



EVALUATION
OF THE INTEL® COMPUTER
CLUBHOUSE NETWORK
YEAR 2 REPORT



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EXECUTIVE SUMMARY

As part of its Innovation in Education initiative, Intel is funding the development of the Intel Computer Clubhouse Network in the United States and abroad. The Computer Clubhouse Network provides young people the opportunity to use technological tools to express and explore their own ideas and perspectives while working in collaborative, supportive communities. This program is intended to respond to two of the key goals of Intel's Innovation in Education initiative: to provide under-served youth with increased access to technology, and to encourage female and minority youth to enter technical careers. As of Summer 2002, Intel has funded the creation of 66 Computer Clubhouses.

The Center for Children and Technology (CCT), part of Educational Development Center, Inc., is conducting a three-year independent evaluation of the Intel Computer Clubhouse Network. The first year of the evaluation focused on formative questions about the opportunities and challenges host institutions encountered as they began to develop their Computer Clubhouses. The second year of this evaluation, as summarized in this report, turned to a careful examination of four Computer Clubhouses where we conducted both institutional case studies and an analysis of selected work young people produced. Our goals were twofold:

- To map whether and how Clubhouse members' projects reflect an engagement with the program goals, and
- To understand which institutional and contextual factors shape members' engagement with these goals and the developmental progression of each Clubhouse.

In a successful Computer Clubhouse environment young people (ages 10-18) and adult mentors share expertise and support one another in using a range of technological tools (including 3-D imaging software, digital video recording and editing apparatus, and music recording and mixing equipment) to explore or express ideas and/or issues of interest to the young people involved. These qualities are summarized in the program goals, which are to improve young people's ability to:

- Express themselves with technology;
- Collaborate and work in teams;
- Solve complex problems;
- Develop, plan, and execute complex projects;
- Develop self-esteem and self-efficacy.

Essential to the Clubhouse model is the idea that young people develop a "technological fluency." That is, they learn to use a range of tools and media by creating original work, and come to understand how these tools can carry important messages about themselves and their worlds.

Our findings show that while many different kinds of activities take place in Computer Clubhouses, some youth, including those with a wide range of technical abilities and interests, are better able to pursue projects that are consistent with the program goals. Youth who come to Clubhouses with a specific area of personal interest and some prior knowledge and interest in technology are better able to engage in sustained design-based activity across a range of stages of Clubhouse program development than those youth that come to Clubhouses without particular interests or knowledge in hand. High level achievement by youth of the program's goals, however, is in part a developmental process. That is, older youth are generally better prepared to engage in the more higher-order program goals, such as problem solving, in an environment in which they are encouraged to do so, than are younger members.

The likelihood that younger and older members alike, who come to Clubhouses without pre-existing knowledge and interests to drive their activities, will engage with the program goals and sustain an interest in pursuing relevant activities is substantially increased when the culture of a Clubhouse is informed by the following:

- *A clear and consistent focus on activities that invite youth to engage with the program goals, including collaborating, solving complex problems, and pursuing sustained, complex projects.*
- *Coordinator expertise with design-based learning, including an ability to draw on a range of resources to support a culture focused on habitual and sustained design-based activity in informal settings.*
- *Pathways for youth development towards program goals that are developmentally appropriate to the range of ages and abilities of the youth who frequent Clubhouses.*
- *Audiences youth can communicate with to share and develop ideas over time.*
- *Youth leadership in Clubhouses and local communities to provide models to newer members and, for more experienced members, opportunities to initiate connections to the larger community.*

Our report concludes with recommendations intended to help guide the next phase of capacity building across the Intel Computer Clubhouse Network. These recommendations emphasize issues relevant to the sustainability of Intel Computer Clubhouses in a variety of settings. These recommendations are discussed in more detail in the body of the report.

- *Build content and resources that articulate and illustrate not only the core qualities but the core activities (community practices, youth activities, teaching and support techniques, etc.) that distinguish Intel Computer Clubhouses to ensure program uniformity and quality, while acknowledging the need for local adaptation.*
- *Build and sustain networks among Coordinators by promoting ongoing professional development opportunities and by identifying leadership roles within the Intel Computer Clubhouse Network.*
- *Prepare for sustainability by forging strategic partnerships with universities, and by developing*

systemic mechanisms for documenting program activities and supporting local planning processes.

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SECTION I. INTRODUCTION

As part of its Innovation in Education initiative, Intel is funding the development of the Intel Computer Clubhouse Network in the United States and abroad. This report reviews findings from the second year evaluation of the Intel Computer Clubhouse Network conducted by the Education Development Center, Inc.'s Center for Children and Technology. The Computer Clubhouse Network provides young people the opportunity to use technological tools to express and explore their own ideas and perspectives while working in a collaborative, supportive, community. This program is intended to respond to two of the key goals of Intel's Innovation in Education initiative: to provide under-served youth with increased access to technology, and to encourage female and minority youth to enter technical careers. As of Summer 2002, Intel has funded the creation of 66 Computer Clubhouses.

Program goals

In a successful Computer Clubhouse environment young people (ages 10-18) and adult mentors share expertise and support one another in using a range of technological tools (including 3-D imaging software, digital video recording and editing tools, and music recording and mixing equipment) to explore or express ideas or issues of interest to the young people involved. These qualities are summarized in the program's goals, which are to improve young people's ability to:

- Express themselves with technology;
- Collaborate and work in teams;
- Solve complex problems;
- Develop, plan, and execute complex projects;
- Develop self-esteem and self-efficacy.

Essential to the Computer Clubhouse learning model is the idea that young people can benefit from developing "technological fluency." Computer Clubhouses seek to support young people in developing this skill, which refers to learning to use a range of tools and media to create original work and coming to understand how these tools can carry important messages about oneself and one's world.

The first year of this evaluation demonstrated that implementing this program effectively is challenging and requires intensive support and training. Coordinators need extensive and detailed guidance about how to create an environment in which young people with different abilities and interests can engage in the kind of open-ended learning that is privileged in the Clubhouse. Coordinators also need a wide range of technical skills in order to manage their Clubhouses effectively, as well as a set of strategies for working with a range of age groups simultaneously.

In our Year One report we suggested that local Clubhouses are moving along a developmental progression and were, at the time of the report, at widely varying stages of program maturity. The pace of their progression is influenced by a number of factors related to the nature of the relationship between the Clubhouse and the host organization, the coordinator's prior expertise and experience, the needs and priorities of the local community, and the quality and extent of the resources provided to the local Clubhouses by the program staff. This developmental model was premised on an expectation that sites would mature through the cultivation of local expertise and resources and through continued interaction with the Network and its resources.

PROGRAM FEATURE	STAGES OF CLUBHOUSE PROGRAM DEVELOPMENT		
	EARLY	MIDDLE	MATURE
Design-based activity	Design-based work is sporadic, serendipitous and not supported.	Design-based work is encouraged intermittently and supported unevenly.	Design-based work is central, habitual Clubhouse activity and is supported consistently.
Coordinator & Mentor expertise	Coordinators & Mentors have limited technical expertise and/or youth development experience.	Coordinators & Mentors have varying technical and/or youth development expertise; may be unsure of how to elicit and encourage design activity with youth and/or how to use design software.	Coordinators & Mentors share a vision that includes clearly understood approach to supporting design activities with youth. Expertise with design software is established and distributed among all Clubhouse participants (e.g. Mentors, Coordinators & Members).
Institutional support	Clubhouse and host organization missions are superficially compatible, but Clubhouse remains isolated or poorly integrated into larger program.	Clubhouse and host organization missions are seen as compatible, but logistical tensions between host organization and Clubhouse may impede Clubhouse development.	Clubhouse and host organization missions are complementary and mutually reinforcing.
Local resources	Few connections to community resources that can be leveraged in Clubhouse.	Community resources, such as consistent Mentor pool, are leveraged by Coordinator for the Clubhouse.	Coordinators, Mentors & Members have & contribute resources that bear upon Clubhouse development.
Technical support	Local technical support is intermittent and/or difficult to come by.	Local technical support is generally available but may not be prioritized by host organization.	Local technical support is readily available.

The Year One research did suggest that, when well-executed, the Intel Computer Clubhouse Network gives young people the opportunity to learn from and contribute to a community in which a range of skills and behaviors are valued, including:

- technical and social competence (made evident through, for example, peer mentoring and collaboration around project work);
- sustained commitment and responsibility (made evident through, for example, long-term attendance and investment in local Clubhouse governance and junior mentoring structures);
- performance and productivity (made evident through, for example, the creation of a sustained body of work that explores a set of technical or conceptual topics).

Finally, our Year One report emphasized that Coordinators require a clear, shared understanding of the program vision and goals in order to develop their local programs effectively. Such a shared understanding of goals was explained to be a necessary first step toward a shared vision of what concrete actions or accomplishments would constitute “success” at the level of the Network, the Clubhouse, or the individual member.

The second year of this evaluation turned to a careful examination of a small group of Clubhouses, which were our sites both for institutional case studies and for studies of the work young people produced. Our goals were twofold:

- to map whether and how Clubhouse members’ projects reflect an engagement with the program goals, and
- to understand what institutional and contextual factors shape members’ engagement with these goals and the developmental progression of each Clubhouse.

Methods

We have used an evaluation framework that is closely attuned to the distinctive qualities of the Computer Clubhouse model, and have not sought to add to the body of research showing that involvement in after-school programs in general leads to a range of positive outcomes, including improved school performance, lowering of high-risk behaviors, and increased positive and pro-social behaviors (Educational Leadership, 2000). Instead, our evaluation considers the program’s progress toward achieving those goals most tightly associated with the practices that are particular to the Clubhouse model and the activities of Clubhouse members.

This research is based on the premise that through the practices it promotes, the Clubhouse model can help youth not only *use* a broad range of design tools in interesting ways, but that they can also *describe* their accomplishments and reflect on them. Our work with design curricula and programs for young people, as well as a wide range of research, has shown that young people’s ability to articulate their work through, for example, conversation, peer mentoring, or the exhibition of work, is an important part of making their learning apparent to themselves and an audience. Anticipating an audience for their work, including for public showing, stimulates Computer Clubhouse members to engage in the kinds of activities, and/or pursue the kinds of projects, that are described in the program goals. For example, members anticipating a public showing of their work are more likely to invest sustained attention in a particular project, developing their ideas

and pursuing revisions and extensions of an initial idea. This type of activity connects with several of the program goals, including the ability to express oneself with technology, the ability to develop, plan, execute complex projects and, often, the ability to solve complex problems.

The core of our second year of program evaluation has been a sustained examination of work products created by Computer Clubhouse members and of interviews conducted with youth about the process of creating those artifacts. We have based this study on portfolio assessment practices, a well-established method for systematically reviewing the work processes and products relative to some set of relevant criteria. This approach to the analysis of young people's work and work process is most often used in classroom settings that privilege the work learners create in order to understand what they know. It is also a central feature in design-oriented educational settings (such as "crit sessions" for architecture students). Since the Intel Computer Clubhouse Network draws on both of these traditions, as evidenced by its focus on youth learning through design and through self-directed exploration, this method was well-suited to understanding the work young people are producing in Clubhouses.

Our analysis of young people's work products was done using a rubric that articulates concrete dimensions of each Computer Clubhouse program goal and describes criteria for each of five levels of developmental achievement in each of these dimensions. This research began from an assumption that success for this program is not best measured by judging youth *mastery* of program goals (as each of the program goals references sociocognitive skills that are developmentally progressive and not perfectible), but by capturing evidence of whether and how youth are engaged with and *progressing* toward higher levels of achievement regarding these goals. Two secondary questions asked in our analysis were, "What factors – such as member age, longevity of Clubhouse membership, prior expertise with technology – map closely to progression through the stages described in this rubric?" and "Is there evidence that young people are progressing over time in relation to these goals?"

Who is included in this study. During the Winter and Spring of 2002, our research team made several visits to each of four Intel Computer Clubhouses. These four Clubhouses were selected for this study because they were sites that had been part of our Year One study, which allowed us to build on a prior base of knowledge about each site, and because they were relatively "mature" and stable Clubhouses, each one having been open for at least six months, and each had a single, consistent coordinator for the duration of their operation.

During our visits to these sites, researchers engaged in a range of activities, including systematic observations of Clubhouse activities, interviews with host organization staff, and informal discussions with Clubhouse members. Most importantly, researchers met individually with a subset of Clubhouse members to review and discuss projects that they were working on. These youth were interviewed more extensively, each one on two different occasions, and examples of their work were collected. This subset was identified in several ways:

- Coordinators pointed us toward members who they considered "exemplary" in either their com-

mitment to the Clubhouse community, the nature of their work, or both.

- Researchers sought out youth who were engaged in sustained work on projects (i.e., working over several hours or days to complete a piece of work).

Some youth included in these two categories were not included in the final sample, because they were unavailable for follow-up interviews during subsequent visits, or because samples of their work were not available to be collected by researchers. Our final sample includes 18 young people, ranging in age from 9-18 years old. We analyzed 22 pieces of work collected from these young people, and informally reviewed another dozen pieces of work. Our findings are reported below.

It is also important to note that this evaluation engages in a relatively unorthodox use of the analysis of young peoples' work, in that the work and work process is being analyzed with reference to a set of program goals that young people were typically not aware of. For example, our analysis considers whether there is evidence of substantial collaboration among young people in the work that they have produced, although none of the young people included in this study were aware that collaboration was something that was privileged by Computer Clubhouses and something they were expected to be working on and developing as a skill. Further, there was not a concerted effort on the part of the Network staff to share or discuss the programs goals with the coordinators. Therefore it is particularly important that this study not be understood as a judgment of the relative success or failure of the young people in any way, simply because neither they or the staff were aware of the goals against which their work practices were to be measured. Our Year One report discusses the importance of sharing the program goals across the Network, and of making progression toward those goals an explicit part of the day-to-day expectations of Clubhouse activity.

SECTION II. CONTEXT FOR UNDERSTANDING YEAR 2 WORK

In Year 2 we continued to pay close attention to the key factors that inform Clubhouse development because of our interest in understanding the interaction between site maturation and member activity. In order to explore this interaction we identified and began to work with two sites at which implementation and ownership of the Clubhouse model has developed at a quick pace and two sites at which program implementation has not been as rapid, but shows steady development.

Site	Soft launch	Hard launch	Avg. number of members/day ¹	Avg. number of mentors/day	No. of members interviewed	Nature of design-based activity	Coordinator turn-over
Bedford	Fall 2000	Spring 2001	23	1	17	Middle	No
Charles	Winter 2000	Fall 2001	25	3	4	Early	No
Orono	Fall 2000	Winter 2001	33	3	10	Early	No
Seawall	Winter 2000	Spring 2001	22	5	11	Mature	No

Youth attendance

We were unable to collect reliable, objective attendance data at any of the sites included in this study, and no such data exists for the program overall. The absence of data is a major obstacle to drawing strong conclusions in this study, or in any future evaluation about the relative success of this program in engaging youth with the program goals. As we note in the recommendations section of this report, establishing a reliable mechanism for collecting this data will be crucial to building on this year's evaluation and conducting more extensive research on how youth develop over time in the program and its relative success in reaching male and female members and members of a range of ages.

Girls and boys attended **Seawall** in fairly equal numbers during our visits. There was also a fairly even distribution in age from 7 – 17, with a somewhat higher concentration of teens, ages 15 – 16. This was consistent during both years of our evaluation. The most significant change was a distinct member population shift at the Clubhouse, which staff attributed to general trends in the community, including a lack of stable housing arrangements for families, and varying employment/economic prospects. These shifts brought a different mix of ethnic communities into the area, and as newer groups of youth entered the Clubhouse with their own peer networks, earlier participants tended to stay away. Later in the year, these earlier members had begun returning to the Clubhouse with regularity and there was greater integration of members in the space.

Unlike Seawall, which is a relatively closed space—that is, the Clubhouse is the sole program for

¹ Average number of members and mentors are for the observation days conducted by the research team.

youth to attend at the space, which they enter directly from the street— **Charles** is a multi-service center with a range of activities for youth. As a result, youth attendance in Charles is much more fluid over the course of a day, with an average of about 10 young people at any given time, fluctuating between three to 20 members in attendance at any given moment. In general, however, youth attendance appeared on the whole to be down at Charles, compared with Year 1, when average attendance during our visits was 25.

Members at Charles range in age from 9 – 17 years, with a significantly higher percentage of teens (13 – 15). By and large, the active membership at Charles is split evenly between boys and girls, with sometimes higher numbers of females, unlike in Year 1 when there was a higher percentage of males.

Although **Orono** has some active members as young as seven, and a few older members about 15 or 16, with one or two consistent 17-year-olds, the large majority of the active Clubhouse members were 10 – 12 during our visits, with a notable presence of eight and nine-year-olds as well. Youth attendance ranged from five during slow periods (several times a day) to the low 20s. As at Charles, attendance was down at Orono from the previous year when there were up to 31 members present at one time in the Clubhouse. Likewise, there was a notable decline in youth attendance between our first site visit (in late February) and our second site visit (in late April). The gender participation ratio ranged from an even male-to-female split to twice as many males as females. On occasion, as the population ebbed and flowed, there were more female members than males using the Clubhouse, but only for short periods of time.

Bedford continues to have an active membership. During our Year 1 visits Bedford had twice as many males in attendance as females (not including a weekly “Girls’ Day”), but this year the imbalance seemed to have faded away. In our observations, about 80% of Bedford’s members were ages 8 – 13, with some 14-year-olds, and a heavier concentration of 9-10-year olds. Generally, when older teens were present at this Clubhouse they were a small group and were present either because they were paid staff from the host organization (Junior Staff), or it was the last hours of the day, when the space was informally dedicated to teens.

Program vision and goals

In the case of the Intel Computer Clubhouse Network it is important to distinguish between the program vision and its goals. During both years of our evaluation we have observed a clear and consistent shared vision of the appropriate tone, culture and values for Computer Clubhouses. However, the goals of the program are rarely discussed and rarely referenced in program activities, workshops, or print or online materials. This distinction has had significant and far-reaching implications for the growth and development of this program.

The core of the Computer Clubhouse vision is the importance of providing young people the opportunity to express their thoughts and ideas by learning how to create design-based projects in an environment of respect and trust and with the support of adult mentors. We repeatedly observed

particular features of local Clubhouses consistent with this vision: For example, every coordinator we worked with understands that in Clubhouses youth should create projects that “start from their own interests,” and that “express their own ideas.” They also uniformly seek to bring adult mentors into their Clubhouses. We see these efforts as reflective of coordinators’ understanding of, and commitment to, a general vision of the collaborative, creative, expressive qualities of a Computer Clubhouse.

However, we also saw great variation in the amount of sustained, design-based project work that was underway in these Clubhouses, and little similarity in how or whether specific goals were defined or specific practices were encouraged to guide members’ experiences in the Clubhouses. We understand these two issues – the amount of sustained, design-based activity underway in a Clubhouse and its focus on the program goals – to be intertwined and mutually reinforcing. Unless the Clubhouse Coordinator is consciously choosing to support and encourage work that involves behavior related to the program goals, such as collaboration and complex problem-solving, young people’s development in these areas will be serendipitous, and only marginally more likely to occur in a Computer Clubhouse (due to the resources available) than in any other setting. In some cases, Coordinators may encourage these kinds of activities because of prior teaching experience or personal priorities for guiding youth development. But in most cases, Clubhouse Coordinators are guiding their members’ work in the absence of any clear sense of how to translate the broad Clubhouse vision into specific practices and expectations for Clubhouse activity.

In fact, at each of the sites included in this study, Coordinators acknowledged that they were not familiar with the program goals, and as a result do not reference them in their decisions regarding program development, in conversations with their members, or when recruiting and/or training mentors. The following descriptions of the four Clubhouses we worked with this year will illustrate these variations.

At **Charles**, the Coordinator is often busy with attending to behavioral issues of youth, managing technical issues, and assisting with program-wide matters for the host organization. In Year 1, three mentors were generally available to work with young people, but by Year 2 there were no mentors coming to the Clubhouse on a regular basis, although the Coordinator anticipated having a new mentor arrive soon after our visit. Without the dedicated time from the Coordinator to focus solely on supporting member work and with no consistent mentor presence, most members spent their time collecting images from the Internet in relation to hobbies, or searched for, downloaded, saved and listened to music. Most instances of more engaged work were the result of undirected tinkering on the part of members and often resulted in cards made for relatives to celebrate special occasions (e.g. birthdays, anniversaries or holidays). At other times, members used digital cameras to take pictures of each other, or used the video camera to record activity in the Clubhouse, or to record the choreography of a new dance routine. These spurts of activity were generally spontaneous and did not benefit from any subsequent support that would have encouraged the development of a sustained project or the development of a skill set.

Orono has the largest paid staff of any of the Clubhouses included in this study. At any time, there may be from two to six paid staff members in the Clubhouse. However, as with Charles, the Coordinator of Orono is heavily involved in responsibilities at the host organization. Many responsibilities that would typically fall to a coordinator are distributed among this staff, who have positive relationships with members, but lack technical expertise or an informed approach to engaging young people in design-based activities. This staff has also experienced considerable turnover earlier in the year while this research was underway. This staff turnover seemed to have contributed to the failure of attempts by staff to jumpstart organized projects, such as a digital still photo program and a video program, which had languished.

At Orono, most members tend to focus their activities exclusively on one or two design programs. Members were producing images that were quite similar in style. Members were generally producing multiple pieces of work in a single day and did not, typically, tackle problems in their projects that challenged them. Some younger members practiced typing or devoted time to school assignments, while some older members wrote, produced, and recorded their own music. The music studio was largely used by one group of approximately five male members and was primarily supported by the interest and motivation of an older member who discovered the Clubhouse as a platform from which to pursue a prior interest in music.

More design-based work takes place at **Bedford**, where members participated in a relatively diverse array of activities. Some of these activities have built-in support mechanisms, such as Lego constructions that members created by following provided instructions. Other members frequented Web-based gaming sites; others spent time playing games like the Sims, which offer scaffolded environments in which to create social networks and neighborhoods. Members also created images, using digital cameras to put themselves into pictures (for example, of cars, or unusual landscapes); they occasionally drew on paper and scanned their drawings (adding color and shading); and they downloaded images and altered them. A few members have created semi-animated action power-point presentations using downloaded images and their own digital drawings, in effect making short click-by-click comic books. One or two older members have created more complex, original, technically-challenging 2-D artworks, using Photoshop and other graphics programs. Also, a music club was formed with the help of a staff person to help members write, record and produce music in teams.

The Bedford Coordinator has the benefit of at least one mentor who is in the Clubhouse every day during prime attendance hours, as well as a handful of other mentors who participate less regularly. The core mentor is a student at a local college and brings enthusiasm to the job as well as prior experience working with youth. There is a concerted effort by both the Coordinator and mentor to encourage members to rely on each other when problems arise, such as when a computer screen freezes or when trying to locate a program, rather than always relying on staff. This has resulted in the creation of a team of junior mentors, Clubhouse members who attend regularly and have shown an interest in contributing to this community. These junior mentors meet once weekly with the Coordinator to receive “training” on a particular software program and are encouraged to

help out in the Clubhouse when other members need guidance or support.

At **Seawall**, members engaged in a variety of design-based activities that incorporated everything from basic computer drawing and painting (such as in Corel Draw or Photoshop); 2-D animation (using Flash software); music recording (including writing and composition of original verse and lyrics); to group work with digital still cameras; website creation; video shooting and editing; and 3-D figure animation.

These activities featured three distinct qualities.

- First is the common utilization of Flash. Though none of the other Clubhouses we visited had made extensive (or even initial) use of Flash, members of all ages in Seawall were encouraged to use this program. Flash is a unique program in that it allows the user to draw freehand, to insert objects and pictures from other programs, and to animate the final product. It provides a sense of accomplishment for members with a wide range of levels of technical skill. Novices can create powerful images in a relatively short amount of time, while expert users can create more complex artifacts through more sustained engagement.
- Second, discussions with Seawall members revealed that their design and animation activities were, in many cases, infused with a sense of teaching and audience. As at Bedford, the Coordinator strongly and consistently encouraged members to share their knowledge with one another. There is a clear, explicitly expressed culture in the Clubhouse that honored the resources, assistance, and suggestions members are able to share with each other.
- Third, Seawall members were willing to take on longer and more complicated projects than were typically pursued in other Clubhouses included in this study. This is evident in project features such as final products that include elements created in multiple media or multiple software packages, and projects that are dedicated to solving specific technical challenges in the service of some larger project goal.

Complex, sustained activities are possible at Seawall in large part because of an environment that privileges what young people know about the range of technology in the Clubhouse and their ability to share that knowledge with their peers. A constant mentoring pool of volunteers familiar both with the design tools available in the Clubhouse and with a learning model compatible with the open-ended nature of the Clubhouse environment, creates the right conditions for supporting youth with a range of abilities in sustained project work. At Seawall, it is not uncommon for members to be engaged with single projects over several weeks.

Institutional support & local resources

Across all four sites, Clubhouses and host organizations remained unsure of how best to leverage the strengths of the Computer Clubhouse program for other local programmatic goals. In many instances, the executive directors at the host organizations referenced attempts to build stronger partnerships or collaborations between the Clubhouse and other programs, but there was little evi-

dence that these efforts were in fact occurring or successful.

- At Bedford, the other technology programs at the host organization were perceived to be in competition with the Clubhouse. The coordinator has cited instances of trying to create cross-program initiatives, but has generally not felt supported in these efforts.
- At Charles, a number of community organizations share the building space under the umbrella of the host organization, and though other host organization staff were sometimes present in the Clubhouse—often to make materials (posters, permission forms) for other programs—few attempts are made to build on or create links with local resources.
- Orono’s host organization has a history of successful fundraising and recently received monies to expand its teen center, which staff members hope will boost teen participation across all its programs. The organization also expects to further invest in its computer lab, which is seen as a complement to the Clubhouse since it is the place where members are expected to do school-related tasks. However, a clear vision for how to leverage the strengths of the various programs to the benefit of members remains unclear, as does a strategy for the requisite professional development of program staff.
- The Seawall Coordinator draws on an extensive community support network to provide ample opportunities for members to extend the work they develop in the Clubhouse. This included creating opportunities for youth to exhibit their technical expertise through public viewing of their work and to further develop their skills through mini projects with community members, and through internships at other community programs. However, this was all done without any visible day-to-day involvement of the host organization in Clubhouse activities.

Technical support

All of the sites noted some technical issue that they relied on Intel staff to help troubleshoot. One of the major challenges that had the most direct impact on the Year 2 evaluation was the absence of any system for saving files to local servers or for making them accessible to members, except from the hard drives of individual machines. Except at Charles, where members had a well-developed system for storing individual files, it was often difficult for members or Coordinators to locate member work without great persistence.

The relationship between Intel Computer Clubhouse development, member activity, and program goals

Each Computer Clubhouse has a distinct culture that becomes apparent the minute you enter the room and is largely indicative of how common design-based activities are at that Clubhouse. This is in large part a reflection of a Coordinator’s expertise that they either bring to the job or are able to develop in the role. Every Coordinator faces multiple institutional challenges and responsibilities, including the relationship with her/his host organization, the consistency and turnover in

youth attendance, and the level of technical support available. These factors can be a major barrier to member engagement in design-based activities for less experienced Coordinators, but become minor obstacles when Coordinators know how to guide a learning process for members that exemplifies the program goals.

This is most evident in the case of **Orono**, which at first glance seems to have many of the necessary elements for Clubhouse development in place, but lacks a coherent interaction among these elements to support sustained, design-based activities among members. Although there is a steady mentor pool, most of whom are paid staff and who have some technical expertise, there is no clearly understood or shared strategy for supporting member work. An interesting example of this relates to the Clubhouse's music studio. A small group of members were interested in producing their own rap songs, but found little support for this because the mentors responsible for working with the music studio had a preference for other music genres. It was the expertise of an older member who was working towards developing an independent business that enabled these members to write and record their songs. This work was largely cut off from the rest of the activity in the Clubhouse, where members' project work usually reflected the expertise and interests of the mentors.

At Orono, although many members are comfortable with some design tools, mentors and Coordinators do not have strategies for building on youth interests and guiding young people toward more complex, sustained activities over time, or for engaging members with design tools outside of a specific group of tools the current mentor group is familiar with. As a result, most of the work created at Orono is repetitive—members produce illustrations or other work products that are minor variations on similar themes, make use of one or two software packages, and address no particular audience or purpose. Although members' work is often displayed on the Clubhouse walls, members are not encouraged to think about how to connect their work to an audience or to develop project ideas over time.

Likewise, while the mission of Orono's host organization is, in theory, compatible with the Computer Clubhouse learning model and the Clubhouse receives wide recognition in the community, few tangible benefits of this programmatic fit are evident in the day-to-day engagement between the Clubhouse and other programs within the organization. Finally, Orono also has significant turnover among its Clubhouse members, with few young people making a sustained commitment to participation in the Clubhouse. Each of these factors suggests the challenges facing Orono's further maturity as a Computer Clubhouse, and each has an impact on the amount of sustained project work that can take place at this site.

At **Bedford** and **Seawall**, youth interest in creating design-based projects is supported by Coordinators and mentors who feel confident working with a variety of design tools and who have taken care to encourage their members to create products for an audience. The significant difference between these two sites is the relative prevalence of design-based activity in proportion to the number of members that attend each of the Clubhouses. At Bedford, a wide range of activities

are underway on any given day. Members move in and out of the Clubhouse on a schedule, and at any given time some members will be playing games, browsing Internet sites related to hobbies, or doing homework, while others are constructing Lego objects in groups or individually, and others are making cards, or taking digital pictures and altering them in Photoshop. Members at Bedford are encouraged to create design-focused projects and to pursue them over time, but the Clubhouse culture remains fluid and loosely structured, keeping the primary responsibility for choosing what activities to pursue with the members.

At Seawall, most members understand that the Clubhouse is place where they are expected to be engaged in some kind of design-based, sustained project work. It is typical for the Coordinator at this Clubhouse to suggest project ideas to members who are undirected, or to pair members with different levels of expertise to collaborate on projects. Members are also often encouraged to create projects for particular audiences, including local community groups and scheduled visitors. Members at Seawall usually remain at the Clubhouse for an uninterrupted time that lasts for the bulk of the Clubhouse's hours of operation.

At **Charles**, the Coordinator continues to find supporting youth in design-based activities to be extremely challenging. This is compounded by the absence of a reliable pool of mentors and a number of other youth programs at the host organization that inadvertently impede the development of the Clubhouse. The result is that young people move in and out of the physical space of the Clubhouse frequently throughout the day, and most activity in the Clubhouse is unfocused and primarily guided by social interactions rather than by the content or goal of the activity itself.

As we noted in the first year of our evaluation, implementing this design-based program effectively is challenging and requires intensive support and training. The expertise the Coordinator brings to bear on a Clubhouse has a significant impact on the nature of design-based activity taking place there. While this would be true of any leader in any learning environment, it is particularly true for the Intel Computer Clubhouse Network because there is no single reference or manual for planning and supporting design-based activities for the Coordinators or mentors to refer to and limited opportunities for sustained training. In the absence of resources that articulate ways for Coordinators to approach the program goals, only young people who enter Clubhouses with some prior technical expertise and motivation are likely to engage in sustained design-based work, while members who require more support from adults are not likely to engage with the program goals or to develop their abilities in those areas.

SECTION III. YOUTH ARTIFACTS: WHAT WE FOUND

Primary data collection occurred during two- to three-day-long site visits conducted between January and May 2002. In addition to the in-depth, one-on-one interviews conducted with selected youth, visits also included observations of youth activities during Clubhouse hours; interviews with program staff, including Clubhouse coordinators and mentors; and, where possible, interviews with key staff at the host organization, including the executive director, program coordinator and/or technical support person.

Prior to our initial visit to each site, Coordinators were asked to identify those youth who exhibited a significant engagement in their Clubhouse: those who showed interest in particular projects or activities, who were regularly attending, and who showed interest in contributing to their Clubhouse community. We did not ask Coordinators to focus their attention exclusively on those youth who had been at their Clubhouse the longest, nor on those youth who exhibited the most technical ability. What was important to us was to work with youth who were motivated to create design-based projects using the vast array of resources available to them in their Clubhouse. In some instances, members of the research team identified youth to participate in the study who were not identified by the Coordinator, but who were similarly engaged in design-based projects.

An interview protocol was designed by the research team that guided youth through a discussion of their work and the process behind it with indirect reference to each of the program goals. Youth were asked to identify at least one example of work that they had a particular interest in (e.g. a good example of working through a problem; had personal significance; represented an attempt at something new and different from previous samples of work). These interviews lasted between thirty and forty-five minutes. When possible, interviews with the same youth were conducted at more than one site visit, however, this was not always possible given the drop-in nature of program participation. Researchers conducted a total of 47 interviews and collected a total of 31 samples of work in a range of media, including Lego constructions, short videos, animation clips, 2-D and 3-D illustrations and images, and music compilations. Examples of work discussed with youth were either collected at the time of the interview, or following a visit, and were collected in paper and electronic form (including printouts of work, audio files of original music compositions, and movie and animation files on CD).

Analysis of youth work samples and work processes

The research team designed a rubric representing the program goals and articulating related criteria for meeting these goals across five developmental levels of achievement. It is not a tool that measures mastery of particular skills. Rather, it enabled us to pinpoint how youth are progressing toward higher-order, more complex levels of expression of the qualities emphasized in the program goals. The design of the rubric was greatly informed by several meetings conducted with Mitchel Resnick and others at the MIT Media Lab. These meetings afforded us the opportunity to investigate in greater detail the core concepts that inform the goals, in particular the relationship

between the broad notion of “technological fluency” and the specific program goals.

Each of the program goals were further articulated across three-to-five component parts, and each of these were linked to criteria identifying three levels of achievement. On each scale, one represented the lowest possible score and three was the highest score.

After preliminary group scoring and discussion sessions to align interpretations of the scales and establish reliability, four researchers worked in rotating pairs to conduct the scoring. All scores were reviewed and discussed by the entire group. Out of the 31 work samples collected across the four sites, 22 were scored by the research team. Others were not scored because they were produced by members who we were only able to interview once, or because members had not focused on those pieces of work in their interviews.

Goal 1: Ability to express oneself with technology

Four criteria formed the basis for this goal.

- The first has to do with how personally invested a youth was in the **content** or style of the project at hand. In some instances, a youth might have been motivated by a personal interest in a topic or by a desire to create something with a particular person in mind. In other instances, there may have been no personal motivation for a particular project, but the act of making something met a momentary need.
- Second was the **form** of the project, in particular, the motivation for creating this particular project in this format or media (for example, the motive to create a piece of music rather than an illustration). Was the youth inspired by what was most popular among Clubhouse members at the time? Or did this particular form allow her to express something specific that was important to her?
- Third, we wanted to know about the **tools** the member used and how open-ended they were. Did the youth primarily use prefabricated elements embedded in a program (such as a template or clip art), or did the youth draw on elements she created just for this project?
- Last, we identified the degree to which youth described themselves as **creators**. In this instance we were most interested in whether the youth saw herself as a passive learner, as an executor of specific tasks, as an inventor, or something in between.

GOAL 1: ABILITY TO EXPRESS ONESELF WITH TECHNOLOGY

	Content How personally invested is the member in the style of the piece?	Form What drove choice of project type (form, genre)?	Structure How open-ended were the tools used?	Identification Does member identify self as a creator?
1	No, or minor, personal relevance/connection to the content or style being explored.	Copied activity. Project is identical or almost identical to others in the Clubhouse in form. Youth may add one formal element that is personally distinguishing.	Project consists entirely, or almost entirely, of prefab elements (such as clip art), or a filled-in template. Pre-made materials may be modified or repositioned. Little or no personal choice is reflected in choice or use of project elements.	Youth describes self as a passive learner or passive executor of tasks. Or, youth expresses interest in learning a skill but not in creating an original expression. Project is focused on mastering technical skill, no connection to an expressive goal.
2	There is an explicit personal connection to the content or style being explored, but it was chosen for convenience.	Project follows established pathways (i.e., Sparks) but form reflects individual ideas about audience or purpose that enlarge on the original notion.	Project uses combination of original and prefab elements. Prefab parts are placed, contextualized, elaborated on with clear personal choices.	Youth focuses on self as technical learner, but ties what she/he is learning to ideas about inventing or creating something personally meaningful. No clear focus on communicating with others through the product.
3	There is an explicit personal investment in topic or style. Evidence of sustained exploration of content, or refinement of style, across multiple projects.	Original activity. Genre or form is innovative, particularly in relation to other current local Clubhouse activity. Project form reflects personal interests and ideas.	Project elements are all or almost all made or selected by youth. All elements contribute to a personal expression (this can include projects with an underlying template or some prefab elements). Project may synthesize elements from multiple platforms, or use tools in innovative ways.	Youth focuses on self as creator, inventor, investigator. Youth may have a larger agenda that is met or exceeded through the execution of this particular project.

How projects scored on this goal. Though the average score for this goal was 2.8, there was a wide spread of scores for each of the criteria. Most members scored highest in relation to the structure of their project. Seven projects (out of 22) scored a three, ten scored a two, and five scored a one. This suggests that members were typically creating a significant portion of their projects “from scratch,” and making clear personal choices in their constructions, as opposed to using clip art, templates, or other pre-fabricated elements.

Members tended to score the lowest on their personal investment in the content of their projects and on the choice of form for their project. Eight members described either no or minor personal investment in the content or style they were exploring in their project, and seven described creat-

ing a project very similar to others done in their Clubhouse.

Goal 2: Ability to collaborate, work in teams, and contribute to the community

The goal was understood via four components.

- First, we wanted to understand who contributed what **parts** to the project whole.
- The second looks at **how** the project was put together, situating the work process within a parallel-play or shared-idea environment, and looking at group process.
- The third was a discernment of the degree to which the project was shared either within or outside of the Clubhouse **community**.
- The fourth has to do with **roles** and shared knowledge.

GOAL 2: ABILITY TO COLLABORATE, WORK IN TEAMS, AND CONTRIBUTE TO THE COMMUNITY

	Composition of project Who made the parts of the whole?	Degree of collaboration How was the whole put together?	Connection to larger community How is the project shared, how does it contribute to others in or out of the Clubhouse?	Roles How much teaching or or being taught is represented in the project?
1	One youth. Another young person or adult may have had minimal input.	No collaboration, but some parallel play may occur, such as youth doing a similar activity, working side-by-side, and sharing ideas.(Sharing may be explicitly promoted by coordinator or be a consequence of members working on similar types of projects.)	Others are not aware of the project or are aware of it only in passing. It is not viewed publicly, or shared or used in other ways.	Youth may have received some specific piece of instruction from others (members or mentors) in relation to some piece of the project.
2	Multiple youth or adults contributed parts that they created independently.	Ideas and suggestions that substantially influence the project are shared through parallel play, but projects remain individual. Sharing of ideas and suggestions is spontaneous and sporadic.	Project is displayed; collected for future reference, and/or shared with others.	More than one project element exists due to interaction with or instruction from others.
3	Most or all components are conceived of and created jointly.	Most or all elements of the project are created through negotiation, shared construction. The process of creating the project involves sustained communication and the integration of multiple viewpoints.	Project provides, or intends to provide input into the community. Project may be part of a larger whole, or undertaken by a larger community.	Multiple projects elements were created through interaction that taught one or more contributor something new. Project may produce significant new knowledge for one or more contributors.

How projects scored on this goal. Scores tended to be quite low in this category overall, particularly in the area of composition (the mean score was 1.6). Most components were made and assembled by one youth. In four instances youth developed their projects in parallel to similar activity by other Clubhouse members, but these various projects were not integrated or combined in any way. Likewise, most of these samples were not connected to the larger Clubhouse community, either through public viewing in the Clubhouse or other opportunities for sharing. In these cases others might have been aware of the project, but only in passing.

Projects tended to score highest in the area of instruction and feedback they received from or provided to peers, mentors or Coordinators, in the context of that particular project. For most projects (9 of the 22), youth acknowledged that at least one or more project elements came about as a result of input or “instruction” from someone in the Clubhouse, or related to their instruction to another youth (in the case of projects that did reflect some co-construction or collaboration). Two projects had elements that were the result of interaction that taught the creator or contributor something new.

Goal 3: Building self-esteem and self-efficacy

This goal has three component parts: **confidence** in skill, **pride** in product and **investment** in process. We understood this goal to relate to a young person’s perception of her ability to learn and use technical skills, her sense of the product as an effective means to communicate a personally-relevant message to an audience, and the value she places on the creative process as an opportunity for discovery and personal growth.

GOAL 3: BUILDING SELF-ESTEEM AND SELF-EFFICACY

	Confidence in skills How does the young person view their ability to learn and use technical skills?	Pride in Product How does the young person view what they made and its purpose? (Emphasis is on communication with audience and continued revision, not on “success” or completion.)	Investment in process How does the young person understand and value the process of creating the product?
1	Primarily views his/herself as passive learner who needs to be guided in use of the technology. May acknowledge avoiding tasks that would require learning new skills. May make some attempts to learn independently or to seek out assistance, but prefers to have others take over unfamiliar tasks.	Neutral about the project, or may identify positive qualities but does not express further interest in how it is received or responded to.	Neutral about the process, or little or no reference to process. Does not identify any personally valuable aspects of process.
2	Feels mastery over a procedure, a set of rules, is confident within those boundaries. There’s one way to do it, and I can do that.”)	Is interested in, receptive to response to the project by others. Is discovering the communicative dimension of the project.	Can explain process with some detail, may reference valuable aspects of it. Product is primary.
3	Is comfortable drawing on multiple skills. Shows signs	Identifies audience, is focused on creating work for/sharing work	Describes process and identifies valuable aspects of it. May

of being a flexible learner, seeing technical skills as a toolkit that can be expanded to meet his/her needs (may be developing this ability, not fully mastered yet). May be recognized in the Clubhouse as an expert regarding particular skills and be invested in teaching others what he/she knows.

with that audience, is able to elaborate on the purpose of work.

describe process as opportunity for growth, connect aspects of process to personal development (gaining skills, learning from others).

How projects scored on this goal. Overall, projects tended to score higher on this goal than on any other (average score was 2.3). Nine projects scored a three on each component of this goal. These scores reflect a general ability among youth to describe an approach to creating a piece of work that they feel comfortable with, to show some recognition of the communicative aspect of a project, and to have some sense of an audience for the work at hand.

Goal 4: Ability to solve complex problems

Problem solving was broken into four subcomponents.

- The first, **identification**, has to do with the young person's ability to identify relevant challenges or questions embedded in the process of creating a project.
- The **response** component relates to the member's ability to describe a problem-solving process and the benefits and/or drawbacks of the problem-solving process employed. Was a problem solved by an arbitrary or opaque intervention (e.g. "I hit this button and it worked" or "I asked someone and they did it")? Was there some degree of trial and error involved in the problem-solving process? Or was there a systematic investigation process of question asking- and -answering?
- The **tools** component addresses the degree to which youth were able to make the best possible match between the range of design tools at hand to the problem or goal in mind. This component captures the importance of being reflective and deliberate in considering the capacities of various tools and choosing among them to meet a particular technical or expressive need.
- The **outcome** component captures the technical complexity of the work or problem solution. While technical complexity on its own is not indicative of the quality of a member's problem-solving process, it is important to include this dimension of the project and to document it in relation to the other qualities of their problem-solving process.

GOAL 4: ABILITY TO SOLVE COMPLEX PROBLEMS

	Identification What challenges does the young person identify in their work process?	Response How does the young person describe the process of solving challenges encountered?	Tools How does the young person match the tools available to the problem at hand?	Outcome How technically complex is the final product or problem solution?
1	Does not identify any challenges associated with the project, or references one problem area but does not reflect on it or describe solution.	Describes problem solution as happening by chance, or gives procedural explanation of problem-solving technique (“I did ‘edit’ and ‘paste’ and it worked.”)	No recognition of choice in tools (e.g., only aware of one type of software).	Single effect is used (e.g., pasting clip art pictures), or multiple effects are used but are not integrated.
2	Describes one or more challenges involved in the project and how it/they were addressed	Describes some process of problem-solving (trial and error, planning an approach).	Identifies one or more qualities of the tools/resources used that were appropriate to the task at hand, and/or references other tools/resources he/she not to use and explains the choice.	Integrated effects (e.g., image & sound), although coordination may not be completely thought through (clip art and drawn images create a generally chose coherent picture).
3	Describes one or more challenges involved in the project and how it/they were solved. Evaluates the solutions reached or attempted, articulating strengths and weaknesses of the outcome.	Describes problem-solving process and identifies benefits and drawbacks of the method(s) used to solve problems. Acknowledges the approach he/she took to the problem as one among multiple possible strategies.	Describes tools and resources sought out and/or used, identifies benefits and drawbacks of choices made.	Integrated effects with reasoned, clear relationships among them, and/or layering of effects (picture makes use of multiple drawing tools and animation to create a coherent whole).

How projects scored on this goal. Overall, projects scored in the lower end of this scale (average score 1.6), particularly in the “response” component of the goal. In general, youth did not identify challenges that they were addressing in their design process. When they did, the problem solving method was described in fairly straightforward ways that did not suggest that the members’ problem-solving skills were being stretched or extended. Scores tended to be higher in the “outcome” component, reflective of a general tendency toward projects that used multiple, integrated effects, that indicated a substantial level of procedural technical knowledge.

Goal 5: Ability to develop, plan, and execute complex projects

We examined how youth developed, planned and executed complex projects by describing this goal across three dimensions. **Goal-setting** captures how and whether a member defines a goal for a particular project. **Planning and persistence** indicates how extensively the member pursued that goal, and **resourcefulness** captures the scope and quality of the resources the member drew upon to pursue that goal.

GOAL 5: ABILITY TO DEVELOP, PLAN, AND EXECUTE COMPLEX PROJECTS

	Goal-setting What goals does the young person associate with his/her activity?	Planning & Persistence How extensive are the young person's attempts to pursue/achieve his/her goal(s)?	Resourcefulness How creative is the young person in bringing together the resources needed to pursue/achieve his/her goal(s)?
1	Pursuing the activity at hand is perceived as the goal in itself. There is no larger conceptual context	The project is a single attempt, there is no follow-up (and the project itself is not a follow-up to other, prior work). Or, project is one in a series of pieces of work with little or no variation across them (e.g., scanned photographs modified in PhotoShop).	References no resources or one resource (other people, information, tools) that influenced project.
2	Identifies some larger goal that is partially expressed by the project. Discusses the project in terms of the conceptual goal.	Project is part of a persistent attempt to work toward a goal. Tactical or strategic planning for improvement is absent or sporadic.	Identifies more than one resource that influenced project and what those resources contributed to the work.
3	Discusses the conceptual goal apart from specific project, and is able to explain other possible directions, outcomes for further work.	Project is the result of (or is part of) a process of systematic planning, testing, and redesign. Young person has moved through a process with a clear strategy and clear goals.	Able to identify and connect with a range of resources to meet different aspects of project goals. Resources may be other people, tools, or information. Able to discuss their choices, explain why they sought out those resources and whether they were useful.

How projects scored on this goal. Scores for this program goal were low (average score 1.8), particularly because youth typically did not identify or describe their projects as being part of an ongoing or sustained area of investigation. Half of work samples scored were described as “ends in themselves,” not connected to any larger conceptual area of interest. In seven instances the work was clearly described as being part of a larger goal. Projects also typically drew on a small and predictable scope of resources, primarily coordinator knowledge and member’s own prior knowledge. Manuals, Internet resources, and other resources available within the host organization or the community were rarely if ever cited as influences on the projects.

SECTION IV. WHAT OUR FINDINGS SHOW

The projects reviewed in this research clearly fell into three distinct categories reflecting low, medium, and high cumulative scores on the rubric. In this section we explain the distinctions among the three groups and discuss examples of projects representative of each group. The examples presented are not the actual artifacts we collected as part of our research, but were created by the research team, based on actual projects, to represent the core qualities of each category. The conclusion of this report presents an overview of how factors, including youth age, youth relationship to the Clubhouse, and Clubhouse level of maturity relate, to these categories.

High

Nine of the twenty-two samples of work (created by eight different Clubhouse members) fell in this category, with cumulative scores ranging from 11 to 14. What is most distinctive about this group of projects is the high level of personal investment they reflect. Six of the nine samples in this group were rated a “3” in this dimension of Goal 1, “Ability to Express Oneself with Technology.” In particular, these projects tended to reflect members’ investment in a topic of personal interest that was being developed through sustained project work over time. Youth in this group tend to see themselves quite explicitly as designers, producers, or performers (e.g. as a singer, a music producer, an animator).

A clear sense of audience also informed the development of these projects. Youth were able to discuss who they hoped to communicate with through the work and how they hoped to distribute or display what they were making. They often referenced specific choices they had made or features of their projects that were designed with specific audiences in mind. These projects tended to be the result of sustained work, undertaken over several days or weeks. These projects were also often innovative relative to typical activities in each respective Clubhouse – rather than following popular models within the Clubhouse, they reflected outside interests or new ideas for using the available media.

Work samples in this category also tended to reflect more technical complexity than projects in the other categories, such as multiple, integrated effects used for specific communicative or expressive purposes. In some cases, technical complexity reflected the fact that a project was a component part of a larger project-development process, and was being pursued by a member to explore particular expressive styles or technical processes.

Who are the youth in this group? The eight members whose projects fell into this category were teenagers between the ages of 15 and 18. Five of the youth were girls. Clubhouses members in this group share the following qualities:

- They come to the Clubhouse with a pre-existing area of interest and a goal for what they wish to accomplish at the Clubhouse (i.e., an interest in video and a desire to make a movie).
- They come to the Clubhouse with one or more friends who share or are aware of the young per-

son's interest and/or their existing technical knowledge.

- They generally have access to relevant technologies outside of the Clubhouse and know how to use them (i.e., youth making videos who have video cameras at home).
- They have identified specific resources or pieces of knowledge that they do not yet have and want to develop at the Clubhouse (i.e., a youth who knows how to plan and shoot a video but has not used digital editing software before).
- They use the Clubhouse as a site to support shared work with a pre-existing peer group.

In our observations, these youth tend to operate largely in parallel with other activities going on in the Clubhouse. Their knowledge is not usually spread to others beyond their pre-existing peer group, and they rarely engage in any activities other than those they came to the Clubhouse intending to pursue. Coordinators often allow these youth to pursue their activities in this way precisely because these youth are both self-motivated and largely building on their own pre-existing knowledge. Coordinators typically maintain periodic contact with these youth and devote more energy to supporting young people with less knowledge in hand and fewer ideas about what activities they might want to pursue. But in instances where Coordinators encourage knowledge sharing among these youth and other Clubhouse members, these members become important leaders in their Clubhouses.

Project example. One such member interviewed was a 15-year-old girl who demonstrated enormous personal interest and motivation to learn animation, a career goal she sees herself working toward. This member had a tendency to work on a number of projects each of which she described as meeting a technical goal (e.g., how to move an figure's mouth to represent talking) and a conceptual goal (e.g., a language tutorial). This project had one of the overall highest scores of any included in this study, and was particularly strong in both the personal investment of the member in the project and the degree to which it was connected to a larger project goal. It was also an original activity motivated by external suggestion, and consisted of mostly original project elements over an underlying template. While this work was created primarily by one individual and was not a collaborative project, it nevertheless provided input into the Clubhouse community as a model for others and as an opportunity for the member to share her expertise. This member was highly motivated to learn from this project and continue pursuing her longer-term goal. She exhibited a high degree of confidence in her ability to use and expand her technical skills, and a willingness to take on challenges to pursue her goals.



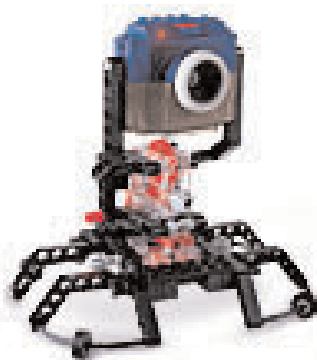
Middle

Nine projects by six members fell into this category, with cumulative scores ranging from 7 to 10. Projects in this category tended to be the result of completed, discrete activities pursued in response to either a specific personal goal (such as making an advertisement for an upcoming concert) or an external prompt (such as a Clubhouse contest, imitating a friends' recent work, or a Sparks activity). The content of the work usually reflected a topic of personal interest. A number of the projects in this group were done with family members in mind, and had very specific communicative purposes, and a clear target audience. However, unlike projects in the "high" category, though a particular audience was often in mind for youth in this category, their projects were not shaped by any reflection on or consideration of how best to connect or communicate with that audience.

The projects in this category tended to reflect a substantial amount of parallel play and little or no collaboration (except for one project, which involved building a Lego robot through a highly collaborative process). In these instances of parallel play, more than one member might have made elements of the final product, but the development and production process was individual, not collaborative. Youth in this category were able to describe challenges they encountered while completing their projects and exhibited persistence towards a goal by pursuing their projects through these challenges. These youth did not, though, generally move through a coherent independent (or collaborative) problem-solving process when facing these challenges. Typically, they sought out adults or peers to resolve the problem, or moved through a period of trial-and-error, attempting various solutions without reasoning through what they were discovering.

Who are the youth in this group? The six members whose work is represented in this category range in age from 9 to 17 (three of the six were ten years old), and one of them *is a girl*. These members tend to come to the Clubhouse without a pre-existing area of interest or goal to accomplish at the Clubhouse and they generally do not have access to relevant technologies outside of the Clubhouse. These youth do exhibit strong ties to their Clubhouse community, coming on a regular basis for extended periods of time. They see the Clubhouse as a place they want to be a part of. In particular, they speak about the Clubhouse as an important place in which they have positive peer relationships they may not experience in other settings. They also express the importance of their Clubhouse relationships as a key factor for their daily participation. This is, again, a contrast to the members in the “high” category, who may be less interested in contributing to a community and are more focused on pursuing a particular project goal.

Project examples. This image is an example of a robot created from a Lego “Mindstorms” kit and is representative of one created by a group of youth at one of the Clubhouses in this study. The project was unusual because of the high level of collaboration it involved. In the example, a 12-year-old girl described a careful collaboration process for creating the object, accounting for each member’s role in building it. She was also able to describe in detail the challenges she and other members encountered as they built their robot and how they dealt with these challenges. However, despite the high degree of collaboration that went into the creation of the Lego object, the member did not describe any personal significance of the object or any motivation to engage in other similar work, or an interest in connecting it to other goals or interests.



The image below is very similar to a Spark activity in which a young person is invited to take a digital photo of him- or herself and then modify the picture. In the example, a member built on previous experience with scanning and using Photoshop by integrating a self portrait with lightning effects.



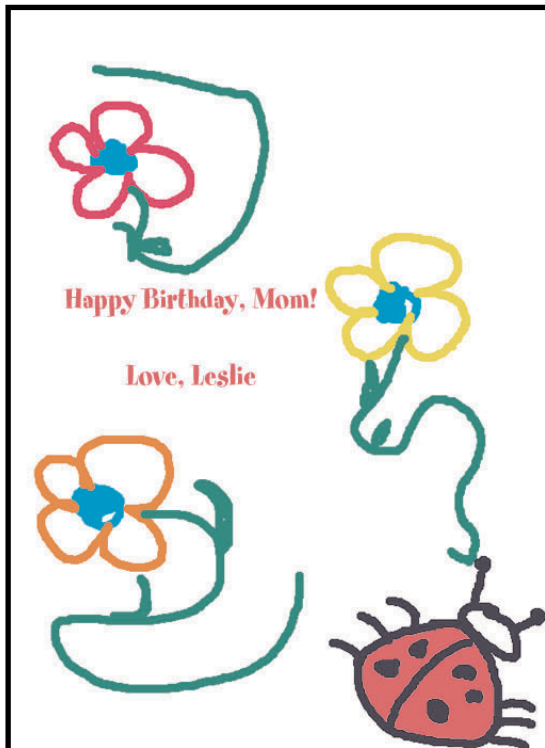
The member was given a sheet with instructions on how to import and layer images and set out to compose the project herself, although some elements of the project were created with direction from a mentor who introduced the idea to the member, and a family member who observed some of the process. Like many of the members we interviewed, this young person described her motivation for the project as interest in learning a technical skill, rather than a desire to express an idea or a perspective. Typically for projects in this category, the member was not able to identify any challenges she encountered in creating this image. Finally, while multiple effects were integrated in the final product (modifying colors in the original picture, altering the image in Photoshop to remove the background, placing the image over an alternate background) the interview revealed that the member had made only arbitrary choices about how to coordinate these effects, rather

than using them together to achieve some desired outcome.

Low

A smaller number of projects (four) scored in this category, with three of the projects receiving total scores of 5, and one a total score of 6. Youth whose work scored in this category had little personal interest in what they were doing and had generally created an image or product that was essentially a byproduct of exploring a program or kit in an undirected way. These projects were not technically complex. These youth primarily worked alone and did not connect their projects with any larger goal or idea. While some of these projects were created for an audience and some were not, there was little to no discussion about particular choices made to connect with that audience.

Who are the youth in this group? The four youth in this group range in age from 9 – 13, and three of the four are girls. As with the members in the Middle group, these members come to the Clubhouse without a particular interest or goal to accomplish.



Project examples. This card represents a fairly common Clubhouse activity. Members often create cards for relatives and friends for special occasions. Many Clubhouses use card-making practices as Sparks to get members engaged in activities. Sometimes members create cards as a way of “doodling” in an unstructured or unsupported way. This particular type of card demonstrates high personal investment, but there was little decision-making involved in the process (e.g. “I just did it because I had to do something”) and it was very similar to many other cards this member had produced over a period of weeks. This card was shared incidentally in the Clubhouse (the member showing it to friends standing near her monitor), and other cards were shared more broadly during periods when most other members were also making them (such as during holidays). This card was not connected to any larger ideas or goals this

member had, or related to either personal expression or developing further technical skills. This member did not identify any challenges or problems encountered in the process of creating this card.

The image below represents an example of a still from an animated sequence. The work had only incidental personal relevance to the member who created it, and is similar to other kinds of work members at this Clubhouse tended to create. This member created this image during a period of parallel play (other, nearby members were working on very similar tasks, and ideas and actions were being shared informally as they unfolded), but not in collaboration with other members.



In making this image, the member was most concerned with the technical aspects of the work. Almost all of the elements were personally created with the help of a mentor who suggested and guided the creation of the image. This project was not connected to any preexisting or ongoing area of investigation, and was created in a single period of activity. When finished it was casually shared in the Clubhouse. The creator was not able to identify any particular challenges encountered while creating the image. The project does display multiple technical effects (the member drew and shaded the objects, and then animated them).

Common themes

The member projects included in this study represent one portion of the entire range of activity that we observed taking place in the Computer Clubhouses. Despite the varying levels of engagement with the project goals that they display, these projects are all more focused on design-based learning than much of the activity we observed in each Clubhouse as a whole.

Although the four sites included in this study vary widely in their structure, tone, population and community context, in each case the majority of youth, the majority of the time, are engaged in passing activities that do not require sustained attention or effort on the part of members. In some cases this work is of value relative to the program goals, as when a young person is reviewing what they have learned so far about how to use a piece of software. In other cases it is relatively value-neutral with respect to the program goals, as when a young person is working on his or her homework. And at other times the activity runs contrary to the program goals, as when young people play computer games, chat over the Internet, or engage in conflictual social behavior among themselves. We observed all of these activities in each of the Clubhouses, in widely varying combinations both across sites and within sites from day to day.

These findings suggest the many pathways that a Computer Clubhouse member can follow from an initial area of interest or period of open-ended exploration. From any starting point, the possibility

exists that a young person may begin to uncover a topic of interest, tackle a design challenge that stimulates his or her thinking, or tell compelling stories through music or images. However, the possibility also exists that this same young person, for any of a number of reasons, may not move on from that initial activity in any productive way. A member may lose interest in the topic, be intimidated by challenges encountered, or be unwilling to take the social risks inherent in seeking out collaborators to learn from and share ideas with.

The success of the Intel Computer Clubhouse Network depends on the ability of Clubhouse coordinators, mentors, and members to maximize the likelihood that every Computer Clubhouse member will find a pathway from their personal starting point toward sustained design-based project work and engagement with the program goals. Our research suggests that the most important factor determining whether those youth can find those pathways is the clarity and consistency of the Coordinator's understanding of the program goals, and the Coordinator's ability to create a culture of practice within their Clubhouse that is focused on those goals. The conclusion of this report suggests some more specific practices that our research suggests are particularly important parts of this process.

SECTION V. CONCLUSIONS

[Kids at the Clubhouse] are just fun to be around and hang with ... because everybody knows different things here and so you can always go to one different person and learn something new that you didn't already know on the computer.

–Female Clubhouse member, age 17

Our findings show that young people with a range of technical abilities and interests are able to develop projects that are compatible with the program goals of the Intel Computer Clubhouse Network. Youth that come to Clubhouses with some personal knowledge and interest in technology are better able to engage in sustained design-based activity across a range of Clubhouses at varying stages of program development than those youth that come to Clubhouses without particular interests or knowledge in hand. In addition to prior knowledge and interest, members also bring their developmental maturity into the Clubhouse with them, and this is also reflected in our findings. In an environment where they are encouraged to do so, older youth are generally better prepared to engage in more higher order program goals, such as problem solving, than are younger members.

The odds that younger and older members alike, who come into Clubhouses without pre-existing knowledge and interests, will engage with the program goals and develop their abilities in these areas over time, are substantially increased when the culture of Clubhouses are informed by the following:

Coordinator expertise with design-based learning.

The role of the Clubhouse Coordinator remains crucial for setting the tone for how young people engage in design-based activities in Clubhouses. Our work with Coordinators across the Intel Computer Clubhouse Network has continued to confirm a shared commitment to the challenging work this program requires of them. Coordinators bring a range of expertise, experience, and commitment to their work that supports young people's day-to-day participation in Clubhouses. However, when a Coordinator's expertise is informed by an understanding of how youth are able to gain new knowledge through an open-ended engagement with a range of design technologies, the young people they encounter are more likely to be involved in the kinds of activities that reflect the program goals.

Pathways for youth development towards program goals.

Youth from wide backgrounds and with different interests, ages and abilities come to Computer Clubhouses to engage with a range of technologies. Although all youth are able to engage in the kinds of activities that reflect the program goals, there are many different ways for them to do so. Providing clear pathways that illustrate how youth with many abilities can achieve the program goals is important both for the development of young people who come to Clubhouses, but also for the professional growth of the Coordinators and mentors who work to support their engagement.

The importance of audience in relation to youth engagement.

While the Clubhouse model places strong emphasis on the importance of young people's personal expression, there is an expectation that youth should, over time, gain greater ability to engage with a larger community. While exploring their personal interests, Clubhouse members need also to develop the communicative capacity to share their ideas and engage in the world around them. Our work showed that those members who were aware of communicating with an audience created work that reflected more complex and sustained project work. Having an audience to communicate with tended to reflect greater motivation and sustained commitment to an idea over time.

Youth leadership in Clubhouses and local communities.

Youth who are encouraged to develop leadership potential exhibit strong connections to the Clubhouses, including an interest in learning from and sharing ideas with others. These youth can be encouraged to understand how their engagement in Clubhouse practices connects with their larger communities. When young people are inspired through their Clubhouse experience to think broadly about using their interests and skills to address larger goals, and are given the opportunity to respond concretely to what they see and experience in the world around them, they are truly acting as designers and as active members of their communities.

SECTION VI. RECOMMENDATIONS

This report has consistently stressed two points: the inter-relationship between Coordinators' ability to provide effective leadership and support for their members and increasing the level of clarity and focus on program goals throughout the Network, and the need to provide members with multiple pathways into the process of developing initial areas of interest and moving into sustained investigations of the technical, expressive, and communicative challenges of design, across a wide range of media.

Our Year Two evaluation efforts have produced a rubric that provides concrete criteria and framework for organizing conversations within and across Clubhouses about what kinds of work and work processes constitute meaningful evidence of youth engagement with the program goals. We also demonstrated the relative strengths and weaknesses, relative to the program goals, of a sample of youth projects, and discussed how those projects were influenced by the age, prior experience, and interests of the youth who made them, as well as by specific qualities of the Clubhouses themselves.

During Year 3 of this evaluation our efforts will be devoted to developing diagnostic tools based on this rubric, which Coordinators can use to understand how youth are developing their abilities in relation to the program goals and, perhaps more importantly, in relation to the existing activities and typical practices within a particular Clubhouse. We expect these instruments will also help Coordinators reflect on how they might best focus their support in order to help members develop relative to the program goals.

The following recommendations are made with an eye to a new phase of capacity building across the Intel Computer Clubhouse Network that is already underway.

Build content and resources to help Computer Coordinators move beyond the “Sparks” stage with their members.

- Create program curricula and guiding frameworks that directly address two key challenges of implementing this learning model. Creating a fully mature Computer Clubhouse requires balancing open-ended exploration with guidance toward certain kinds of activities and supporting sustained development and growth, over time, for both the individual member and the Clubhouse itself. Our research shows that Coordinators are seeking guidance in addressing both of these challenges. Creating these materials is crucial to ensuring consistent and substantive program quality across the Network, although they must also allow for local adaptation.
- Promote media literacy. Youth working in the Clubhouses are largely engaged with a range of visual media. A focus on consuming images (as opposed to producing original work) can be a significant impediment to engaging in design-based activity. While exploring these media is a valid part of the Clubhouse experience, it is important that youth have the opportunity to develop their capacities to evaluate and critique this information.

- Recognize the need for developmentally appropriate materials. Age, prior experience, and interest all impact the degree to which youth can engage with the program goals. Younger members are able to create design-based projects, but they will do so at a different pace and level than older youth.

Build and sustain networks, both geographical and topical

- Coordinators need ongoing opportunities to share their ideas, learn new strategies, and renew their knowledge. They need opportunities to learn, through direct experience, what it means to engage young people with the program goals.
- Identify Coordinators who exhibit, through leadership and engagement, approaches to supporting youth in design-based activity that reflect the program goals. Develop their leadership potential across the Intel Computer Clubhouse Network.

Prepare for sustainability.

- Build conceptual clarity across the Intel Computer Clubhouse Network, including among Intel site coordinators, so that there is a shared understanding of what the program goals mean. This will require sustained conversations rooted in concrete evidence (samples of member work, shared informal observations in Clubhouses, peer coaching among Coordinators) and exploration of other program models and how they have supported youth in similar areas.
- Establish systemic mechanisms for ongoing program documentation and provide supports to help sites conduct local evaluations. The key priority is to establish reliable mechanisms for documenting youth participation (both the number of youth and frequency and duration of attendance).
- Forge strategic partnerships with universities that can provide local and regional support to Clubhouses.

SECTION VII. APPENDICES

APPENDIX A:

Member Interview Protocol

This is a detailed protocol for one-on-one interviews with members, plus staff in some instances, if appropriate. Consideration should also be given to conducting protocol with small groups of members as well.

Preconditions

CCT staff, young person, and coordinator/mentor if appropriate, are sitting together, focused on this task, not moving in and out of the conversation to do other things.

Young person has picked out, prior to this conversation, at least one piece of work to share with CCT staff, and the work is at hand.

Introduction

Explain (even if you did to the group previously) who we are, why we're visiting, and that we're interested in learning more about the kinds of things young people make when they're at Computer Clubhouses.

Note name of coordinator or mentor if present: _____

Background

How old are you?

What grade are you in? (if in school – if not, do you work, etc.)

Do you have a computer at home that you use? What do you use it for?

How long have you been coming to the Computer Clubhouse? Do you remember the first time you came? Why did you decide to come that time?

After the first time you came, why did you decide to come back?

How often do you come to the Clubhouse these days? How do you decide when to come/how often to come?

Are there certain people you usually come with? (Has this changed over time?)

How would you describe who comes to the Clubhouse? What do they mostly come here to do?

Discussion of work and Clubhouse experience

We understand that you've picked out something that you've made to share with us. Why don't you tell us something about this piece?

If the young person is able to start talking about the work, in whatever way (explaining what it is, explaining how they made it, etc.), go with that and then fill in with the questions below. If they don't have much to say, start using these questions.

Creative process

First, why don't you describe what it is.

Can you tell us a little bit about how you made this?

Okay, now let's start at the beginning. Tell us about how you started making this.

How did you get the idea? (* Here, get at both technical issues – How did you figure out how to make it? – and conceptual issues – How did you decide what you wanted to represent? Whichever one they focus on first, pursue that, then ask about the other.)

How did you decide what to do next? Did you already know how to do that, or did you have to figure that out? How did you learn how to make that work?

What was something that you had to learn to do in order to make this?

What was hard about doing this?

What else would you like to do with this project? Are there things you would like to do to make it different? Are there other directions you'd like to go with the same ideas?

What do you think is interesting about what you've made? Why might someone else be interested in looking at what you've done here?

(Say this question as an aside, since it doesn't flow very well – or, ask it elsewhere if you see a better place.) What other things (software, etc.) have you used in the Clubhouse (besides the tools they used to make the piece being discussed)? Are there things that people do here that you are interested in learning how to do? (Get a sense of how aware they are of the range of materials available to them.)

THINGS TO LISTEN FOR, PROBE FOR:

Resourcefulness – how do they decide what tool to use? Where do they go to identify tools, locate them, find how to use them to meet a need? Do they adjust the task to meet the tool or vice versa, or both? Probe for examples of this.

Expressiveness

Would you say that this piece of work expresses something that's important to you?

If yes: what does it express? Does it surprise you that you've made something that expresses that idea/feeling?

If no: Does that matter to you? (Get at: *Were they trying to express something and feel it didn't work, or were they not engaged with the idea of personal expression? Need to probe here as they may be tentative about this.*)

If no: How else might you use the tools and ideas you've used here to express something that is important to you? (Brainstorm this with them if you can.)

If no: What are some other things that you do that are important to you (sports, writing, singing)? Can you think of ways that you might draw on that interest in the things that you make here?

Collaboration, community, working in teams

When you're making things here, do you usually do that by yourself? (If with other people, who? Does it vary?)

Who do you ask for help when you need help? Who helps you to come up with new ideas or ways to do things? Can you think of an example?

Can you think of a time when someone at the Clubhouse asked you for help? Tell us about that. What did you do?

Who in the Clubhouse knows a lot about how to do things here? What do they know? How do you think they learned that? Would you ask (this person) for help? Why/why not?

What makes it hard to ask for help or to ask someone to help you come up with new ideas?

Seeing self as a designer of technology

What was the most surprising thing you ever saw someone make here at the Clubhouse? Have you ever seen someone make something, or make something happen, that you had never seen before?

We want you to imagine something with us. Can you imagine making a piece of technology, or changing how things like computers work so that you could do something you can't do now? (If necessary draw on something they've said to illustrate this). What do you wish you could do with a computer or some other kind of technology here at the Clubhouse? Do you think you could figure out how to make a new kind of technology that did that thing? (If you get anything here, follow up on it: brainstorm with them how they might design such a thing, who might help them?)

Perception of self/Clubhouse

Think about a typical day when you've been in the Clubhouse and been working on a project – maybe this piece of work we've been talking about. Can you describe how you feel when you're working here? Is it exciting? Boring? How is it similar to or different from other things that you do (being at school, working at a job, playing on the computer at home)? What do you think makes this place different from those other places?

What would you like to see change about this Clubhouse? What would you like to see stay the same – what's most important to you about it?

Is there anything else you'd like to tell us about or show us?

Thank you so much for talking with us.

APPENDIX B:

Scoring rubric for member work

GOAL 1: ABILITY TO EXPRESS ONESELF WITH TECHNOLOGY

	Content How personally invested is the member in the style of the piece?	Form What drove choice of project type (form, genre)?	Structure How open-ended were the tools used?	Identification Does member identify self as a creator?
1	No, or minor, personal relevance/connection to the content or style being explored.	Copied activity. Project is identical or almost identical to others in the Clubhouse in form. Youth may add one formal element that is personally distinguishing.	Project consists entirely, or almost entirely, of prefab elements (such as clip art), or a filled-in template. Pre-made materials may be modified or repositioned. Little or no personal choice is reflected in choice or use of project elements.	Youth describes self as a passive learner or passive executor of tasks. Or, youth expresses interest in learning a skill but not in creating an original expression. Project is focused on mastering technical skill, no connection to an expressive goal.
2	There is an explicit personal connection to the content or style being explored, but it was chosen for convenience.	Project follows established pathways (i.e., Sparks) but form reflects individual ideas about audience or purpose that enlarge on the original notion.	Project uses combination of original and prefab elements. Prefab parts are placed, contextualized, elaborated on with clear personal choices.	Youth focuses on self as technical learner, but ties what she/he is learning to ideas about inventing or creating something personally meaningful. No clear focus on communicating with others through the product.
3	There is an explicit personal investment in topic or style. Evidence of sustained exploration of content, or refinement of style, across multiple projects.	Original activity. Genre or form is innovative, particularly in relation to other current local Clubhouse activity. Project form reflects personal interests and ideas.	Project elements are all or almost all made or selected by youth. All elements contribute to a personal expression (this can include projects with an underlying template or some prefab elements). Project may synthesize elements from multiple platforms, or use tools in innovative ways.	Youth focuses on self as creator, inventor, investigator. Youth may have a larger agenda that is met or exceeded through the execution of this particular project.

GOAL 2: ABILITY TO COLLABORATE, WORK IN TEAMS AND CONTRIBUTE TO THE COMMUNITY

	Composition of project Who made the parts of the whole?	Degree of collaboration How was the whole put together?	Connection to larger community How is the project shared, how does it contribute to others in or out of the Clubhouse?	Roles How much teaching or or being taught is represented in the project?
1	One youth. Another young person or adult may have had minimal input.	No collaboration, but some parallel play may occur, such as youth doing a similar activity, working side-by-side, and sharing ideas.(Sharing may be explicitly promoted by coordinator or be a consequence of members working on similar types of projects.)	Others are not aware of the project or are aware of it only in passing. It is not viewed publicly, or shared or used in other ways.	Youth may have received some specific piece of instruction from others (members or mentors) in relation to some piece of the project.
2	Multiple youth or adults contributed parts that they created independently.	Ideas and suggestions that substantially influence the project are shared through parallel play, but projects remain individual. Sharing of ideas and suggestions is spontaneous and sporadic.	Project is displayed; collected for future reference, and/or shared with others.	More than one project element exists due to interaction with or instruction from others.
3	Most or all components are conceived of and created jointly.	Most or all elements of the project are created through negotiation, shared construction. The process of creating the project involves sustained communication and the integration of multiple viewpoints.	Project provides, or intends to provide input into the community. Project may be part of a larger whole, or undertaken by a larger community.	Multiple projects elements were created through interaction that taught one or more contributor something new. Project may produce significant new knowledge for one or more contributors.

GOAL 3: BUILDING SELF-ESTEEM AND SELF-EFFICACY

	Confidence in skills How does the young person view their ability to learn and use technical skills?	Pride in Product How does the young person view what they made and its purpose? (Emphasis is on communication with audience and continued revision, not on “success” or completion.)	Investment in process How does the young person understand and value the process of creating the product?
1	Primarily views his/herself as passive learner who needs to be guided in use of the technology. May acknowledge avoiding tasks that would require learning new skills. May make some attempts to learn independently or to seek out assistance, but prefers to have others take over unfamiliar tasks.	Neutral about the project, or may identify positive qualities but does not express further interest in how it is received or responded to.	Neutral about the process, or little or no reference to process. Does not identify any personally valuable aspects of process.
2	Feels mastery over a procedure, a set of rules, is confident within those boundaries (“There’s one way to do it, and I can do that.”)	Is interested in, receptive to response to the project by others. Is discovering the communicative dimension of the project.	Can explain process with some detail, may reference valuable aspects of it. Product is primary.
3	Is comfortable drawing on multiple skills. Shows signs of being a flexible learner, seeing technical skills as a toolkit that can be expanded to meet his/her needs (may be developing this ability, not fully mastered yet). May be recognized in the Clubhouse as an expert regarding particular skills and be invested in teaching others what he/she knows.	Identifies audience, is focused on creating work for/sharing work with that audience, is able to elaborate on the purpose of work.	Describes process and identifies valuable aspects of it. May describe process as opportunity for growth, connect aspects of process to personal development (gaining skills, learning from others).

GOAL 4: ABILITY TO SOLVE COMPLEX PROBLEMS

	Identification What challenges does the young person identify in the work process?	Response How does the young person describe the process of solving challenges encountered?	Tools How does the young person match the tools available to the problem at hand?	Outcome How technically complex is the final product or problem solution?
1	Does not identify any challenges associated with the project, or references one problem area but does not reflect on it or describe solution.	Describes problem solution as happening by chance, or gives procedural explanation of problem-solving technique ("I did 'edit' and 'paste' and it worked.")	No recognition of choice in tools (e.g., only aware of one type of software).	Single effect is used (e.g., pasting clip art pictures), or multiple effects are used but are not integrated.
2	Describes one or more challenges involved in the project and how it/they were addressed	Describes some process of problem-solving (trial and error, planning an approach).	Identifies one or more qualities of the tools/resources used that were appropriate to the task at hand, and/or references other tools/resources he/she not to use and explains the choice.	Integrated effects (e.g., image & sound), although coordination may not be completely thought through (clip art and drawn images create a generally cohesive picture).
3	Describes one or more challenges involved in the project and how it/they were solved. Evaluates the solutions reached or attempted, articulating strengths and weaknesses of the outcome.	Describes problem-solving process and identifies benefits and drawbacks of the method(s) used to solve problems. Acknowledges the approach he/she took to the problem as one among multiple possible strategies.	Describes tools and resources sought out and/or used, identifies benefits and drawbacks of choices made.	Integrated effects with reasoned, clear relationships among them, and/or layering of effects (picture makes use of multiple drawing tools and animation to create a coherent whole).

GOAL 5: ABILITY TO DEVELOP, PLAN, AND EXECUTE COMPLEX PROJECTS

Goal-setting	Planning & Persistence	Resourcefulness	
1	Pursuing the activity at hand is perceived as the goal in itself. There is no larger conceptual context	The project is a single attempt, there is no follow-up (and the project itself is not a follow-up to other, prior work). Or, project is one in a series of pieces of work with little or no variation across them (e.g., scanned photographs modified in PhotoShop).	How creative is the young person in bringing together the resources needed to pursue/achieve his/her goal(s)? References no resources or one resource (other people, information, tools) that influenced project.
2	Identifies some larger goal that is partially expressed by the project. Discusses the project in terms of the conceptual goal.	Project is part of a persistent attempt to work toward a goal. Tactical or strategic planning for improvement is absent or sporadic.	Identifies more than one resource that influenced project and what those resources contributed to the work.
3	Discusses the conceptual goal apart from specific project, and is able to explain other possible directions, outcomes for further work.	Project is the result of (or is part of) a process of systematic planning, testing and redesign. Young person has moved through a process with a clear strategy and clear goals.	Able to identify and connect with a range of resources to meet different aspects of project goals. Resources may be other people, tools, or information. Able to discuss their choices, explain why they sought out those resources and whether they were useful.
