating them to concentrate on what they are doing and to get them to engage in the particularly onerous, rote–like parts of homework assignments (e.g., the times tables). This was no easy task in a somewhat crowded environment with many invitations to distraction, but it clearly increased the amount of help the children received. However, the need to get the kids through their homework and leave time for enrichment activities that were the heart of our interests required us to relax some of our power-leveling preferences and ask the undergraduates to take on more of a tutoring role than we normally like until they were finished and could engage the children in ways more palatable to us.

Another change that occurred owing to our presence and the resulting increase in manpower was that a concerted effort could be made to collect report cards and progress reports for each of the children. LCHC needed such information to document the effectiveness of its program and Ms. V needed it for her own accounting purposes, but it was a time consuming task that had routinely been pushed aside by more pressing demands. An unintended consequence of actually tracking children's progress in school was to bring to the forefront the severe deficiencies in many of the children's academic achievement. This new information forced discussions about how best to support the children in their current assignments while simultaneously providing enrichment experiences that

would fill in some of the gaping holes in their knowledge that made independent completion of homework assignments impossible for many.

A similar process of change took place with the age-specific clubs that Ms. V had organized. For example, the teens at the center (led by the girls) were organized into a "teen council" that met weekly to organize fund raising events which they then used for field trips. Before we and our undergraduates arrived, infighting and a general lack of coordination among group members was common unless Ms. V was in attendance, which, given her work load, was not always possible. This lack of adult mediation had kept many of the proposed activities from ever materializing, limiting the possibilities for the group. The undergraduates, several of whom had experience working in youth camps, quickly proved themselves adept at keeping the teens more or less focused, and helped get some of the specialty programs off the ground. Many of the plans still floundered, but the teens and undergrads alike have come away with new skills for working together toward common goals. Now one of the first issues that the teens seek to resolve when new undergraduates turn up at the Center is who will participate in their council.

Similar changes occurred when undergraduates entered into the activities of the elementary school girls, the 'ladybugs', who were focused (at Ms. V's request) on etiquette building activities, specifically on acting like 'ladies'. This posed some interesting challenges for the undergraduate girls, whose cultural understandings of gender roles were quite different than those of the little girls or of Ms. V.

These are but a few examples of the kinds of support the university partners were able to provide to further the existing programs at the center, but are hopefully enough to make our point

clear. We stepped in gently, offering our personnel and our expertise in support of the ongoing efforts. As a result, both the T&CLC and the UCSD programs were greatly enriched.

Hybrid Activities

In time activities began to emerge from the LCHC/UCSD – T&CLC collaboration that are best described as hybrids. One such example concerns after-school snacks. School children anywhere arrive home from school eager for nourishment. This is especially true for the youth who qualify for free school lunch programs. A number of issues combined compromise the ability of T&CLC families to provide nutritious foods for their children. Not only are funds extremely limited for virtually all of the resident families at T&C, but local options for buying fresh food are virtually nonexistent and fast food chains are ubiquitous.

As mentioned earlier, when we first started to work with Ms. V and the residents at T&CLC, food sales were a regular practice designed for raising funds for basic materials at the center. These included the sale of prepackaged sugary or salty snacks, or easy to prepare items, such as nachos. The children were purchasers as well as purveyors of these snacks. The unhealthy quality of all these foods raised concerns for both us and Ms. V. Ms. V was well aware of the health issues, but she was balancing the need to raise money and the kids' enthusiasm for consuming these familiar snacks against her concerns about health.

Early in our work at T&CLC we began to work out an arrangement with Ms. V in which we supplemented her monies for providing snacks and raising money and, of equal importance, introduced new ways of engaging in the preparation of snacks that resulted in the "Science Cooking Club." The club was initiated by a number of undergraduates who organized collaborative cooking

sessions for the kids, complete with nutrition lessons that entailed going to government websites to search out recipes for healthy and delicious foods. Smoothies were a big hit that in turn sparked a number of new projects that included making a video documentary of the smoothie making sessions and producing a smoothie recipe book that could be built upon by succeeding generations of undergraduates and local youth.

In order to insure that the kids could reasonably apply their new knowledge of nutrition at home, Ms. V insisted that the cooking activities used only ingredients that could be obtained locally. The sad fact that the only place within walking distance to buy fresh vegetables (in a very limited selection) was a local "99¢ Store" complicated the food project and exponentially increased the educational value of the enterprise for the university students. The center had a struggling vegetable garden. Fortunately, some of the university partners were gardeners. As some of the kids and undergraduate buddies worked in the kitchen, others labored in the garden, breaking soil, building raised garden plots, and doing online research of vegetables and their optimal growing conditions. The result was salads, lots and lots of salads, which in turn led to new recipes, and salad dressing taste tests, which led to another documentary film on gardening and a salad dressing recipe book. The kitchen-garden connection turned out to be cross-cultural connection as well. Collard greens, beloved in the African-American community, were strange for the undergraduates. In their research the kids and buddies found that the traditional ways of cooking the greens were not all that healthy, and with assistance from a local mom who, for the first time, began to participate in the activities at the Center, a compromise recipe was worked out that made everyone happy.

Yet another hybrid activity involved quarterly events that Ms. V called "block parties." She viewed these events as a means to get the parents more involved in the work of the Center and to bring

members of the community together. She worked with the kids to organize the block parties around seasonal themes (Easter, Christmas, Halloween). Parents were asked to contribute food, so these events had some of the aspects of a potluck picnic that included entertainment provided by residents, both adults and children. The block parties also included gift raffles with items donated by local businesses that were often of genuine value to the residents.

From our perspective, the block parties offered a great opportunity for the kids and the undergraduates to showcase the work that had been accomplished at the Learning Center during the quarter. The new recipes, the new garden, and other activities such as the tea party, many of which were documented in brief digital films and slide presentations, fit perfectly into the genre of the block party and as others have shown (i.e. McLaughlin and Brice-Heath, 1993) such public presentations can be a source of motivation for new joint projects.

After attending our first block party, we appropriated the gift raffle idea, working it into the daily interactions with the children, seeing it both as a means of motivating the kids to participate more fully in the activities at the center and simultaneously to provide a solution to the always-challenging problem of documenting the kids' involvement in the projects. We organized a new procedure with Ms. V whereby children would be given a raffle ticket when they arrived at the center, and differently color-coded tickets whenever they engaged in specific activities ranging from participation in physical education games, homework, cooking, gardening, film making, and specially organized academic enrichment activities to be described below. Before each block party raffle the accumulated tickets are tallied, allowing us to keep track to the kids' participation in the site activities. This hybrid use of raffle tickets has become central to the daily workings of the center.

Activities Introduced by the University Partners

With Ms. V 's blessing LCHC has also introduced a number of activities geared toward developing the T&CLC students' interests in, access to, and knowledge of science, technology, engineering and math (STEM). Some of these topics were promoted by modifications wrought in already-existing practices (e.g. gardening, cooking, exercise), but other activities were designed directly to engage the kids in STEM activities. Typically, these activities also serve as research foci for graduate students because they have relatively defined goals, can be carried out in separate areas that ward off the frequent intrusions that are typical of the Center's activities, and therefore make professionally acceptable levels of documentation and orderly data collection possible.

For example, one such activity involves building a virtual world, called "WITS" (Worlds of Internet Technology and Science), similar in look and feel to "Second Life" WITS uses a kid-friendly computer programming language for easily incorporating flash animations and digital photos and videos. This activity has proven popular with a number of the elementary and middle school children and is being studied by a graduate student who is supported by a local oceanographic institute as a potential means of extending its public education program. Because WITS involves many new forms of mediation and representational practices, communication technologies, and challenges for social organization, it serves *both* as an enrichment activity (from the perspective of the community) *and* as an important research site from the perspective the oceanographic institute and the student's home department.

A second such activity involves participation in video-mediated distance physics lessons with science educators at a partner institution in Colorado (Mayhew &Finkelstein, 2008;Finkelstein, 2004). Graduate and undergraduate students participate with the children during these lessons, helping mediate between what is happening locally and what is being communicated by the physics educators

at a distance. In addition to these tele-mentoring sessions, the children are asked to use stop action animation software to create movies that represent the concepts taught during these sessions. From the child's point of view, the activity involves drawing and learning to make animated digital films about new phenomena. From the perspective of T&CLC it is clearly an educational enrichment program. From the perspective of the graduate student and his advisor at LCHC, it is a wonderful opportunity to study distributed cognition and conceptual change as a communicative process, one that is, by virtue of its organization, is almost entirely recordable in digital film for analysis. From the perspective of our science teaching partners in Colorado, it is a rare opportunity for gaining experience in teaching physics in informal settings, and for those who made the software it is an equally rare opportunity to discover the limits of the teaching tool they have created for local classroom use. It also serves the local goal of having something new and exciting to show at the block party and enhances the learning of the local children involved.

Evaluating the Town and Country Intervention

Evaluation of the T&CLC intervention in terms such as "effect sizes", measured by contrasting control and experimental group performances on standardized tests, has never been the focus of this research. Rather, we have focused on the extent to which principles derived from cultural historical activity theory could serve as a guide for developing a new form of intervention. Nonetheless, it is entirely appropriate to ask how effective the intervention has been in such conventional terms.

At the time of writing, we are just completing two years of work with T&CLC. Having a good deal of experience evaluating more restricted forms of intervention like the Fifth Dimension, we knew that "science-based" evaluation would be, to put the matter delicately, difficult. As noted above,

we have found mere description of the activities at a detailed level to be a challenge and we have learned that such a seemingly simple matter as getting evidence of changes in children's grades and keeping track of the activities they engage in daily at the site to be an even greater challenge.

Nonetheless, we have made enough progress with respect to the issue of evaluation to be able to offer some conclusions. First of all, we have clear evidence of large changes in both academic performance and social behavior for a sizable number, but not all of the children with whom we work. These changes are documented by improved grades, prizes won, college scholarships obtained, parental reports of more harmonious life within families and among peers, and the ability to engage in conceptually more complex forms of the enrichment activities. We are also seeing progress in our efforts to "backfill" (or to facilitate the acquisition of) critical basic academic skills (multiplication, working with fractions, reading with comprehension, etc.) that many of the children lack and which, if not acquired soon, will doom the kids to school failure and its social consequences.

Undergraduate field notes reveal the regular emergence of rich academic interactions across the entire range of activities at the site and the ways in which children appropriate academic skills in these informal and difficult to document activities. With respect to the undergraduates, with whom our interactions are more institutionalized and more easily documented, we have solid evidence that we have successfully implemented the kind of theory/practice education that leads to marked changes in academic performance, identity, and social awareness. Some of these conclusions are based on pre- and post-tests given to the undergraduates, but especially telling are the comments from the students' final reflection papers. In these papers the students are asked to write their impressions after reading, from first to last, the field notes they wrote over the 10-week quarter. Virtually all of the students reported a profound change in their understanding of many of the key concepts covered in the class.

Central to most of the student reports were accounts of unexpectedly deep emotional investment in both their involvement at the practicum site, and in their own learning and development. The second common theme was the undergraduates' sharply increased awareness of preexisting stereotypes about differing racial and socio-economic groups, and about the emergence of a new-found tolerance, respect and admiration for others. Finally, the undergrads discussed a new appreciation for the complexity of the problems facing intervention research, and a new commitment to addressing these problems in a theoretically informed way as a community focused on improving the well-being of all its members.

Contrasting the Two Strategies

Our goal, as stated at the outset, was to contrast two strategies for university/community collaborative interventions as they were implemented in local after school programs. It is to that topic that we now briefly return. Both of the iterative research/intervention strategies discussed in the pages above allow us to chart the development of joint activities within the collaborating organizations. Both provide insight into the relationship between the designed activity and its ecology as these develop over time. As described thus far, it would appear possible to move now to a reasonably straightforward comparison of the two intervention strategies. We provide such a comparison here, but in the section immediately following, we describe an aspect of the dynamics of the changing activities at Town and Country Learning Center that complicate the process of a straightforward comparison.

The two interventions we have reported on are comparable in three, more or less conventional, terms. These include:

1. The initial structuring of relationships, particularly the ways in which leadership and responsibility for meeting daily challenges is distributed.
2. The kinds of activities that emerged and evolved in relationship to the local ecologies
3. The extent to which the partnerships were able to effect changes in the larger ecologies of the institutions involved.

The Initial Structuring of the Partnerships

The partnership at the BGC was analogous to parallel play in preschool children. Activities were carried out side-by-side, and in a friendly fashion, but with minimal interaction. By and large, UCSD staff and students ran the Fifth Dimension while BGC staff occupied themselves with other club activities or caught up on their paperwork. The two organizations maintained autonomous control over their own institutions and practices even as those practices were conceptualized as part of an ongoing collaboration by both sides. When 5thD activities did begin to spill outside of the designated 5thD space into other parts of the BGC, the UCSD partners ensured that these activities were designed and carried out in keeping with the 5thD routines. At no time did the leadership of one organization step in and alter the activities of the other.

The T&CLC partnership strives to be collaborative at every level. As needs and interests arise, appropriate activities are introduced by both the university and the T&CLC partners. As the activities progress, changes in the form and direction they take are instigated by members from either side of the partnership. When resources are lacking, help from outside agencies is solicited and welcomed. It is entirely possible to have a UCSD mobile tech facility in the parking lot projecting exercise videos on a huge screen, a young physician from Community Health taking blood pressure in the 'cool room', students from the UCSD School of Engineering surveying the grounds,

representatives from Legal Aid counseling parents in the office, and meditation instruction happening in the yoga room – all while the kids and undergraduates work at homework and enrichment activities in and around the Learning Center. In addition many activities are regularly scheduled to take place outside the Learning Center. These include participation in the Martin Luther King Day parade, trips to the ballet, visits to the Scripps Center for Oceanography, and a number of activities on the UCSD campus.

Activities in their Ecologies

The different local ecologies, resulting in differing organizational structures, allowed for the introduction of different combinations of activities and different ways in which these activities developed and evolved. In Figures 3 and 4 we revisit the earlier schematics of the two locations, this time with indicators showing the direction of influence in the instigation of and changes in some of the activities that arose in the two projects.

Insert Figure 3 about here

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As shown in Figure 3, activities in the Fifth Dimension that spread beyond the designated room for this activity were introduced by the university partners. Moreover, the Fifth Dimension space and the Fifth Dimension staff remained as the 'control center' where the activities were created and orchestrated. BGC partners acceded to and sometimes participated in the activities, but they did not take part in their development or organization. An exception was the last site coordinator hired at the BGC. From his first day at the club it became apparent that he understood the ethos and the

workings of the two institutions and of the partnership. He slipped easily into a role as BGC coordinator of the Fifth Dimension that bridged the organizations and coordinated activities between them. His redefinition of the site coordinator's role became the first and only hybrid product of the partnership Of course this position was eliminated with the closing of the facility, and, as best we can surmise, the BGC 5th Dimension never escaped the confines of the club; no vestiges of the activities we instigated there remain in play today.

Insert Figure 4 about here

Figure 4: The distribution of new activities that emerged from our collaboration with the T&CLC community.

The collection of geographically distributed activities in Figure 4 and the lack of a central 'hub' from which the arrows flow, illustrate the complicated interweaving of intentions and resources at the Town and Country site. Concentrations of power are temporary, and their direction is often reversed midstream. This distributed form of leadership sometimes results in players who carry on with little immediate knowledge of what others in the project are doing, or of how their actions impact and are impacted by other players or by the project as a whole. For this reason, new forms of communication were initiated, the most notable being the participation, via speaker-phone, of the site coordinator, Ms. V , in the on-campus undergraduate class.

Rather than jump in with solutions that had proven successful in the past, or to design activities based on theoretical models of how things might work, our goal at T&CLC is to listen deeply to the opinions of the local participants about their concerns and goals for the project, and to trust that community members, largely represented by Ms. V , have a better understanding of, and

deeper insights into the situations and needs of their children than we, as outsiders, have. Only after participating on local terms in locally organized activities are suggestions made for restructuring, adding or eliminating elements of an activity. The resources that the university can offer are treated as potential contributions to broaden the range of possible solutions that can emerge through partner collaborations

Undergraduate and graduate students participate at T&CLC in ways that are unprecedented in our experience. Without coaxing or credit they flock to attend, serve and perform at evening block parties and weekend social events, take the children on outings, donate countless hours to fund-raising activities and sometimes considerable funds of their own to keep the Center's activities up and running. And they keep coming back. Students repeat the class, use the Center as the focus of research projects in other classes and return to the Center as volunteers. By their own analyses, the benefit to the undergraduate students in this project is far greater than the benefit they provide to the Town and Country community.

Changes in the Larger Ecologies of the Partner Institutions

The Mutual Appropriation strategy has forced us to broaden the scope of our investigations, and our interventions in recognition of the fact that the development and well-being of the children we are trying to help is inextricably bound up with the well-being of their families and of the local community. Where the Fifth Dimension was a closed partnership between the BGC and the university, the MA arrangement at T&CLC is pressured to be responsive to the multiple needs of the families in their neighborhood. As Figure 5 below illustrates, the project quickly expanded into areas of education, health, inter-institutional connections, and neighborhood safety. On the university side of the partnership, this expansion has required an extensive rethinking and restructuring of many of

our practices, both in our classrooms and our practicum program. On the Town and Country side, the partnership has resulted in increased involvement by the Village residents as well as new connections to agencies and services in the extended community. We return to this subject below.

Insert Figure 5 about here

The Distinctly non-Conventional Evolution of the Intervention at Town and Country Learning Center

We begin with a reminder that T&CLC is located in the center of a low income housing development and is open to all of its residents, although it is the neighborhood children and youth who are the predominant users. On their way home children pass by the center. The sight of Ms. V 's red jeep, and/or a sign saying "UCSD Buddies are here" is a clear invitation to stop in – for a snack, for help with homework, for access to high speed internet, or simply to socialize. While parents might be at work or preoccupied at home with other matters, they, too, can stop in or call on Ms. V for assistance in a wide variety of life problems.

T&CLC is *part of* the local residential ecology of the children and their parents. In contrast with institutions where 5thDs are generally implemented, the everyday problems of the children and their families intrude into the activities at the Learning Center in ways that are impossible to ignore. For example, we've learned through discussions with the kids that some of the families are consistently unable to provide food for their children after school. During our "science cooking" activities, Ms. V and adult visitors to the Center began to talk to us about the frequency of childhood diabetes, dangerous food allergies, obesity, and high blood pressure among community residents. We

were present when one of the center teens came to the center for refuge after being hit by a car. The police had sent her on her way, making no effort to contact her parents or to secure medical attention. (A trip to the emergency room later in the evening revealed a broken arm.) We were also present the following day when her friend ran into the center to call for police assistance. Avoiding the spot of the prior day's accident, she had walked home on the opposite side of the boulevard (adjacent to a cemetery) only to be assaulted by a man who threatened to pull her behind a gravesite and rape her. Despite repeated calls, the police did not respond. The following week, when two high school friends of Center attendees were shot and killed in a gang conflict, the fear and sorrow of the children and teens were palpable.

We quickly became aware that many of the children at the center had personally experienced violence in their lives, and that they were routinely ignored by law enforcement in their times of genuine need. Our efforts and our resources were simply insufficient to address the complex issues this community was grappling with. We began to inquire of our colleagues at the university about their expertise (family medicine, urban studies, educational studies, and communication technologies). We also ventured out into the neighborhood beyond Town and Country Village to meet with representatives of local organizations (the police, school officials, the YMCA, and local philanthropic foundations) to figure out how to change elements of the local ecology of the children. This expansion became an essential aspect of achieving the goals of our initial design work.

Our inquiries evoked strong resonance, both within the UCSD community, and in the surrounding neighborhood. As a consequence, over the past year, while we have continued to develop our collaboration with Ms. V and the children/youth at the Learning Center, we've also become the catalyst for an entirely new organization at UCSD, a "Center for Community Well-Being." This co-

laboratory, coordinated by a highly experienced senior staff member at the California Institute of Telecommunications and Information Technology, has been developing a series of integrated projects that focus on health, safety and job preparation. These projects are designed to organize the institutions and community geographically surrounding Town and Country Center in a set of complementary efforts to promote the well-being of the children and their families in the context of their community. The projects receive broad-based and coordinated support from UCSD, with increasing collaboration between UCSD and other local institutions of higher education.

This outcome of implementing *mutual appropriation* as a strategy of intervention has, in short, carried us in a serious way into the "learning ecology" of the activities that were the initial focus of our concerns. While psychology, even broadly conceived, can be considered an important disciplinary contributor to this larger effort, we have clearly gone beyond psychology into a study of development in its sociocultural ecology of a kind that has few precedents. Correspondingly, it has taken us to the frontier of a new kind of social-scientific undertaking, one for which an entirely new and expanded set of methodological tools are required. Our experiment in "mutual appropriation" created what Engeström (2008) has referred to as a "runaway object."

Final comments

Both of the strategies we describe here have developed in response to the specific local ecologies in which they were applied. The encapsulated nature of the BGC partnership is typical of 5th Dimension projects, but not universal. Members of the LCHC research group, for example, have maintained an in-school and after school program for more than a decade at a local elementary school where numerous Fifth Dimension activities have become part of the daily practices of the classroom teachers. This can be seen as evidence that some 5thD programs can and do morph into arrangements

that come to resemble the mutual appropriation model. The project at T&CLC is also specific to its historical-social-cultural time and space. The explosive expansion of activities we are witnessing at present, where the rapid influx of local interests and resources is extending the program into areas and in ways we could not have imagined, can never be exactly duplicated.

These kinds of cooperative social arrangements, in which we are developing our theories of learning and development, clearly have important precedents in their general impulse. The connections to the work of Dewey's laboratory school and general philosophy are obvious. They also have some well established precedents in Jane Addams' work at Hull House, where she put "enrichment" programs like poetry reading on hold until some very practical services like temporary housing, daycare, literacy classes, medical and legal services could take root. Addams insisted that the value of the neighborhood program rests in its "…flexibility, its power of quick adaptation, its readiness to change its methods as its environment may demand." She described the Hull House as a place where information was interpreted, rather than as an agent for social leveling. In her eyes Hull House was first and foremost a meeting place where a cross-section of Chicago residents united around common social problems (Adams, 1893/2002).

Addams' sentiments are echoed in more recent works of Lave and Wenger (1991) and Matusov, St. Julien, Lacasa and Candela (2007). For Lave and Wenger (1991) the business of a community is the ongoing activity that shapes and sustains the community itself. Learning is a byproduct of the processes of negotiation and renegotiation of one's participation in community life. Matusov et al. (2007), who, like us, make undergraduate education a key element in their approach, note that learning and development are integral parts of the process of transcending one's life

circumstances, and as such require a certain amount of directionality (p.36). They ask, "Who defines that directionality? How is it defined? Who talks on behalf of the "transcending?" (36).

It is precisely these complicated issues of agency, both personal and institutional, that surface in our responses to the thoughtful suggestions from the reviewers of this paper, who encouraged us to discuss Mutual Appropriation "as an example for an activity theoretically grounded analysis with Engstrom's DWR concepts." After much consideration, we hesitate to draw too clear a distinction between the two bodies of work. Both rely on CHAT principles to understand complex social systems, using the insights gained to allow solutions to arise from within the systems themselves. We also find it difficult to draw direct comparisons between Engstrom's Change Laboratories and our Mutual Appropriation model as it is emerging. In the organizations and schools where Change Laboratories have been conducted, agency can most often be exposed, articulated, understood and reorganized. "Formative Interventions" is a methodology evolving within these relationships. In contrast, we work to develop the Mutual Appropriation model at T&CLC where relationships are just developing, loosely defined, and transient. Consequently, Mutual Appropriation has at its heart a concept of power that includes routine changes in direction, often several times over, during a single interaction. While they share a common theoretical grounding, the two approaches are developing in very different social ecologies. We look forward to fruitful integrative discussions of the two approaches, but feel they are premature at this writing.

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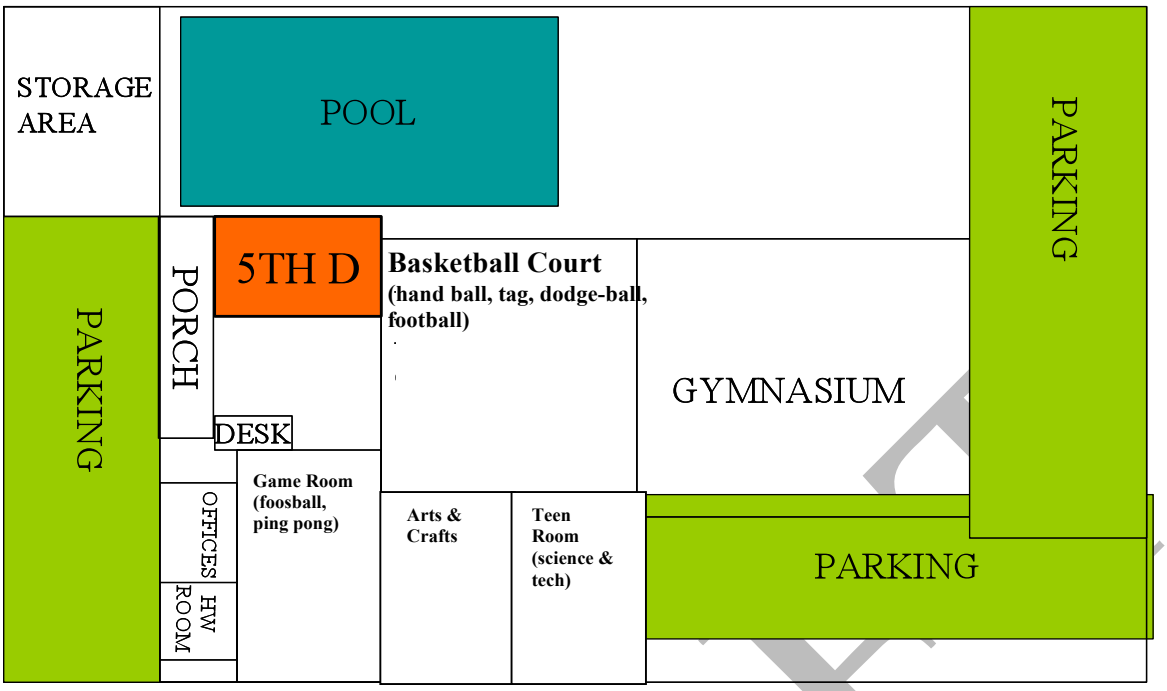

Figure 1. Schematic Overview of the Beach Boys and Girls Club.

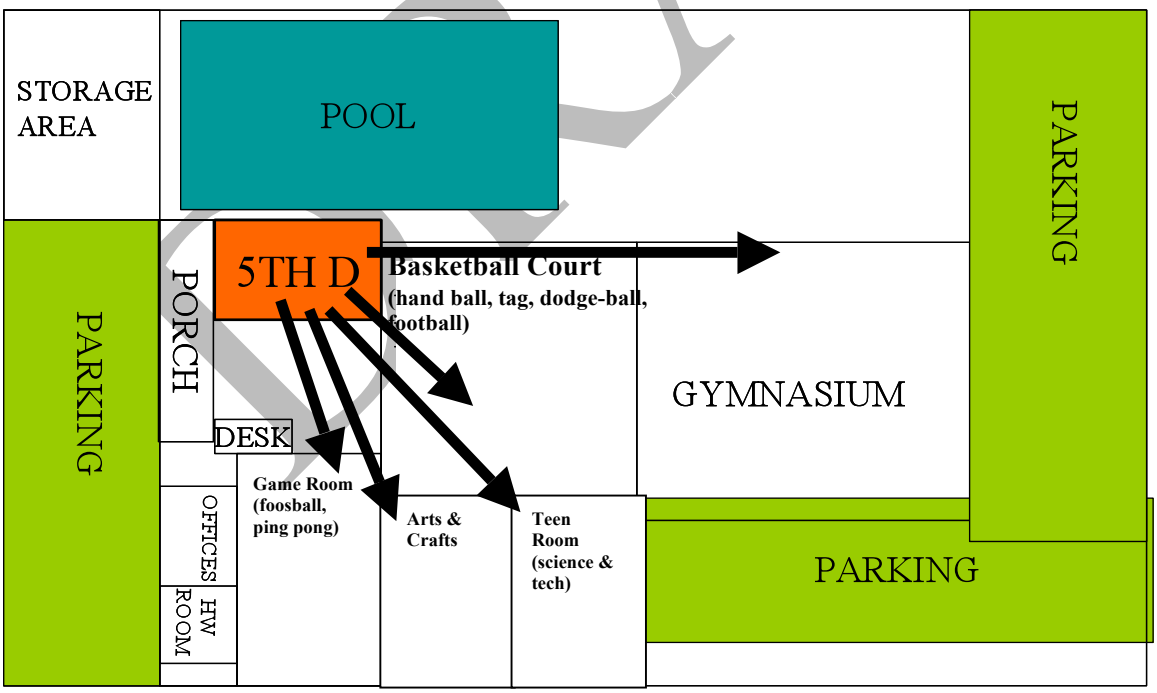

Figure 3. Overview of the Beach Boys and Girls Club showing direction of influence in the instigation of change.

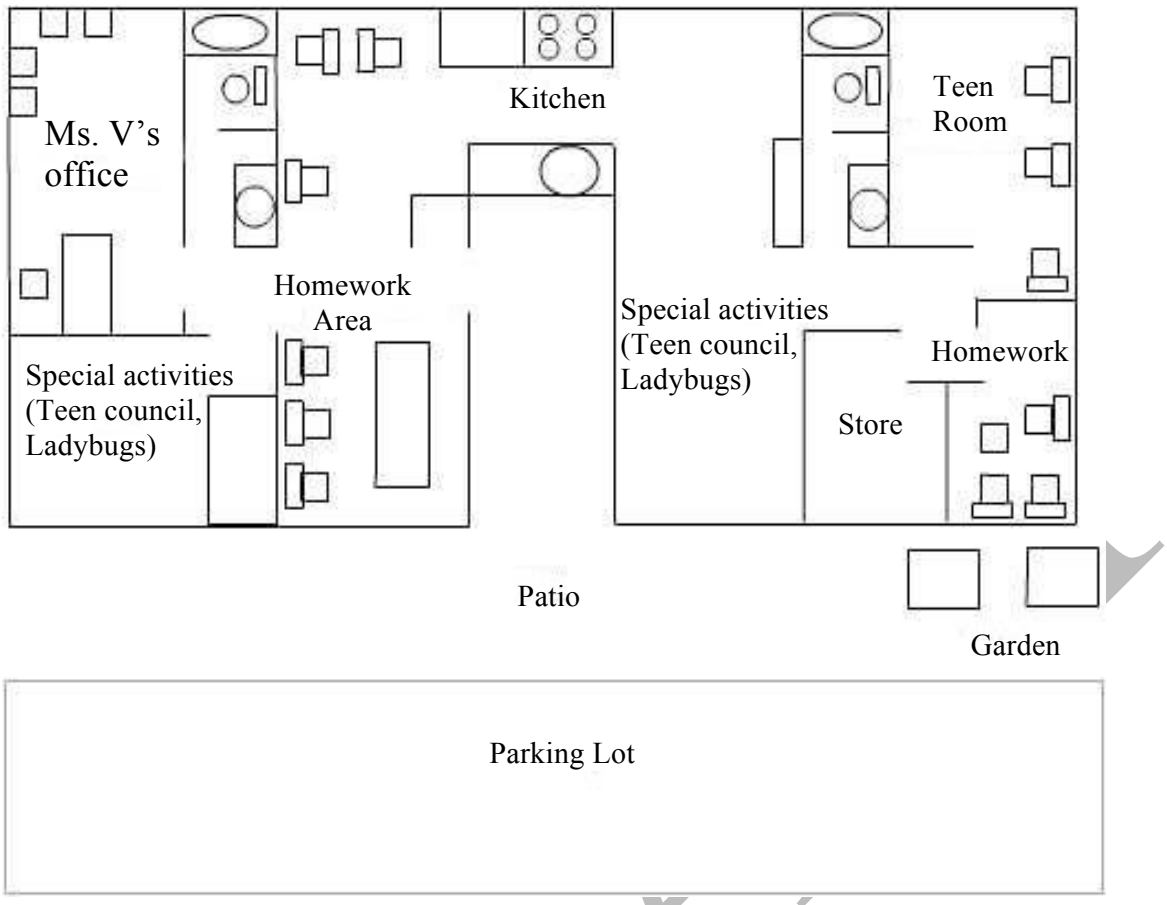

Figure 2. Schematic overview of the Town and Country Village Learning Center.

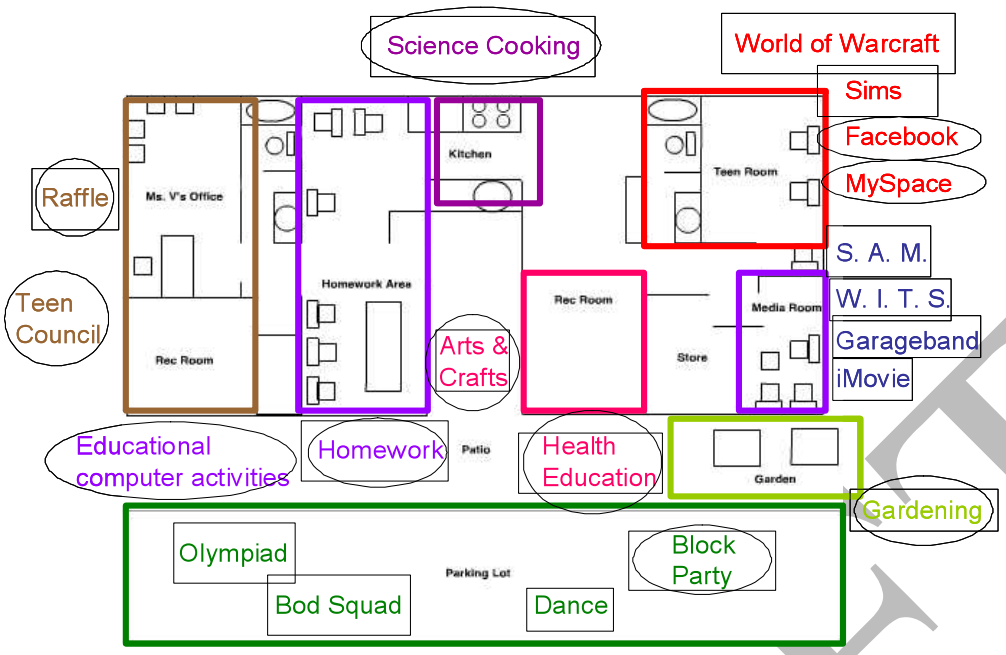

Figure 4. Schematic overview of the Town and Country Village Learning Center showing concentrations of influence. Key: Circle = T&CLC original activity, Rectangle = LCHC activity, Circle & Rectangle = hybrid activity

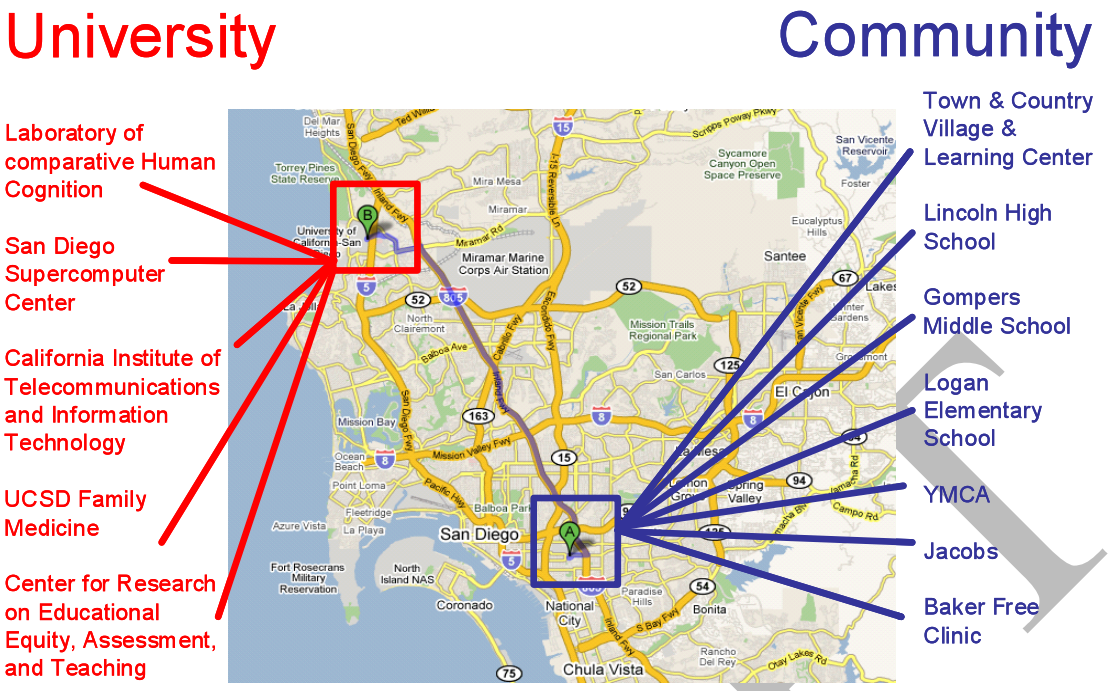

Figure 5. Schematic showing the relationships between the University and Community participants in the LCHC/T&CLC collaboration.