Lean Enterprise Institute
lean.org®

The Joy of Lean Innovation:
A Case Study of Menlo Innovations

by James M. Morgan

MENLO
innovations

This case study can be found in LEI's book, *Lean Product & Process Development.*
Learn more about the book at **lean.org/lppd**

The Joy of Lean Innovation: A Case Study of Menlo Innovations

by James M. Morgan

Richard Sheridan and James Goebel did not set out to create a lean enterprise. In fact, they intentionally avoid the "lean," "agile," and "start-up" jargon that pervades their industry. They set out to create a joyful enterprise, one that they, their team, and their customers would truly love. Their frustration and disillusionment with the software industry drove them to want to create something entirely new to their industry. While they have certainly learned from a variety of sources ranging from Thomas Edison's Menlo Park (their namesake) to "Extreme Programming," Sheridan and Goebel have remained true to their vision of creating joy in the workplace. Consequently, far from simply copying tools from a book or another company, Menlo has innovated unique approaches to key challenges of developing new products. And their company may be their most important innovation.

The energy is absolutely palpable as you enter Menlo's brightly lit, wide-open space. The buzz from work pairs huddled around computers, small groups of people debating hand-made prototypes, and customer "show and tells" is everywhere. The walls are covered, "obeya style," with key program information, performance indicators, and visual reminders of their process and culture. Once per day, when a tone sounds, every person rises and moves to form a large circle to begin the daily ritual of sharing their work. In the circle, work pairs pass around a plastic set of Viking horns as they describe what's happening on their projects. Weekly project planning is done using work orders folded to a size proportional to the amount of time required, and placed on a physical card with room enough for just 32 hours of project work.

Clearly, these are practices are far different than any other workplace. However, it becomes quickly apparent that these innovations and others—including the basic thinking underlying the system—are grounded in the central principles of lean product/process development.

And they work. Menlo has grown steadily and profitably since its founding in 2001. In fact Menlo has moved to successively larger spaces three times. The firm has won five *Inc. Magazine* awards and numerous "Happiest Work Place Awards."

Menlo attracts thousands of visitors to its site each year, including several groups from Toyota. Menlo customers are elated with their products and are typically able to dominate their competitive space with Menlo solutions. Consequently, in a fashion similar to the company's namesake,[46] Rich Sheridan and James Goebel have created a veritable lean innovation machine.

And what about "joy"? Well, first, it's important to understand what Menlonians mean by "joy." According to CEO Sheridan, joy is not necessarily about happiness, "Happiness is fleeting and unpredictable. Joy is the feeling you get when you win an Olympic medal after many years of difficult and dedicated training." And it is the feeling Menlo gets when customers are delighted with the company's products. The pursuit of this experience drives everything they do. How does this system work and what can the lean developer learn? Let's take a look.[47]

First and foremost, deeply understand

Even the most efficient development process is waste if it delivers no value. If it efficiently churns out products no one values or will pay for, it is pointless. Consequently, the first step in a lean product/process development process is to deeply understand what, exactly, the product needs to be.

At Menlo this process is led by pairs of professionals with the job title *High Tech Anthropologist* (HTA) who visit and methodically study the environments and the people who will use their product. HTAs focus on the end-user as the "customer" for this work, rather than the client. They spend large amounts of time on-site at the workplaces where their product will be used, to deeply understand the complete context of product performance.

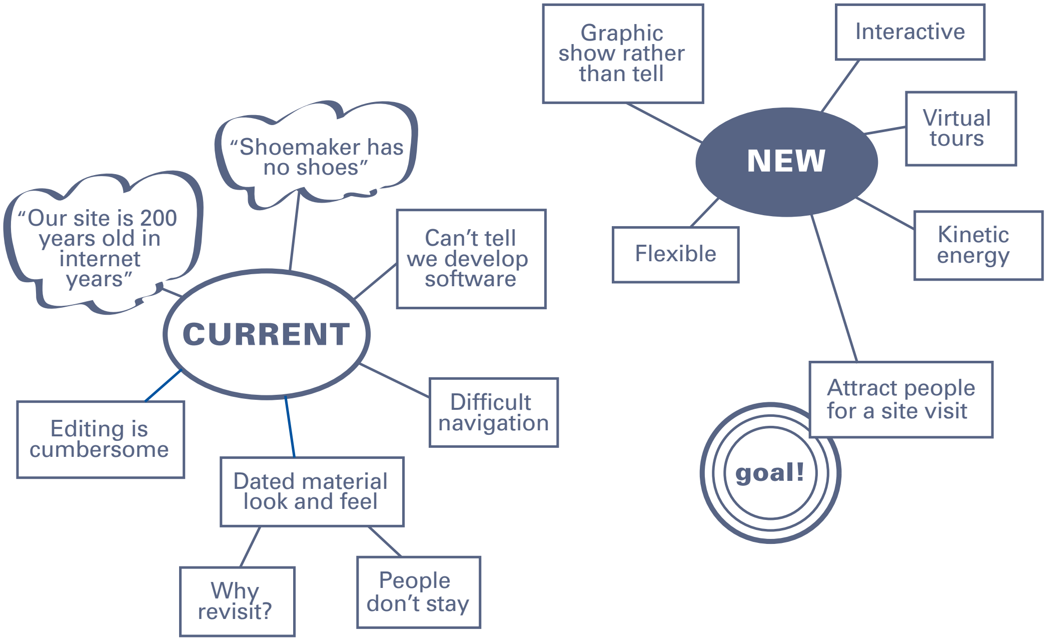
HTAs work in pairs and spend many days observing and interviewing target users in the users' native environment. They watch carefully for what they call "the pain points"—problems the users are having that may provide the greatest opportunities to add value. They create "mind maps" in which they capture critical aspects of their interviews with potential users, and graphically illustrate the users' thinking about both the current situation and desired future state. Doing all this at the actual workplace is crucial. As Sheridan says, "Design is contextual and we have to study users in their native environment."

Idea Generation

After the initial visits, the development process starts with a problem vision statement crafted by the HTAs and shared with their client to be sure they have a strong and shared understanding of exactly what they are trying to accomplish. The problem statement is a brief, hand-written summary of the HTAs view of what it is they are setting out to accomplish. While perhaps a simple document, it is not easy to create. And it is a critical step in order to create alignment with the client and the rest of the Menlo team.

Once this is done, the HTA team leading the development at this time will use this statement to call on other HTAs to help brainstorm ideas. They engage as many fresh perspectives as necessary in these lightning-fast sessions, generating hundreds of quick sketches of potential design solutions for the user interfaces. This is followed by an HTA debrief in which the lead pair sort through all the sketches, discuss, and develop further solution focus. They utilize the mind maps created from their interviews to further clarify their thinking and communicate their vision for the product.

Interview Mind Map to Convey Essential Points



"Shoemaker has no shoes"
"Our site is 200 years old in internet years"
CURRENT
Can't tell we develop software
Difficult navigation
Editing is cumbersome
Dated material look and feel
Why revisit?
People don't stay
Graphic show rather than tell
Interactive
Virtual tours
NEW
Flexible
Kinetic energy
Attract people for a site visit
goal!

Solution Convergence

Based on observations, idea generation, and evaluations, the HTA pairs create 20 to 30 "personas." Each persona provides an highly differentiated and specific potential target user, captured on a handwritten persona card. The cards are placed on a persona map that looks like a target—and then the fun starts.

The pairs argue with each other, and with the customer, about which persona should be the target user. But in the end, the customer must settle on a single target. As difficult as it may be, they force themselves and their customer to pick just one persona out of the group, so that they can focus their actual development work on a very specific customer. That persona is taped to the center of the target.[48] Then they will ask the client to select two secondary users and they are taped on the outer rings of the target. They insist that this is a critical priority because, "If you try to create a product for everyone, it will not work well for anyone and you will get killed in the market."

Design Assessments

In the next step of the development process, the HTAs create simple, low fidelity, hand-drawn interface mock-ups of their vision for the product based on all their research and client dialogue. They share these mock-ups with "persona" type targeted users at the gemba and make quick changes as feedback is digested.

This is where Menlo's "make mistakes faster" philosophy and spirit of rapid experimentation really comes into its own. They do not attempt to hit the target center with a single shot, but rather develop multiple potential design solutions in order to create the best possible product for the target user.

Most Menlo projects require three or four major design assessments with end-users, along with many more minor ones. At a typical design assessment, the HTA pair shows the prototype interface to the end-user in their native environment with little or no explanation. They describe the user scenario and ask the users to perform the target task. The HTAs write down everything the user does or says during the review. If the interface is not totally intuitive to the user, the HTAs start to ask questions to understand what must be changed. They frequently utilize multiple prototypes in order to assess a range of attributes across design alternatives, taking copious notes and returning to debrief from each experience.

Instead of spending hours of wasted time in endless meetings listening to mind-numbing debate, the teams design and execute quick, LAMDA-cycle-like experiments with simple prototypes to test out their theories.

Alignment

Developing a deep understanding of the customer and clear vision for the product is critical but insufficient for project success. HTA's must share their vision with the rest of the team and gain agreement what must be done to achieve it. A key tool for accomplishing this this task are the hand-written story cards created by the HTAs that encapsulate their product vision in order to help communicate with programmers who then execute the product vision. And while there is significant and intense dialogue during this process, the goal is to deliver on the product vision. It is very much a "how" discussion, as opposed to the "if" discussion all too common in traditional developers. Once the team is aligned on what the product needs to be, they can begin the planning process.

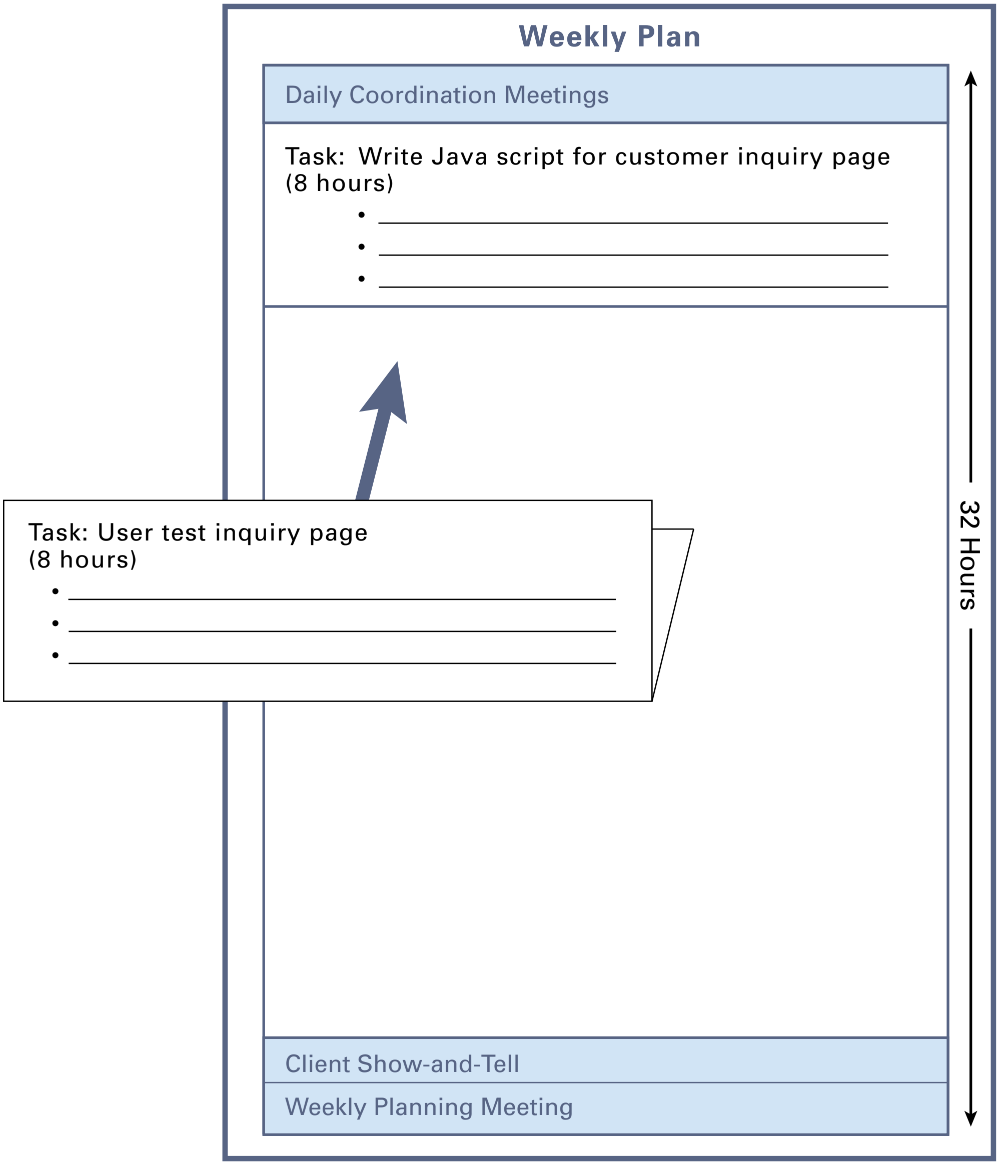
Planning

Planning begins with outlining all of the tasks, series of tasks, and estimated hours required to deliver the product vision. The people who actually do the work, not senior management or an isolated estimating group, complete the estimates. This practice gains input from the experts and helps enroll them in the project. The estimates are not always correct, but this too is a part of Menlo's learning process.

Next the project managers and clients employ a simple "planning origami" to set clear priorities for work and make that visible to all employees. This practice makes it very clear what the project is—and equally clear what the project is not—to everyone involved. The planning cards (called "story cards") are folded origami-style, to a size that represents the number of estimated hours the task should take. For example, a 5.5" x 8.5" card could represent 16 hours, a card folded in half would be eight hours, in half again is four hours.

These cards are then placed on tabloid-sized planning sheets (as shown at right) with an inscribed box the size of 32 hours (the available capacity for a given week after subtracting out planning and coordination activities). Additional sheets are added for larger teams. The project managers, together with the client, place the task cards onto the tabloid sheet(s). If the card is on a sheet, it will be worked on that week; if not, it waits for another week.

Menlo's Weekly Planning Sheet


Weekly Plan
Daily Coordination Meetings
Task: Write Java script for customer inquiry page
(8 hours)
Task: User test inquiry page
(8 hours)
32 Hours
Client Show-and-Tell
Weekly Planning Meeting

This exercise (called the "planning game") is repeated weekly and reviewed with clients. This enables the team to react very quickly to unexpected events and dramatically reduce surprises about content or progress. At the same time, this practice prevents overloading teams which can suck the joy out of any organization.

Communicate Simply, Directly, and Visibly

Visual management is central to Menlo operations and the company's walls reflect this. Sheridan is passionate about this topic. "Using the walls in this way avoids the plague of 'out-of-sight, out-of-mind.' If important information is kept in password-protected electronic files or three-ring binders it will not be used. Just check the dust on your binders."

Menlo's walls contain a variety of information, with evident marks of daily use. For the programmers it might be a depiction of a database schema, whereas for designers it might be design artifacts like persona maps or prototype designs. A significant amount of financial data is also shared with the entire team. But the dominant wall occupant are the Work Authorization Boards, containing story cards, color-coded sticky dots and a long string of yarn mounted in the middle of the work space. The boards provide unambiguous work direction to the pairs and customers. It's simple: if it's not on the board, it does not get worked on.

When the planning game described above is finished, the project managers move the folded task cards from the planning sheet and pin them to the project's work authorization board in the form of a rectangular matrix. Each column of the matrix represents a different work pair and each row is a day of the week. Specific tasks are assigned to each pair, and the pairs work on the cards they are assigned that week—and nothing else.

As the pair begins work on the story card, a yellow sticker dot is placed on it. When programmers think they are finished with a card, they ask the HTAs for a quick check to be sure they have completed the intent of the card. If the HTAs agree, an orange dot is placed on the card. Once there is an orange dot, the quality team completes a quality-assurance check. Automated unit tests (explained below) remove much of the technical and mundane aspects of software testing, so the quality team can focus on validating that customer performance expectations have been fully met.

At Menlo the QA team is not relegated to "checker" status, but is central to delivering true customer value. They are an integral part of a powerful development system and share fully in the joy of creating great products. When the QA team approves the work, they place a green dot on the story card. The final check, though, will be at the "show-and-tell" with the client. A long piece of yarn stretched across the board is moved down each day. If everyone is on schedule, there will be only orange and green dots above the string of yarn.

Simple, Direct Communication

Weekly “show and tells” with clients, which take place throughout the process, actually require the client to explain to the development team members the status and key attributes of the interface/software under development. In this way the program team talks directly with the client, no intermediaries, no “interpretation.” These regular events help to ensure accuracy and timeliness of communication and a common understanding.

Daily stand-up meetings require all Menlo people to form a large circle. They pass around Viking horns (two horns representing the “pairs” that are the foundation of their system), and while holding the horns the pairs provide brief updates on their work to the entire team. Everyone feels free to comment but the total meeting takes only about 15 minutes. Any detailed follow-up questions or discussions are handled after the general meeting freeing everyone else up to go back to work.

Creating Process Flow

Most products are a collection of individual part designs that must work together as a system. Thus to create flow and eliminate the waste of rework in product development, sub-teams must ensure the compatibility of each piece with the larger system before completion of those individual parts. As we saw in the Ford case, the interdependencies of individual parts inherent in a system drive the need to validate interfaces between parts early and often in the development process.

Menlo’s teams avoid late-stage integration issues and the waste of rework that are so common in the software business by requiring the entire team to continuously integrate the parts they are working on by compiling the latest code and design. What’s more, weekly “show and tells” with clients that take place throughout the process are done with fully integrated versions of the product, so that customers and the development team get a better idea of the actual product performance.

These “show and tells” are critical to ensure the client and program team stay on the same page. Equally important, the client gets to discuss the project with the people who are actually working on the product instead of going through layers of management interpreters. If there is a disconnect between client expectations or product performance, it is discussed openly, directly, right on the spot. This eliminates a great deal of the miscommunication and misunderstandings that lead to a rash of late changes and waste typical of traditional processes.

Built-in Quality

Product performance deficiencies and emergent quality issues are another common source of late changes and costly rework. Lean product development processes often utilize standards, checklists, and embedded testing to eliminate or at least minimize this source of waste

At Menlo programmers must write automated unit tests before they write the code to be tested. This practice builds in rigor and alignment with technical requirements and does not allow programmers to “adapt” tests to fit their coding results at the end of the programming. The effect on both quality and morale is unparalleled because the program catches all the little human things that can go wrong. This practice has also created a strong sense of pride and professionalism among the Menlo programmers.

Learning and Innovating by Working in Pairs

The ability to learn effectively, and then apply that knowledge to products and processes in order to deliver greater value may be the most important competency that a product driven enterprise can develop. This ability, combined with a relentless focus on value creation, is a primary differentiator of a lean product development system. But as anyone who has tried it knows, it can be surprisingly difficult.

At Menlo learning and innovation are viewed as inseparable. Consequently, learning is central to nearly everything Menlo does. “Pairing,”says Sheridan, “is the atomic element of organizational learning at Menlo.” In pairing, two people sit together at one computer working all day on the same task. Pairing fosters a learning system, builds relationships, eliminates silos of disconnected and specialized knowledge, simplifies on-boarding, and helps identify performance issues. Pairs change on a regular cadence in a practice referred to as switching. (This practice was borrowed from the airline industry in which pilot/copilot teams switch in order to avoid complacency.) Pairing continuously brings a fresh perspective to projects and fosters communication. Learning is constantly happening as one person teaches the other what they learned from the previous assignment as the pairs switch seats, enhancing cross-project learning.[49] Menlonians also talk about the huge benefits of talking through problems aloud with their partner. At the same time, pairing increases casual learning as people who know each other from previous pairings are more likely to talk to each other informally.

Culture is a critical ingredient for effective organizational learning and innovation. Sheridan strongly believes that culture is the most important enabler for innovation. He feels that creating a safe environment where it is not only okay to fail, but in fact is seen as fundamental to the process, fosters the energy, enthusiasm, and collaboration fundamental to learning and innovation.

At Menlo the "make mistakes faster" mind-set is pervasive and powerful. In order to promote fast, inexpensive, experiments early in the process, Menlo consistently encourages everyone to "just do an experiment" and move their product/process forward. HTAs regularly create fast and simple interface prototypes, design quick tests, and adjust in order to create fast learning cycles before committing significant resources. They look, ask, model, discuss, and act in order to learn rapidly.

Since collaboration is crucial in Menlo's learning and operating practices, the firm has developed numerous mechanisms to encourage collaboration—starting with the hiring process. Not everyone is a fit for a "joyful culture" and Menlo goes to great pains to determine appropriate fit.

The first interview round consists of three 20 minute exercises executed within the span of a two hour mass "extreme interview" session with a group of 20 to 50 invited participants. During these first round exercises, interviewees are paired with each other and do simulated work in pairs while a Menlonian observes their behaviors. After each 20 minute exercise, the pairs are switched and a new observer is assigned. The Menlo team gathers at the end of the interview to compare notes and discuss each candidate's performance. Those who make it through the first round will spend a paid day working while paired with at least two different Menlonians on real projects. At the end of this day, the Menlo team participants discuss the potential fit of the candidates. If the candidate is successful, they will be offered a three-week contract as a trial period. Only after this three-week trial period do they become a Menlonian.

Another practice designed to promote collaboration is Menlo's promotion feedback process. Before an employee can be promoted, he or she must request a lunch with a group of peers. During this lunch, he or she receives direct and detailed feedback on performance. Employees can request as many lunches as they want and are encouraged to invite their most ardent critics to participate in order to build the required support for their advancement.

Employee skill levels are organized into five ascending categories from “Associate” to “Senior Principal”, with three sublevels within each of these categories. Each level is based on “real world” demonstrated skills and capabilities with no seniority requirements. Everyone’s current level is posted on the wall and employees enthusiastically support each other in their pursuit of skill acquisition since it is not a zero-sum game. This reinforces the passion for learning that is so central to innovation and the success of Menlo.

Menlo Joy in Action

One example that demonstrates how the Menlo development system creates joy is the story of Accuri Cytometers. A small technology startup, Accuri Cytometers sought to revolutionize the highly complex world of flow cytometry. Its aim was to make the analysis software intuitive, productive, and easy-to-use, right out of the box. Accuri hired Menlo as the company’s software development team.

Because of Menlo’s unique, user-focused development process and extensive use of HTAs, the resulting *C6 Cytometer* and *CFlow* software were so robust that they can be shipped with only quick-start documentation. Unlike competing products that require a specialist to setup the cytometer followed by several days of training, C6 users self-install and are capable of running samples within an hour.

The pride, exuberance, and yes, joy, experienced by creating this product was clearly evident in each Menlonian who their shared customer-success story. It is indeed what they are all about.

And the customer? Well, Jennifer Baird, former President and CEO of Accuri, said, “I simply don't think we could have done what needed to be done without involving Menlo in this process.” As a result of this game-changing product, the Accuri Cytometers startup was recently purchased by a large medical-device manufacturer, bringing joy to all involved!

So… what about you?

In an industry known for employee burnout, arcane and needlessly complex products, and end-user rage, Sheridan and Goebel have created something remarkable at Menlo: an enterprise truly worthy of that storied name. And like Menlo Park so many years ago, Menlo Innovations has provided us with many valuable insights into what it takes to create a culture of lean innovation.[50]

But they are just that—insights. As with the rest of this book, we can only provide guideposts for your journey. Like Richard Sheridan, James Goebel, and the other leaders in these case studies, you will have to create your own path. The hard work is up to you. There is no "paint by number" process to lean product and process development, no turnkey solution to continuous innovation. And even if there were, we wouldn't share it—we would not want to steal your "joy."