Formal and Informal Processes
in the Production of the Tech Challenge

“Can your team create a Mars Lander that can climb out of a crater? Can your team build a device agile enough to scale the vertical wall of this mysterious hole?”

With this prompt hundreds of students from around the Bay area begin designing and building robots that can accomplish the job. This buzz of activity is born out of the Tech Challenge, a yearly event designed to “inspire the innovator in everyone.” Each year the Technology Museum of Innovation plans and organizes this experience, culminating in the Tech Challenge competition in April. Much effort goes into the design and testing of the robots, but how does the staff at the Tech make it all happen?

The Tech Challenge is the most visible and highly attended program at the Tech - celebrating its fourteenth anniversary this year. Through repetition, iteration and experience the formal process involved in running the event is almost down to a routine. However, the people who follow the process have a significant effect on what gets done, including when and how it gets done. This informal process cannot be ignored when reviewing the steps from inception to implementation. An organization is the meeting of two sources of structure: the designed structure of the institution and the emergent structure of practice. (Wenger) While the formal process for running the Tech Challenge stays much the same from year to year, the informal process is in constant flux.

The Challenge requires many hours of work from multiple departments within the Tech, however, primary responsibility lies within Galleries and Programs (see organizational chart). *Marilyn Davies, the VP of Galleries and Programs directs the Tech challenge and oversees all work associated with it. Throughout the process she is assisted by her staff, other departments and outside volunteer advisors. According to the official organizational chart, working under Marilyn are three program staff positions: the public program manager, family program manager and the science/technology program manager. The majority of work associated with the Tech Challenge falls to the science/technology program manager – a position that has remained unfilled for over a year. In fact two of the three programs positions under the VP of Galleries and Programs were unfilled at the start of planning for the 2001 Tech Challenge. This problem illustrates one of the main obstacles to the completion of projects and work at the Tech – lack of personnel resources.

The location of the Technology museum within the Silicon Valley provides both benefits and drawbacks. While there is wide public support for the museum they have difficulty filling their staff positions. The museum is unable to pay competitive salaries in order to
compete with the high-tech firms in the area and is constantly losing workers to higher paying jobs. This staff shortage creates a system where job titles have little meaning. As the VP of Galleries and Programs states, “That’s the way we get things done around here, we just all do what we have to do. We all chip in.” In the absence of the science/technology and public program manager positions the work shifted to the family programs manager. This manager, Jill*, was asked by Marilyn to add the Tech challenge to her list of duties and begin the planning process. No change in the formal structure has taken place to account for the multitude of empty desks at the Tech. The organizational structure remains the same but the informal practices show the results of the absence of workers, with many employees now covering the work under two job titles.

The formal process chart for the Tech challenge lists the project cycle as beginning in July with a required meeting of all organizers. At this meeting the involved parties go over the evaluation summary from the last event and target any areas for improvement. The evaluation summary is a compilation and interpretation of the forms filled out by participants, parents and mentors at the previous Tech Challenge. *Jackie, Evaluation manager at the Tech, prepares the report each year and presents it at the July meeting. This year, however, Jackie was on extended leave for the month of July, and with her assistant position unfilled, the report was not ready when the planning began. Jill designed the challenge and created the brochure without the help of the evaluation summary.

The finished brochure design was presented at a meeting in the beginning of September. At this same meeting the evaluation summary was presented to Marilyn, Jill, community volunteers (experts in the area of robotics, engineering and technology) and myself. The design was iterated and problems with the diagrams, wording and rules were discussed. At the end of the one and a half hour meeting, all aspects of the official rules and instructions were reviewed. The evaluation summary was also discussed and while it was too late for certain items to be changed, the team did take action on other concerns, for example, adding more categories of winners and prizes to the competition. The outside (non-Tech employee) team members contributed greatly to the design process with their expertise. In a matter of an hour and a half they had carefully gone over much of the plan, found significant errors, corrected them and laid out the basic plan for the event. According to each member of the Tech staff I spoke to, the outside contributors greatly add to the strength of the programs offered at the Tech. As Marilyn stated, “We get amazing input and consultation from our volunteers, some of the sharpest minds in the area - for free!” Instead of having to keep a number of workers knowledgeable in the area of robotics and engineering design on staff for the Tech challenge, the museum looks to the community to support their programs with their expertise. This design decision reflects a realization that knowledge lies in people not in databases, as Brown and Duguid discuss in The Social Life of Information. While the Tech cannot keep these knowledgeable people on staff, they can bring them in to help with technical design issues and decisions. In order to design an effective program the museum takes the networks and rich social connections of the Silicon Valley into account and makes them part of the formal design process.
However, there are also drawbacks associated with having such a collaborative design process. Leaving the meeting Jill shared with me her stress over having to meet with the outside experts. She stated that they often get caught up in the minutia, such as what color the carpet should be and which Tech logo to put on the T-shirts. She mentioned that, “everyone has an opinion and often they do not respect our positions or the work that has already been done.” Additionally, she told me that she takes several phone calls a day from volunteers wanting to go over the detail in the plan. She expressed to me that she often felt that this interfered with her other work and created a problem in completing her job goals. According to Jill, the VP of Programs exacerbates the problem by continually forwarding e-mails and asking Jill to make insignificant changes proposed by the volunteers. “She just doesn’t know when to stop, and I feel like she does not have respect for my position or the work that I do.”

Once the brochure was complete and the event description had been sent to schools, the project went into remission for a few months. According to the formal schedule Jill was in charge of scheduling the locations, speakers and organizing the auxiliary events surrounding the Challenge. Jill reported to Marilyn that all tasks had been accomplished and that only minor details remained. It was important that all plans be in place by the end of October, because Jill was scheduled to go on maternity leave at that time. Two weeks before Jill’s departure, Marilyn scheduled an offsite powwow with all of her managers in order to discuss the division of duties and prepare for Jill’s six-week absence. At this meeting, a hired facilitator helped to negotiate a division of duties. In the end it was decided that Marilyn would take on responsibility for Jill’s work and that the other managers: Lily, from public programs, Gwen, from performance programs, and Sonja, the director of gallery experiences, would all chip in to help when needed.

The planning for the Challenge hit a critical point in early December. A meeting was scheduled for all partners to discuss the final preparations and details surrounding the upcoming coaches and informational clinics in advance of the Tech Challenge. Marilyn, who took on all of Jill’s responsibilities was in Russia on vacation and unavailable to attend the meetings. In her place she assigned Lily to attend. Lily describes the situation as “difficult at best”. Lily, hired as manager of public programs in October, had no experience with the challenge and had to meet with all the managers of different departments within the Tech. She states that she had little knowledge of the project, but was handed the reins at the last minute. At the meeting, where the progress of the event was discussed, other departments, based on knowledge of previous competitions, interjected their opinions and ideas about what needed to get done. Lily referred to this as “interference”. She states that they were more than willing to criticize and tell her what she needed to do, but did not offer any help in completing the work. She felt that she was “under siege” and had to drop her other duties in order to complete the myriad of new tasks that came out of the meeting. One of the tasks – sending out a “Tech Call” asking for volunteers to staff the coaches’ clinic was met with sarcasm and angry responses asking why it hadn’t been sent out earlier. Another task took her and her assistant most of a week to complete and ended up not being needed. She told me that she thought that moment was a clear example of the difference between the stated workflow and philosophy and what actually occurred. While the Tech professes an
attitude of working together to accomplish tasks, Lily and others describe it more like “other people trying to tell you how to do your job.”

With Marilyn out of town, the responsibility now fell to Lily to run the pre-challenge events including the coaches and informational clinics. She said it was a difficult task because the departments within the Tech stay somewhat isolated and the other managers did not know that the challenge originally fit under Jill’s job description with Marilyn taking on the responsibility and Lily now filling in. “The way things are around here is that Marilyn likes to keep control. She does not give clear instructions and she doesn’t like to let go. Really, she feels like no-one can do it as well as she can and so she tries to do it all, but she doesn’t have the practical abilities to make the events happen and has to rely on me at the last minute to get the work done.” Several other employees corroborated this account, agreeing that Marilyn likes to keep information and control for herself making it difficult to take on responsibility and new tasks.

From the beginning many in the office have guessed that Jill would not return from maternity leave. What started as a six-week leave has grown into 12 weeks and the Tech challenge looms in the near future. Lily, the public programs manager, has taken on more and more responsibility for the project. She mentions that the “Pitch in and Help” attitude discussed at the offsite meeting did not live beyond the first weeks of Jill’s absence. The director of gallery experiences is too busy to contribute time to the Tech Challenge and the performance program manager is quick to say that it is not in her job description. While the Tech advertises the philosophy of collaboration and working together to get the job done, in reality the collaboration is limited. Lily states that, “we have different working styles. There are others here who can say clearly, I am not going to do it because I have my own work. I just can’t do that and so the workload gets dumped on me. When I interviewed for this position they did not tell me about this shifting of work and the vacant positions, truly, if they want me to stay, Marilyn is going to need to rethink the work practices of this department.”

With a planned event for the deliverable there is no turning back on the project. According to Marilyn there is no problem with getting the Challenge pulled together and ready to go. She tells me that she is taking up the duties that are left and is having no trouble pulling it all together. In her version of events, she has easily folded the responsibilities of the family programs manager into her own and there has been little trouble covering all the tasks. Obviously, I hear a much different story from Lily and the other program managers. While Marilyn tells me that job titles mean little to the people in her department, they speak of being confused by the lack of clarity in their assignments, of being hired for one position but being asked to do another, and of being given tasks at the last minute and expected to deliver on demand. Lily tells me that Jill is not coming back – period, but that Marilyn refuses to face the reality of the situation. Jill has sent three e-mails announcing her resignation, but each time Marilyn returns it offering to let her return at a later date. According to Lily, Marilyn, “has great ideas and is really creative, but doesn’t have a clue about how things actually get done. When you tell her all the different pieces that are part of the process and how much time it will take
to complete them, she just doesn’t hear. Her view of reality and ours (managers who work under her) is very different.”

In the end it is the practice of the people who work in the organization that brings process to life, and indeed, life to the process. (Brown & Duguid) The informal structure that is currently in place for the completion of the 2001 Tech Challenge is slowly draining the life out of the department. While all the employees I interviewed stated that they enjoy their jobs, they feel that the pressure grows daily and they may not survive the lack of personnel and be forced to leave. Lily expressed to me her concern about her ability to complete the projects associated with her job title. Additionally, she told me that much of what she has planned and put in place relies upon an unfilled assistant position. “They are offering less than what a teacher makes, and so I am really concerned that they are not going to be able to fill it. With the economy cooling off maybe we can find someone – but the electric bill at the Tech may force them to cut the position all together. If that happens there is no way to reach my job goals.”

What is occurring within the Galleries and Programs department is a juggling act. With so much of what is produced in presentation form the projects must be finished; they cannot be put on hold until positions are filled. The work transfers around the department from one worker to the next in order to complete the project. From my observations the department has clear job titles, organizational plans and projects in place. However, the limited resources in terms of personnel create an informal workflow that is far less precise and puts unreasonable demands upon the employees. The upper management that I interviewed did not acknowledge the workflow problem and in the end may be contributing to their difficulty retaining employees.

*Names are pseudonyms.*