Art and Innovation @ Xerox PARC

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Abstract

Can artists and scientists work together to produce creative art and new scientific innovation? This is a report based on the Book "Art and Innovation, the Xerox PARC Artist-In-Residence Program". The book documents the program at PARC that is aimed at producing innovation in new digital media by pairing artists with scientists. The aim of this paper is to understand how the project was organized, to learn concrete examples of results of the pairings, and ultimately to reflect on the meaning of Art @ Science for the design of future digital media.

1 INTRODUCTION

Innovation is the core activity of many organizations in corporations and Universities but also in hybrid organizations like research institutes. Nevertheless it is still not clear which ingredients and recipe leads to innovation. Moreover, looking back just few decades ago one realizes that the best ingredients and recipe probably change overtime. Xerox built the Palo Alto Research Center (PARC) in what was to become Silicon Valley having in mind a particular recipe: put creative people in a hot house setting, innovation will naturally emerge. The aim was to nurture and cultivate innovation through not only multidisciplinary but also interdisciplinary research. Such a type of research should distinguish itself from the highly focused research in University Departments or in ventured capitalist funded startups. Such an in-house innovation center has the advantage of having immediate effect on the company itself compared to methods relying on outside innovators. Two major objectives arise from such an enterprise: how to keep the hothouse fertile and how to keep the research aligned with the needs of the company.

The PAIR program –the PARC Artist-in-Residence program- was designed to respond to these objectives. The PAIR program invites artists who use new media into PARC and pairs them with scientist that are researching with the same media. The artists are expected to revitalize the research bringing new ideas and perspectives. The cross-
fertilization is also expected to deliver interesting art and new scientific innovations. PAIR also helps PARC in keeping the research relevant to the company. In fact, what artists fundamentally make are documents, particularly new forms and genres of them. Artists discover new kinds of documents, new uses for the documents, and Xerox is after all The Document Company. The documents in the future will be different from the existing one. The path that leads to the future documents is a co-evolution of technology, social structure and design. PAIR is helping PARC in jumping in the future to see how documents could be like. The aesthetic and the technology to express or create these are tightly intertwined. They probably best develop simultaneously.

Can we achieve innovation by combining art and science? In the mid-1940s C.P. Snow observed the existence of a dichotomy in our society between artists and scientists. He feared that these two groups were not communicating with each other creating language, educational, and social infrastructures that augmented the distance between them. Snow suggests that the "clashing point" of two subjects, cultures, disciplines, "ought to produce creative chances", and that "in the history of mental activity that has been where some of the breakthrough came. Moreover, he criticizes the "fanatical belief in educational specialisation" and suggests more comprehensive and integrated approach to education.

Nowadays these thoughts find proof in the activities of scientists and artists working with new digital media. Recent development in digital media technology are changing our work practices and ways of communicating, while a large group of artists around the world is working with the same digital media developing creative approaches to science. New media infiltrated art academies and music conservatories as technology evolved and as artists directed their attention to the potential offered by the new digital media. As a result, many trained people in various aspects of fine arts are participating into scientific communities as programmers, designers, and user of sophisticated systems designed to develop and implement new media resources. On the other hand, many people trained in the sciences are intersecting in their research with art, communication and creativity.

Chapter 2 introduces the PAIR Program describing its organization and processes. Chapter 3 describes the physical place at PARC that hosts the artists. Chapter 4 describes five stories of artists paired with scientists within the PAIR program.

2 PAIR: The Xerox PARC artist in residence program

2.1 The Advisory Panels

The process of the PAIR program started in 1993, and comprehended a conceptualization and design, the selection of the artists and scientists pairs, and implementing and guiding the programs. The final success of the project depends on the involvement of the various scientists and research groups. The director of PAIR, Rich Gold, organized two Advisory Panels to monitor the program and guarantee the project relevance to the organization at PARC.
A group of interested scientists willing to participate as a guiding and evaluating body formed the PAIRCORE the PAIR Internal Advisory Panel (IAP). PAIRCORE is comprised of representatives from several research groups within PARC and facilitates the artist-scientist pairings. The main functions are to initiate the process and monitor and evaluate the progress of PAIR in PARC.

The second Panel was the PAIR External Advisory Panel (EAP), which comprised an independent curator and representatives of established traditional and non-traditional art galleries and new media arts organizations. The objectives of the EAP are to bring diverse perspectives to the discussion about how artists, use new media, how artist-in-residence programs should be designed, and how participants should be selected. EAP members concentrated their efforts in discussing how to the design such an artist-in-residence program in a research environment, how to define and balance technological sophistication and artistic relevance, and how to facilitate the intersection of PAIR with the Bay Area multicultural artists community. Other issues were the ownership of creative artifacts and scientific discoveries, or how to acknowledge the benefits from knowledge and creativity and experience of artists. A list was made with basic selection criteria, including cultural and gender diversity, artistic variety and identification of appropriate and willing scientists at PARC. Each EAP member brought recommendations and work samples of two artists. The members viewed a large variety of artwork employing new media.

2.2 The PAIR Organization

The PAIR program started with two categories of artist-in-residence: long term and short term, to facilitate the pairings and raise the interests in the facility. The aim was also to provide the opportunity to explore the potential in specific pairings before making a longer-term commitment. It also became clear that the true value in the PAIR program was in the opportunities for artists and scientists to interact in a longer-term relationship. PAIR artists were not hired full-time at PARC. On one hand offering a full time position to artists would have establish their parity with the scientists, but on the other there was the fear of loosing something by taking the artists out of the domain of practicing their art. The concern was that this might have turned them into researchers. PAIR recognized the importance of establishing promising pairings and more important recognized the freedom to the participants to set their own challenges and projects.

The Book "Art and Innovation, the Xerox PARC Artist-In-Residence Program", is part of the documentation that followed the project's evolution. The book summarizes nearly four years of data about aspects of the collaboration. The documentation gives an understanding of the impact of the program in the company and builds the premises to explore directions of development. The documentation goes beyond a tabulation of art and research result to provide insights into the cultural setting and reflect on the nature of the collaboration. The chapters in the book explore differences and similarities in approaches of artists and scientists and the role that technology plays in mediating the collaboration. The artists and scientists had the freedom to choose the mode of presenting their collaboration. For this reason, each chapter is presented in a very particular manner, separately as individual artist or researcher or in concert.
3 THE PLACE OF THE ARTIST

Although from the beginning members of PAIRCORE discussed the idea of creating a studio space for the artists, in the end, all the artists were housed like other visitors to PARC. They found places in unoccupied office space located as close as possible to the person and project that they were paired with.

3.1 Workplaces at PARC

PARC is an office building, it does not offer studio like environment. The researchers usually have window offices along single loaded corridors, and the walls often have whiteboards and bookshelves. In small shared offices each worker has enough space for at least of personal desk with one computer. PARC has characteristics of academic facilities but is built to the standards of modern corporations. Offices and meeting rooms look not too far from those of an insurance company. Each office distinguishes itself for the number and types of computers. The average researcher has at least two computers, top of line workstations, with multiple monitors. As with the size of offices, the quantity and kind of furniture at PARC are determined by rank and function. The variation is between the wood-grained Formica and painted metal of researchers’ office to the conservative dark oak of managers’ offices.

3.2 What Happened when Artists Came to PARC?

The first intention was to make a single studio to house the artists. One concern was that a studio might isolate the artists from their researcher colleagues. The studio was not organized at first for other practical reasons, and PAIR offered the artists available space in offices near their colleagues giving them standard furniture and a standard computer. The artists ended up using the space like the researchers. The initial image of artists and their needs was wrong, as the artists need facilities not found in an office.

4 INSIGHTS INTO PAIRING STORIES

In the book (Harris ed. 1999) the chapters from 5 to 12 are dedicated to give insight of the various collaborations that happened in PAIR. This chapter selects 5 of the "pairing" summarizing some interesting aspects of the collaboration and some facts about the content of the research.

4.1 Narratives in LambdaMOO

Chapter 6 of the book (Harris ed. 1999) describes the story of Judy Malloy who worked with a text-based social virtual reality site, called LambdaMOO, created at Xerox PARC by Pavel Curtis. Judy Malloy worked investigating the narrative variety inherent in MOO's (multi-user dungeouns- object oriented), and created three narratives:
- The Ocadillo Files: "an ephemeral performative narrative that examined role playing and story telling in the heart of the visual community—the LambdaMOO".
- Brown House Kitchen: "is an exploratory collaboratively experienced narrative in which text is disclosed by programmed objects".
- Deep Creek School: "is a collaboratively created model of an alternative art school".

According to Malloy, MUD's are "cohesive text-based universes existing parallel to life where, just as they do in real life, stories occur daily that usually are observed, only by the participants. In these people-centered places a wide variety of public literature can be created." And she continues "MUD's are recreational gathering spaces that connect many users to the same place at the same time. Users are visible to each other and share a database of rooms, exists and other objects."

**LambdaMOO** is a MUD that uses an object oriented programming language developed by Pavel Curtis at PARC. **LambdaMOO** is a malleable code-based structure that does not only focus on creative social interaction, but also provide means for complex information delivery, and for an infinite variety of narrative structures. We will now have a closer look at the narratives The Brown House Kitchen.

4.1.1 **Brown House Kitchen**
This narrative was influenced by the ubiquitous computing research. The kitchen was conceived as a future communal eating space where interrelated devices integral to its functioning would record events in various ways. Players who enter Brown House Kitchen can unfold the story in various unpredictable ways by examining the things they find there. The information disclosed by the object is accessible to one player or all of them. For example, some devices (simulated video, simulated audio) disclose information that is seen, when activated by everyone in the room. Other devices (electronic book, diary) disclose text visible only to the player that activates them. “People can sit at the table, order meals, and as usual in LambdaMOO, talk with their companion.” The environment contains a large amount “tiny scenery” which can be hypertextually activated. For example, by the use command “look” the following text is disclosed:

```plaintext
look cat
The cat has a white splotch across the top of his face. If you say "Fireball get down!", he will look at you with yellow eyes and then go back drinking from the slowly leaking faucet. When Ralph approaches the sink, Fireball retreats to the small shelf beneath the telephone.

look sink....
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The environment contains also five integral text disclosing devices:

- Ralph, a mobile audio equipped robot, a Will Clean After You unit,
- a database food dispensing table, GoodFood,
- a prenarrative video device, Barbie-Q,
- and two electronic books.
Two devices, Ralph – the Will Clean after You unit– and GoodFood are time based. The information they disclose varies according to the day of the month and the time of the day in which you enter the story. Barbie Q discloses text sequentially. The two electronic books generate randomly hypertextual lexias.

“Brown House Kitchen is structured with parallel intersecting data streams that are contained in and disclosed by this collection of objects... a work that exists in a time warp in virtual space, is a more complex narrative. It not only challenges readers to discover less obvious streams of text but also locates them into the story.”

What each device says must be consistent. For this reason during the writing a chart with all details helped Judy Malloy. The chart integrated what was eaten at the meals (GoodFood), with what the video device has recorded, the information disclosed by Ralph and the words in the electronic books.

Judy Malloy was the artist. She acknowledges the researchers for their decisive contribute in her work. She says that although they are not to blamed for the weird elements in the programming of the Brown House Kitchen, the work would have not been possible without them. In her opinion, the work would have been carried out more smoothly with a team of writers and programmers actually working on the project. She continues noting that a more experienced programmer would have not “banged his or her head against the virtual walls of LambdaMOO as much as I did in the creation of this work.”

4.2 Artist PAIRing with the User interface group

4.2.1 Artists as Researchers
Stephen Wilson is an artist, who participates from 1994 to 1996 to the PAIR program. Stephen Wilson poses the following question: how can artist respond to the growing importance of scientific and technological research in shaping culture? One answer proposes artists as consumers of the new tools who use them to create new images, sounds and video. Another answer proposes artists emphasizing the critical functions of art to comment on technological developments. The response that is proposed by Stephen Wilson is that artists must work at the hearty of the research process and not just as consumers of technological gadgets (see also Wilson 2000).

4.2.2 The Work within the PAIR program
Stephen Wilson joined the PAIR program at Xerox PARC in the User Interface (UIR) Group. He was paired with Jock Mackinlay and Polle Zellweger. Jock worked on creating three-dimensional graphic systems to visualize complex information spaces. Polle worked on Hypermedia authoring systems and speech issues. Stephen regularly attended the UIR meetings and started to participate as he became familiar with the work. It was important to get knowledgeable about the research going on at PARC. At the beginning, it was not clear, how the collaboration would develop. There were mutual interests in each other’s work. A brainstormed list of project ideas was discussed. The World Wide Web was capturing most of the attention. The first two projects were Searches as Portraits and the Road Not Taken/What’s Ahead. Stephen Wilson developed prototypes and jock and Polle collaborated in design and critique. Searches
as Portraits were portraits of people as made manifest through their web activities. Using images, text and sounds from the URLs that a person visits, the intention was to make digital movies to portray their navigation experience. Jock and Polle were interested in this project from the perspective of increasing productive work through technology. It might be useful to have a record of searches for the original searcher or other searchers. There was some skepticism about to which extend the video-clip about the search could tell about a person. The project was enhanced by incorporating also what a person does not choose during the search. In the Road not Taken project, the intent was to create a system that confronted users with information (text and images) not necessarily on the main path of the search. This information consisted of choices other than the ones they were making at each point that they had choices. The background images were links to real web pages, so that an interested user could click on the material to make it into a live web page.

Figure 1: Searches as Portraits Early prototype of portrait of a search (graphical representation of pages visited and missed)

4.3 A Contemporary Performance Group

In Chapter 8 artists Margaret Crane and Jon Winet and researchers Dale MacDonald and Scott Mineman, describe their story of trying to establish a contemporary performance group. "In the three years since we had met, we had covered the distance between trying to unite our individual projects, developing a collective interest that had something to do with public art and interactive communities, tweaking technology until it does what you want, and making narratives between the virtual and physical worlds. …"

4.3.1 The Snake Pit

This first project was about a participatory installation designed to explore issues of mental health care and human consciousness. It was based on Jon and Margaret (the artists) text/image work and exploration of social pathologies. It also combined the interests of the researchers: the development of a high resolution flat panel display, and exploration of electronic communities. The project was not successful, it never left the drawing board. “In hind sight, this failed project was pivotal to our creating a viable pairing that genuinely fit who we were. It was the beginning of a shared working practice combining art and technology.” In PAIR artists and researchers were to create an intensive, finite project. This first experience was a starting point. During the design
on paper a typical conversation would have one of the artists say to one of the researchers: “I have an idea that would look really great. What can we do with the technology to make it happen?” The authors note that they were still in their distinct and separate capacities as artists and researchers. “Our individual interests were clearly defined but collective enthusiasms were still to come.” The project was cancelled because the display would have been ready too late.

4.3.2 General Hospital

*General Hospital* was an investigation of mental health in the American Society. The pieces used high- and low-tech media ranging from the Internet and WWW to live focus groups and wired gallery installations. The General Hospital juxtaposes narrative text/image pieces with practical information and the voices of online participants. Several features add a lively flavor to the site: Stories, comments, the interactive comment areas and late-breaking information posted to the linked text based newsgroup at alt.society.mental.health. One of the intentions was to extend the notion of public space to encompass electronic space, and within electronic space to adapt strategies of public art to digital technology.

4.3.3 Accommodations

The starting point is a derelict trailer that is “a bridge between two worlds – a physical place with an evocative online analog, and a rich online representation where movement and activity on the web site produced effects in the physical installation.” This piece is part of a series of installations that explored the contemporary notion of home. “*Accommodations* evoked home as an illusive site of the imagination – part memory, part history, part wish. Cyberspace mirrored the mobile home park. And the technology became another kind of bridge between two changeable, fluid locations.” The goal was to immerse visitors in a charged narrative environment. The installation had a stand-alone network of three computers to run and display a local website. Two computer served the visitors with a web browser and in a nearby closet another computer had a webserver and controlled various MIDI devices that changed the sound and lighting in the trailer.
4.3.4 The Inaugural Ball
The Inaugural Ball is a multimedia installation. The piece set the 1996 presidential election “against the Darwinian global politics of the shrinking world. The installation extended the research and focus on new genres and technologies. The piece had the following elements: photography, text, time based digital projection, sculptural objects, environmental lighting, and sound. These elements were combined to create a charged and shifting narrative environment. “The intent was to contrast the zeitgeist of the 1996 presidential election campaign with notions of collective memory and amnesia and the challenge of the fin de siècle civic life.” In previous pieces, the viewer interaction and participation were explored. In the Inaugural Ball it was different, a highly controlled and mediated environment for an art-world audience.” That was part of what the piece was about anyway – how sometimes the world seems to be spinning out of control. And in creating the illusion of an out-of-control world, we were approaching theater and the creation of illusion.”
“It also solidified our collaboration into a more complex relationship than a pairing of artists and researchers. A shared world view emerged in the piece. The four of us dreamed up the melancholy party atmosphere with its flashing disco floor and the twinkling of mirror ball lights. Divisions between art and technology were blurring.”

4.3.5  Sunset: The Latest Frontier
“Sunset is a series of soap-operatic tableaux featuring a dozen glittering faux stars. By clicking their garage doors openers or keyfobs, drivers on Hollywood’s Sunset Strip can alter the narrative on two outdoors monitors. Their drive by intervention changes the course of the narrative displayed on the screens outside the Billboard live nightclub. Motorists can also tune in to an audio track from a micro-power FM transmission originating inside the club.”
4.3.6 Some Reflection

“We discovered that particularities of specific language systems – Unix, Xemacs, perl, HTML and of course our individual idiosyncratic usage of English – both provided bridges to our respective cultures of art and technology research and kept us at bay... at Xerox everything looks like a potential document. Our linking of document and artifact, artifact and artwork provides the conceptual basis for our projects.”

“In terms of public art production what replaces the statue in the town square? And what replaces the town square? Much of the Pairing’s work has been to experiment with new forms of creative and social expression in public space. Irreversibly, our sense of self and others is dramatically evolving, with new notions of private and public experience and new for of our cultural, social and personal lives.”

“The development of the Web was concurrent with our residency... issues of access appear at the center of our discussions. Who gets to see the work, participate in the dialog, and join in on its production? As artists and researchers, what do we lose or gain in visibility, effective communications and sense of community as our work more and more Internet-based and electronics dependent?”

The authors feel that in the art world there are large segments that mistrust and distaste technological culture. On the other hand, in dialectical fashion, there is “also now a stampede mentality in the arts to race onto the information superhighway.”

By the time the chapter was delivered the authors were still working on the Sunset project. In this last project “definite patterns of collaboration have emerged:

- We appear to have an insatiable attraction for strange experiences in environments foreign to our natural milieus;
- We relish anthropological thrillseeking in clashing cultures from the hallways of the mental clinic to the spectacle of presidential politics to the heart of rock’n’roll via a contradiction-fraught mobile home park project;
While taking on the challenge of integrating new technologies into contemporary art practice, we continue to struggle to ensure that meaning of the work isn’t swamped by the seduction of those technologies.”

4.4 Similarities and differences between artists and scientists in a discussion

This chapter is a collection of selected sentences out of a discussion between composer-performer Pamela Z and researchers Michael Black and David Levy. Michael Black’s work involves the analysis of visual motion by computers. One focus of this work is the automatic analysis of human gestures and facial expressions. Also Pamela Z is interested in body gestures she uses a MIDI controller called the BodySynth, which uses electrode sensors worn against the skin and wired to a small device that translates the muscular activity into MIDI. This allows Pamela to trigger or manipulate simply by making physical gestures. Michael was interested in creating a tool for capturing information about human motion. Pamela was interested in exploring randomness with a device that produces unexpected sounds. Michael and Pamela started to think about a controller that involved an element of chance, instead of a controller that gave a specific result. This resulted in the idea of to feed it data from Michael’s motion analysis of various objects and see what kind of sound would result from translating this information into MIDI.

Michael: But you see, being a scientist is something more... It’s something more than just – well I shouldn’t say just – but something more than being a programmer. It means that your seeking deep answers to deep questions. And you are seeking answers that maybe no one else has ever asked. And it means sort of going out on a limb. Being in the frontier of something. And it took a long time to realize that I could go there... Science is something that involves rigor, and there is a methodology, a tradition, and a history that goes along with it... Scientists have tremendous freedom and responsibility. So realizing that you are a scientist, you have to step up to the plate and accept the responsibility that comes with the freedom.

The line between things like design and research, art and science is sometimes blurry.

Michael: The line is really blurry. And I think that creates opportunity, but it also causes some confusion. I may have a model in my head of the kind of things we should be pursuing and someone else may have a completely different idea.

Pamela: But it could all fall under science. I’m curious what the dividing line is, if there is one, between science and things that are not science?

Michael: Well, there is a pat answer that involves invoking the scientific method. I don’t think that it is a particularly compelling answer in the context of PARC. Science involves building on a knowledge of work – rigorous approach to experimentation – and often involves the application of very formal methods...

Pamela: So it does seem blurry this line between science and non-science?
Michael: We talk a lot here about blurring. There is a recent emphasis the physical and virtual worlds. Blurring the boundaries between our real world and this electronic world. I think people see PARC as a place were blurring can happen because there are people from all different parts of the spectrum.

Pamela: It’s funny because I’ve been dealing with a lot of blurring where art is concerned and it’s mainly around computer arts. You’ve probably heard me railing about this multimedia industry.

Michael: No, rail away.

Pamela: My big complaint is that the multimedia industry stole this word multimedia from the arts. It used to mean “more than one medium”. Surprising! In that context you may have performing going on with projected image, perhaps with sound and dance – all of these different media combined. If you were a visual artist the expression multimedia meant the use of many visual media. Then the computer industry stole the word, and now suddenly any “artwork” done on the computer is considered multimedia. So now multimedia means “one medium”. If you are using the computer to do it, that’s multimedia! And supposedly because there is all this software that allows you to do visuals and sounds and whatever, all you have to do is make some little director movie where some little thing dances across the screen and that’s called multimedia... Then there is this new confusion about “what is art? “ I never wanted to be one of those people who scowl and says , “that’s not art!” or “that is not music!” You can say that you do not like it, but how can you say that it isn’t music? But I am noticing suddenly many people being artists because of the computer industry. I am questioning the level of artistry in what they are making. Is it art, or is it just a mastery of some software?

Michael: can it be both?

Pamela: Well, the comparison I’m drawn to make is to skill of drawing photorealism. This is the skill that the layperson often thinks is the most important skill related to visual arts. But many great artists are unable to do this and would perhaps never desire to do it. Being able to do that is less about whether the person is a good artist and more about whether they’ve acquired a very specific skill used in art.

Michael: what you are doing is separating the creative process the mechanical process. The computer is just a different tool. If someone is truly creative and you give them a paintbrush and teach them how to use it or you give them a computer and teach them how to use it , they will master that skill and then apply their creativity.

Pamela: that’s true that is all art. You often wind up with bad painters but they are still painters. But the difference is really because of the marketing for this industry. It has given people reasons both financial and trendwise to want to learn do this thing. It feels to me as if it’s being driven not so much by deep seated artistic tendencies as it is by industry an commercial motives.
4.5 Artists @ Work Practice and Technology

Chapter 5 of (Harris ed. 1999) reports the pairing between two artists and the Work Practice and Technology (WPT) area. WPT is a small group of anthropologists and computer scientists who studies the practices by which workers take up technologies in creative and unpredictable ways (Lucy Suchman, Jeanette Blomberg, Susan Newman, Randy Trigg). The two artists are John Muse and Jeanne C Finley, their installations, single channels videotape, and book projects utilize documentary elements. "the theoretical and practical problems of non-fiction compel us, as do the challenges that attend crossing the borders between reportage and fable, the evidentiary and the invented". The common grounds of artists and researchers are the use of technologies, video, interviews, and observation. But also a concern for the ethical implications of using technology to create and distribute images, text, and stories. The artists came to PAIR to explore how recent innovations in digital and internet technologies might affect artists who work with non-fiction elements. By the time they started at PARC Muse and Finley were working on an experimental documentary videotape, entitled Based on a Story. The document examines the encounter between Jewish Cantor Michael Weisser and Lincoln Nebraska's KU Klux Klan Gran Dragon Larry Trapp. After harassing Weisser by telephone and mail and TV programs, Trapp had meetings and became eventually close friend with Weisser and also renounced the Klan. "We were particularly interested in how media technologies were used to disseminate fear and yet also made possible Trapp's transformation." The artists and researcher agreed on a pairing collaboration. WTP members would use their technologies and expertise to document the activities of the artists working on the tapes.

5 DISCUSSION AND CONCLUSION

In the first pairing described, Judy Malloy creates narratives for LambdaMOO. In this case, the artist and researcher are not really co-developing. It seems that the artists contributes to the technological oriented artifact donating an aesthetic component, the narrative, that tries to envision uses of MUD's in the future. In the second pairing story, the collaboration is of a different kind. Wilson in his work is just receiving suggestions and critiques, while developing the prototype alone. The interesting aspect in this pairing especially in Searches as Portraits is that both scientists and artist have an interest in developing the artifact, but the interest is different. In this case, the scientist thought that a condensed record of searches might be a useful tool for the original researcher or other researchers pursuing similar searches. In the third story, the contemporary performance group seemed to develop the artifacts more in symbiosis.

Going back to the fundamental question of whether the collaboration of artists and scientists is fruitful for innovation, the stories reported in the book seem to support an affirmative answer. The collaboration between artist and scientists can have even a more profound meaning. According to Steve Wilson (Chapter 4.2, Wilson 2000) it is a mistake to conceive contemporary research as a merely technological enterprise. The mistake has profound philosophical and practical implications for the culture. The shaping of research and development agendas can definitely benefit from the contribution of artists. Wilson warns about the danger of letting die important line of research because they are not supported by any scientific discipline. Moreover, he
witnessed inventions and emerging technologies, killed because marketing departments judged that no money could be made out of them. Government and corporate support for basic research has been decreasing. The judgment of the marketplace is not a wise one. It is a judgment that makes sense in a short-term for stakeholders but does not make sense for the culture. Also scientific communities are often critical to new ideas, because they can not see beyond their disciplinary blinders.

He believes that art can fill a critical role as an independent zone of research. Where abandoned, discredited, and unorthodox inquiries could be pursued. The roles of artists could incorporate other roles such as researcher, inventor, hacker, and entrepreneur. Wilson writes:" Emerging technologies are my medium. I seek them out before they become widely known. I focus on them to understand where they come from, where they might go, and might be their cultural implications. I experiment with them to see whether they have unexplored potentials."

Artists can add a perspective than can help development in research labs. Several common characteristics for artists equip them for this function:

- Artists typically pursue their idiosyncratic interests less constrained by utilitarian, commercial, or disciplinary imperatives than peers in other fields.
- Institutionalized iconoclasm means that artists are likely to integrate widely ranging cultural issues in their research.
- The valuing of social commentary means that artists are likely to integrate widely ranging cultural issues in their research.
- Artists are more likely than commercial enterprises to incorporate criteria such as celebration and wonder.
- The interests within the arts in communication means that artists could bring the scientific and technological possibilities to a wider public better than peers in other fields.
- Artistic Valuing of creativity and innovation mean that new perspectives might be applied to inquiries.

Something that is clear in all the stories is that technology builds the common ground for the collaboration between researchers and scientist. Like Rich Gold (leader of the program) puts it:

"PAIR is based on the simple idea that we could use technology as a common language to get otherwise divergent disciplines to speak with each other, and that once the conversation began, everything else would follow." (page 15)

Technology provides a common language, whereas its purpose can be different. Traditionally the researches are striving for utilitarian objectives and efficiency whereas artist's goals have more to do with aesthetic. This traditional view is beginning to change in isolated research groups in Human-Computer Interaction. The research in these cases devotes particular attention to develop new interaction modes that serve pleasure more than efficiency, aesthetic more than function (PLAY 2000).
The PAIR program considered only artists already working with new media technology. To which extend, can we really say something about making art and science work together? What if you would have greater potential by pairing artists that are expressing themselves with pre digital revolution media? On the other hand, the new digital media is becoming part of everyday everyone’s life. Does it make sense an art that does not consider digital media as mean or object?

References


PAIR, www.pair.xerox.com
PARC, www.parc.xerox.com