
Using a Change-Management Approach to Promote Customer-Centered Design

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Abstract

Future business success is strongly linked to establishing and sustaining a superior customer experience. Through an internal company wide initiative called "Total Customer Experience," Hewlett-Packard (HP) has focused on the delivery of a superior customer experience as a differentiating advantage. Using a proven change-management framework, the authors promoted a customer-centered approach to product development in designing tape drive products. This paper discusses the approach taken within the HP Tape Storage Division in Bristol, UK to introduce and successfully institutionalize customer-centered design within the tape drive development function. Compared to designing the customer-centered approach, the change-management process accounted for a major part of the authors' time and energy. Introducing the customer-centered design approach at the appropriate phase in the change-management process was crucial to its adoption.

Keywords

Change-Management, Product Design, User-Centered Design, Process Improvement, Experience Design, Organizational Culture, Business Case, Organizational Change, User Experience, Tape Drive, Customer Experience.

Industry/category

Technology/product design

Project statement

This program had two goals. The short term goal was to develop a new generation of Hewlett-Packard (HP) tape drives that delivered a superior total customer experience for business customers in the enterprise storage market.

The second and long-term goal was to introduce a more customer-centered approach to the design and development of tape drives at HP Bristol. The goal in the requirements phase was not to put customer requirements ahead of technology, company, and competition-based requirements, but to put customer requirements on equal footing with the other requirements. The goal in the design and development phases was to provide regular customer input as the product design progressed.

In order for the customer-centered approach to become institutionalized, the authors recognized that they needed to go beyond just changing practices in product design, and needed to affect changes to the organization structure, processes, and culture [1] [2] [3]. Therefore, a plan was developed that introduced customer-centered practice within a larger change-management approach. The approach used was closely related to John Kotter's "Eight-Stage Process of Creating Major Change" [11]. Kotter's approach was well-suited for this program since there was already company and CEO support for delivering the best customer experience in the industry. Kotter's eight-stages to creating change are:

Step 1: Develop a sense of urgency

Step 2: Form a guiding coalition

Step 3: Create a vision

Step 4: Communicate the vision

Step 5: Empower others to act on vision

Step 6: Develop short-term wins

Step 7: Broaden the transformation

Step 8: Anchor change in the culture

For further clarity in the process section of this paper, we have grouped Kotter's eight stages into Mayhew's three phases for change [10]:

- Promotion phase
- Implementation phase
- Institutionalization phase

Figure 1 shows a chronology of deliverables for this project with both Kotter's eight steps for change and Mayhew's three phases for change superimposed on the diagram.

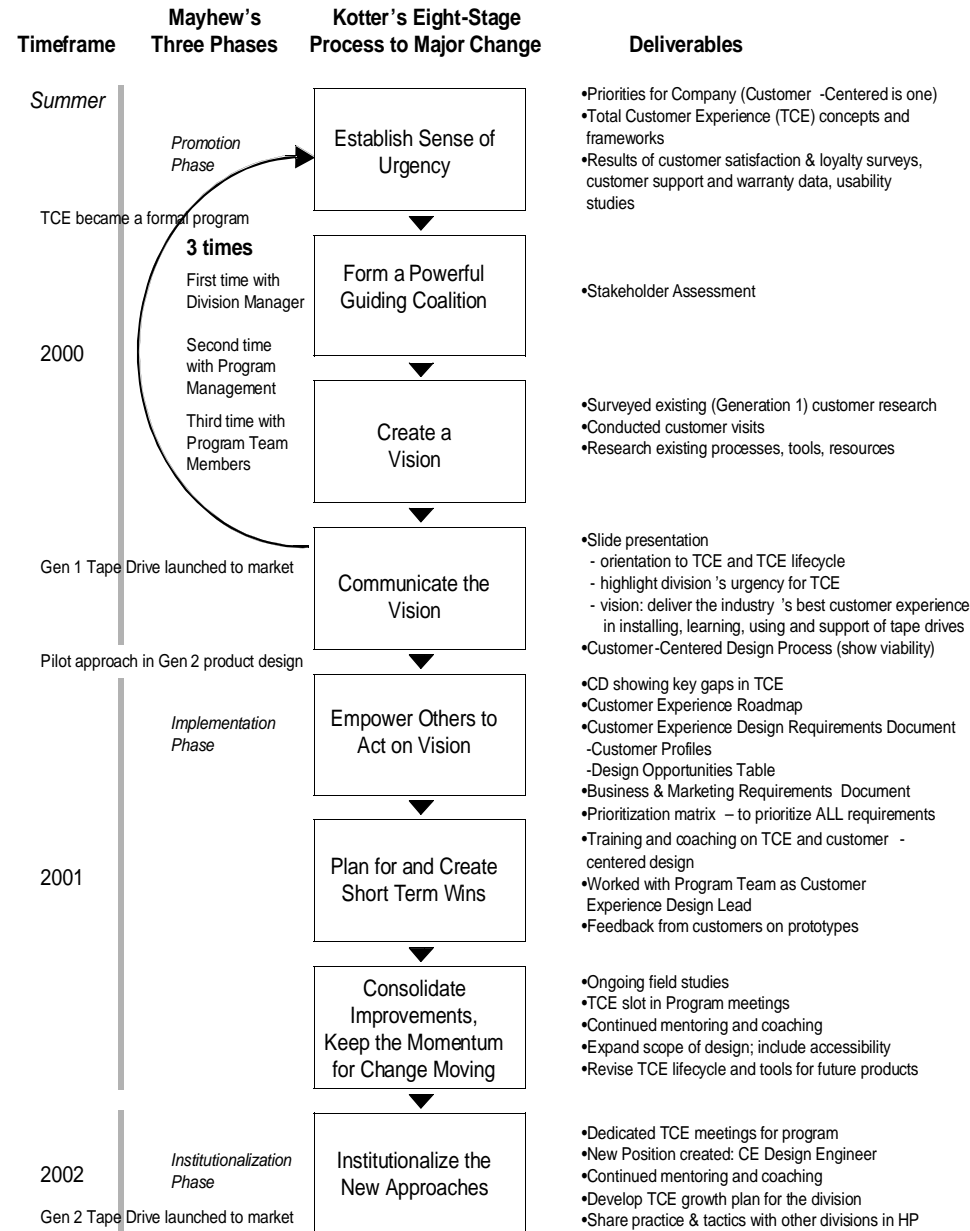
Project participants

The Customer Experience Design lead for this work was the co-author, Andrew Panton, who has extensive experience in customer experience design initiatives and in working with HP product development groups. Steve Sato, the author, is an internal consultant in customer-experience planning, process design, and change management. Andrew engaged Steve to help him develop the processes, tools, and change-management approach for this program. In addition to the two authors, a variety of people were crucial to the implementation and adoption of the program; they are mentioned in the Acknowledgments section at the end of this paper.

Project dates and duration:

In Fall of 1999, Carlton "Carly" Fiorina, the new CEO for HP, initiated organizational changes throughout the whole company. The objective was to make this world-wide company more competitive in the new economy.

Figure 1: A chronology of the tape drive design project showing activities and deliverables used to advance the adoption of a customer-centered design approach. Activities and deliverables directly associated with a new customer-centered design process only start appearing in the middle stages of the change-management process.



Process

The goal was to make HP more focused, more centralized although more agile, and more customer-driven. Carly was and remains a strong champion for the company being customer-driven. To strengthen the company to become more customer-driven, Carly put "Deliver the best customer experience in industry" as one of the top three goals for the company.

In Spring of 2000, a "Total Customer Experience" model was introduced throughout the company. The Total Customer Experience (TCE) is the customer's overall impression of HP based on his or her interactions and experiences with HP people, products, services, and solutions. There are two general TCE models used in HP. One model of business customers presents the predominate needs they have over the life of an HP product or service they purchase. The business customer segment may vary depending on whether they are for example, choosing a product (a buyer) or using the product, as is the case with an IT operator. See Figure 2 (at end of paper) for further details on the business TCE model touchpoints. For product development teams, the TCE touchpoints they have most direct influence to design for are the installing, learning, use, and support touchpoints.

TCE frameworks were being used by some marketing divisions and by Fall of 2000 were beginning to migrate into product development groups.

Up until this time there had been a large community of interest around the TCE philosophy, consisting of dispersed practitioners. However, there was no formal organization or standardized TCE frameworks in place until Fall of 2000. In Fall of 2000 though, improving

TCE became an official company initiative, so formal organization and systems were begun to be developed in parallel with this program effort. By the time this program was completed in the Fall of 2001, a formal, growing network of practitioners was established throughout HP to support TCE improvement efforts.

Promoting a customer-centered approach

The author and co-author worked together for the duration of this program, nearly three years, exclusively by telephone and NetMeeting. There were many discussion sessions in the summer of 2000 on how to prepare the Tape Drive Storage division for change. The approach developed closely followed John Kotter's "Eight-Stage Process of Creating Major Change" [Fig.1], [12].

The authors began by assessing the key stakeholders Andrew needed to enroll to form a guiding coalition.

Together with the help of another HP TCE colleague, Deirdre Stainer, Andrew prepared a presentation that oriented key stakeholders to the TCE concept/frameworks, outlined the customer-centered design approach, and showed how this approach supported the delivery of a superior tape drive customer experience.

In addition, the authors reviewed the existing design process (product lifecycle) and modified it to be more customer-centered. Relatively extensive modifications at the "Requirements and Definition Phase" were made to increase the importance of customer requirements. Less extensive changes were made downstream in the process to provide regular customer feedback to the design team.

The HP Bristol Division manager was presented with the modified design process and acknowledged the potential benefits of such an approach. It was agreed to apply the customer-centered design approach to a product development program for a new generation tape drive pending the program development team's approval. The aforementioned set of activities constituted the first iteration of the first four steps in Kotter's process:

1. Develop a Sense of Urgency (slide presentation)
2. Form a Guiding Coalition (division manager)
3. Create a Vision (slides, modified design process)
4. Communicate the Vision (slides)

This first cycle took approximately one month to complete [Fig.1]. This was the authors' one major departure from Kotter's linear model; we cycled through these four steps three times to gain alignment with three different levels of key stakeholders.

Andrew and Steve then started to develop a vision of the ideal customer experiences. This would provide the program team members with the context of how all design requirements could be prioritized based on the key experiences customers wanted the most. Drawing on a variety of information sources, and with the help of colleagues in marketing, business planning, and support, Andrew used prior research to develop a "Customer Experience Roadmap" [Fig.3].

This roadmap showed three "horizons" of what the ideal customer experience could evolve into across future product generations. Each customer experience goal is built upon the previous goal. For each generation of the tape drive, these were listed:

- The business objective
- The target customer segment
- The value proposition to the target customers
- The features and functions the new tape drives would need to provide
- The technology advances that would be needed to stay competitive

This "vision" showed how all the components of the customer, business, marketing, and technology requirements could be accounted for as the tape drives evolved.

Having secured the divisional manager's "buy-in," the next stage involved engaging the tape drive program management team. A series of presentations were made to educate and inform people on TCE and the customer experience design goals set through the customer experience roadmap. The divisional manager's buy-in was crucial in helping others acknowledge this new way of working. An agreement was reached to pilot the approach. This second cycle through Kotter's first four phases took approximately three months [Fig.1].

The third and final group of people that needed to be aligned with the customer-centered design approach was the program team members. These were key stakeholders as they were responsible for actually designing the product. Collaborating with Andy Brown (Tape Drive Product Manager) and Andy Porter (Tape Drive Support Engineer), Andrew worked with members of the program team to raise awareness and engage them in the approach.

The authors recognized that once the team was aligned to the customer-centered design approach they would need the methods and tools to do the customer-centered portions of the process. To support the program team the authors began to develop a customer experience design requirements (CEDR) document that complemented the existing business and marketing requirements document. In Kotter's terms, this was the stage of "Empower Others to Act on the Vision" [Fig.1], [12].

Implementing a customer-centered approach

In early 2001, the authors began developing the CEDR document. It had four major sections to it. Section one showed how the customer experience design document was to be used with other documents the team was already familiar with [Fig.4]. Section two provided an overview of the TCE model [Fig.2] and the touchpoints the design team would focus on. Section three was a profile of the target customers and their working environments. Section four presented a "Design Opportunities Table" [Fig.5]. This table lists:

- The TCE touchpoint, such as "installation"
- The target customer's desired experience
- The value proposition to the customer
- The customer's task goal
- The design criteria/requirements
- Potential design opportunities
- Metrics for success

To be truly successful the authors realized the team would need a tool to prioritize the customer, business, marketing, and technology requirements. A

prioritization matrix was developed [Fig.6] that ranked all the requirements, based on what was of most value to the company and to the customer. To ensure that there was a good distribution across the full matrix, all the requirements were reviewed and the highest and lowest valued requirements for the company and the customer were established before all the other requirements were plotted. After the team set all the requirements in the matrix they would set the threshold for what would make the final list of requirements that provided both high value to the customers and high value to the company. As a final step, the team reviewed the selected requirements to ensure they had coverage in the install, learn, use, and support TCE touchpoints.

Together with the help of Jim McKenzie (consultant from Human Applications), Andrew compiled video clips from his customer visits and usability reviews onto a CD and arranged them by the key design requirements. This proved very useful in helping the program management team understand and prioritize customer experience design requirements.

The CD allowed a viewer to select a design requirement and understand the rationale. More importantly, it enabled the viewer to create real human connections by allowing them to see issues from the customers' perspective, engaging them at an emotional level that is rarely touched by logic alone. This method proved a powerful way to articulate the key issues and reasons for change, ensuring the key customer requirements were addressed in the design of the tape drive.

The CD proved a real breakthrough in facilitating change. The authors found it was far easier to persuade individuals when the approach appealed to people's emotional side as well as rational side.

Once the program team had the methods and tools to integrate a customer-centered approach into their design approach ("Plan for and Create Short Term Wins" in Kotter's change model, [Fig.1]), the author's goal shifted to helping the program team make short-term wins. While Andrew, as the Customer Experience Design Lead, continued to train and coach managers and team members on TCE and customer-centered approaches, he also conducted concept and prototype tests to provide the program team with fresh feedback from customers. This provided the team with valuable information about what was not working well and more importantly what worked well from the customer's perspective, showing the team they were making gains by using a customer-centered approach.

As the project progressed through the rest of 2001, improvements were made to the design. Most notably for Andrew, the scope of the customer-centered approach was expanded to cover new designs needed to support design for accessibility. By the end of 2001, the program team was working with the TCE lifecycle and tools for future tape drive versions.

Institutionalizing a customer-centered approach

In 2002, TCE and the customer-centered approach became formally institutionalized at the HP Tape Storage Division in Bristol. Before, TCE had a slot in the Program meetings; now there were dedicated TCE meetings. In addition, a new permanent position was created on the program team for a Customer Experience Design Engineer. Andrew now focused on coaching and mentoring this person to develop a customer-centered design leadership capability. The Product Lifecycle for future product development now included specific activities, deliverables, and checkpoints to encourage customer-centered design. Future tape drive programs now include TCE as an integral part of the development process. Andrew has been sought to share his practices and tactics with other HP divisions [Fig.1].

Things we would do differently next time

We would appeal to people's emotional side as well as their intellectual side as early as possible when persuading them to change [10] [11]. The CD with customer video clips was particularly effective, and we would opt to use it again much earlier in the process. This medium recreated the customer's experience in a very effective way.

We would position TCE and the customer-centered approach early on for people to understand how their job related to the program. This was crucial in gaining cross-functional collaboration.

Results

The results of the work brought about changes in three main areas: product, organization/process, and culture. Product improvements have been acknowledged by customers through iterative usability testing. The new Product Design Process has helped create a much stronger emphasis on the customer throughout product development, which has encouraged strong engagement and support from all groups in the development program.

Product improvements

There have been a number of enhancements in the tape drive solution design that have helped enhance the customer install, learn, use, and support experiences. Customer interviews and testing during and subsequent to making the described design changes have confirmed the value to the customers.

Improved installation and learning experience

- Improved learning products are much better tailored to the actual profile of our customers, providing the comprehensive information they require to address their range of usage environments.
- Installation assistance software through Library and Tape Tools (L&TT) checks the configuration of the installed drive in the host computer and helps the user to troubleshoot common problems (e.g. SCSI settings, cable connections, etc.).

Improved usage experience

- Improved tape drive front-panel design with better use of LEDs and labeling to indicate more effectively the status of the tape drive and current operation.

- Easier tape access through an extended eject distance to allow easy access of tape media when removing from tape drive.
- Easier tape management through changing the tape drive cleaning cartridge color to orange from blue to prevent customer confusion between standard data cartridges and cleaning cartridges.

Improved support experience

- Provision of local diagnostic tools through Library & Tape Tools (L&TT), which help the user to identify and troubleshoot typical error situations.
- Improved Product Upgradeability through L&TT that helps the user manage and undertake firmware upgrades to the drive, allowing the user to more easily take advantage of product enhancements.
- Improved interactive diagnostics through Instant Support that allow the customer to check their drive installation and e-mail the results of any tests directly to a HP support engineer.

Improved accessibility experience

- Improved eject and power button design with modified size, shape, and color to make the tape drive more accessible.
- Improved accessibility of software and learning products to make them accessible through better keyboard access and through assistive technology (e.g., screen readers).

Organizational and process changes

Changes within the organization and the processes that drove the organization were crucial to integrating and sustaining the customer-centered approach.

Organizational changes centered on a reallocation of resources and process changes focused on the refinement of the product development process. In both cases there was a strong belief that these changes would help reduce internal costs through increased product development efficiency and reduced warranty claims, and help enhance sales through improved customer loyalty.

Specific changes:

- A revised product design process (product lifecycle) to reflect the key customer-centered design activities and deliverables
- Regular TCE team meetings in addition to the product development team meetings
- Regular customer experience design reviews within the customer's environment with members of the program team
- A specific job function within the product development organization, Customer Experience Design Engineer, which has TCE objectives and measures within its set of performance objectives

Cultural changes

Perhaps the most significant improvement brought about through the TCE program at HP Tape Division in Bristol is that the TCE message has been spread to a much wider group of people. Now, instead of a lone or single voice trying to look after the interests of the customer, there is empowerment of a much wider audience to help advance the customers' interests.

The way this tends to work is that the TCE team still retains overall responsibility for identifying TCE objectives and measuring products/services against those targets. However, the responsibility for identifying potential solutions lies with the wider product development team.

This has a number of real advantages to the way TCE is done within the HP Tape Division in Bristol:

- Wider range of inputs—Just getting the directed input from a wider range of HP staff means that we are much more likely to come up with a better solution than if the “design request” was left to the design team.
- Customer requirements have the potential to affect fundamental shifts in the design—since the customer requirements are reviewed with business and marketing requirements early in the design process.
- We let designers design—Sounds obvious, but it is easy to fall into the trap of the TCE team describing the solution rather than describing the problem and letting some of our great designers come up with better solutions.
- Greater ownership of solutions—This has been a true success of the TCE program. By shifting the emphasis from the TCE team trying to impose solutions, to getting the product team to understand customer problems and concerns, and then for them to invent the solution—there is no doubt that there is a much greater level of ownership within the product teams.
- Greater supportability of solutions—Because our solutions have been invented and designed by the product team, the solutions they come up with tend to be easier to support and evolve with future product developments.

- Better solutions, continuous improvement—Taking account of the other factors previously mentioned, the overall result is that we now specify, design, implement, and support a better “Total Customer Experience” for our customers, and we will continue to get better!

Key Lessons

The following points summarize the key lessons from this project:

- Using a proven change-management approach (Kotter’s), increased our chance of success. The time we spent to plan and implement change management was important to set the conditions for the division in adopting the customer-centered design approach.
- Organizational change takes time since it involves new roles, relationships, ways of thinking, behaviors, and approaches to work [4].
- Having a simple, teachable, customer-centered design process that was a modification of a process the program team already knew, made accepting the process easier.
- Having the same TCE lead/champion/mentor throughout the program (Andrew) provided a consistent philosophy and approach for the team.
- The use of a variety of communication vehicles (e.g., group meetings, posters, one-to-one talks, videos/CDs, key stakeholders on customer visits), and communicating the same core message in appropriate variations for different levels of management and different disciplines (all of whom have different motivations) provided a better chance that the core message would be understood and internalized [5] [6].

- Technical prowess and logic are not always enough to bring about changes. Allowing the emotional message from the customers to come through to the team members, by using multimedia or onsite usability testing, helped the members to really live the customers “experience” and truly understand the importance of customer issues [7] [8] [9] [12].

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References

- [1] Rohn, J., and Braun, S., (1993). Structuring Usability Within Organizations, Usability Professionals Association Conf. 1993, Redmond, WA.
- [2] Rideout. T. B., Hewlett-Packard’s Usability Engineering Program Usability in Practice, 1994 by Academic Press
- [3] Mrazek, D, and Rafeld, M (1992). Integrating Human Factors on a Large Scale: Product Usability Champions, Proc. ACM CHI ‘92 Conf., Monterey, CA pp.565-570.
- [4] Rideout, T.B. (1991). Changing Your Methods from the Inside, IEEE Software, 8, (3, May), 99, 100, 111.

- [5] Bloomer. S., Croft. R, Wolfe. S. Selling Usability Into Organisations: Strategies for Convincing People of the Value of Usability CHI 98.
- [6] Bias, R. and Rietmeyer, P.B. Usability Support Inside and Out, Interactions (April 1995) ACM Press. 29-32.
- [7] Nielsen, J. Usability Engineering. Academic Press, 1993.
- [8] Rosenbaum. S, Chauncey E.W., Jokela, T., Rohn J. Smith. T, Vredenburg, K. Usability in Practice: User Experience Lifecycle – Evolution and Revolution CHI 2002, April 20-25 Minneapolis.
- [9] Bloomer. S, Croft. R Pitching Usability to Your Organization Interactions November + December 1997.
- [10] Mayhew. D Strategic Development of the Usability Engineering Function. interactions, September – October 1999.
- [11] Kotter, J. Leading Change, Harvard Business Press.
- [12] Trenner, L. and Bawa. J. The Politics of Usability. Springer-Verlag, 1998, London.

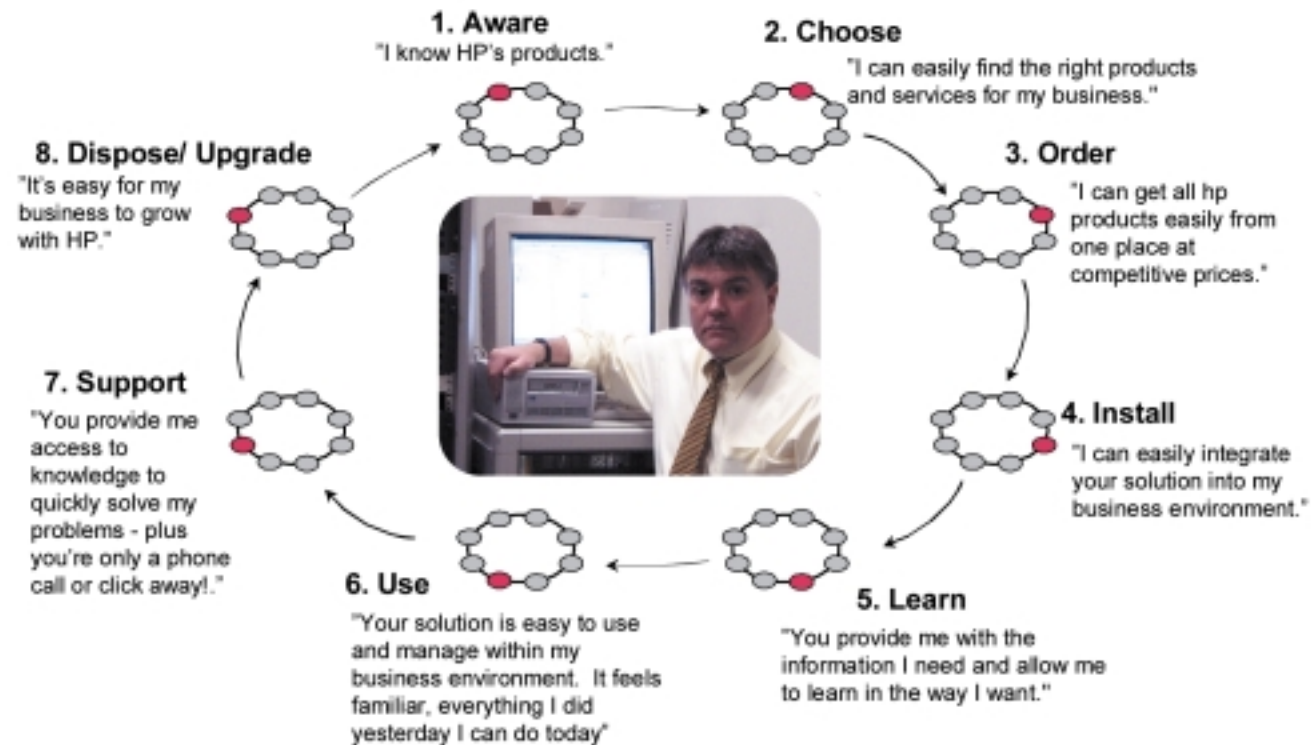
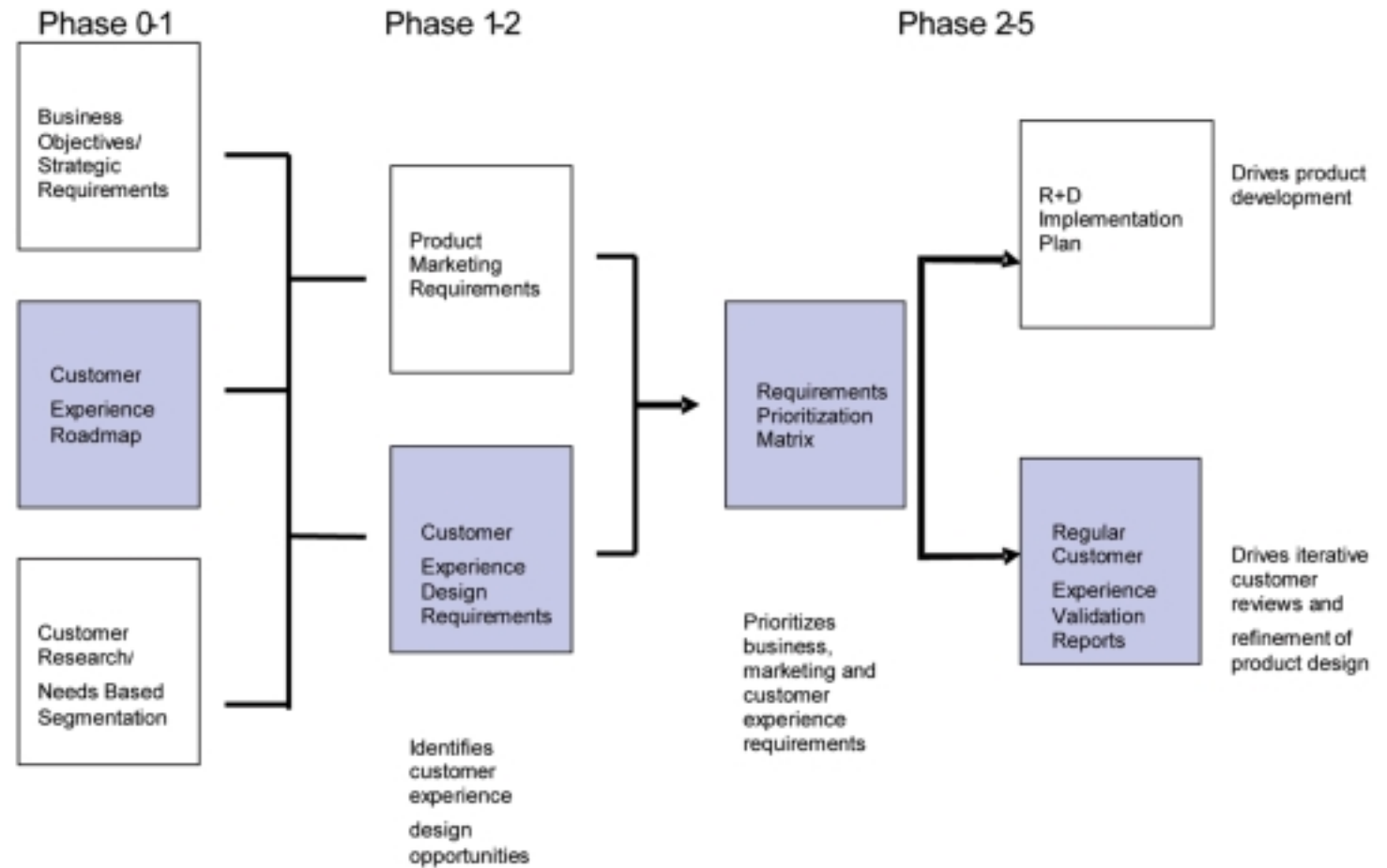


Figure 2: A sample of "Total Customer Experience" touchpoints for enterprise customers. The tape drive designers put most, but not all, of their focus on the "Install," "Learn," "Use," and "Support" touchpoints.

Figure 3: The Customer Experience Roadmap helps a team understand how customer, business, marketing, and technology requirements can evolve together in successive generations of products.

	Generation 2	Generation 3	Generation 4
Business Objectives	<ul style="list-style-type: none"> • Create and grow new XXX market by driving customers to switch from competitive products to HP drives by delivering XXX. 	<ul style="list-style-type: none"> • Continue to grow market share for HP drives and become dominant XXX vendor through XXX. 	<ul style="list-style-type: none"> • Protect market share for HP drives with XXX.
Value Propositions	<ul style="list-style-type: none"> • Consistently completes the backup and restore first time. • Etc. 	<ul style="list-style-type: none"> • Less time, cost + risk in finding out about, evaluating, purchasing and getting started • Save time + cost at XXX 	<ul style="list-style-type: none"> • Lower cost of XXX
Customer Experience Target Customer: Network Administrator in an IT environment	<ul style="list-style-type: none"> • Exceptional reliability resulting in fewer tape and media failures during backup and restore resulting in less service downtime, reducing anxiety, aggravation and costs. (Usage experience) 	<ul style="list-style-type: none"> • Better experience in XXX 	<ul style="list-style-type: none"> • First in industry to deliver XXX
Solution Features	<ul style="list-style-type: none"> • Software compatibility with leading operating systems. • Etc. 	<ul style="list-style-type: none"> • Enhanced XXX. • Etc. 	<ul style="list-style-type: none"> • XXX
Technology Features	<ul style="list-style-type: none"> • XXXGB capacity on a single cartridge of up to XX MB/sec). 	<ul style="list-style-type: none"> • XXX GB capacity on a single cartridge. • Transfer rate of up to XX MB/sec. • Enhanced display 	<ul style="list-style-type: none"> • XXXGB capacity on a single cartridge. • Transfer rate of up to XXXMB/sec.

Figure 4: This diagram shows the relationship of documents that are familiar to the project team (in white) and new documents for a customer-centered approach (in blue). Reallocation of existing resources, roles and responsibilities; and activities was necessary; however, there was little impact on the product development duration.



TCE Touchpoint	Value Proposition and Target Experiences	Customer Goal	Design Criteria	Customer Experience Design Opportunity	Customer Success Metric
Installation	<p>Less time, cost, effort and risk in getting started. <i>"I can easily integrate the tape drive into my business environment with the minimum of disruption and downtime."</i></p> <p><i>"I can easily verify that the tape drive is working before I use it for my daily data protection activities."</i></p>	<ul style="list-style-type: none"> -install tape drive. -Verify tape drive installation 	<ul style="list-style-type: none"> -Learning Products (LPs) and tape drive back panel design enable easy and fast installation. -Software that enables fast and easy verification at any time. 	<ul style="list-style-type: none"> -Key information provided on a poster. -SW user interface design troubleshoots then guides customer through successful installation. -Customer is made aware of verification tool. -CD-ROM based software verification tool 	<ul style="list-style-type: none"> -Obtain "Big Picture" of what to do within two minutes. -install tape drive within 15 minutes. -Verify successful tape drive installation in 15 minutes

Figure 5: Excerpt from a Design Opportunity Table showing how various key customer information is integrated for designers.

High Customer Importance	<ul style="list-style-type: none"> ● Hardcopy of installation information in box vs. a CD-ROM. (customer requirement) 	<ul style="list-style-type: none"> ● Poster in box with key information (customer requirement) 	<ul style="list-style-type: none"> ● 200 GB capacity for data cartridge (business requirement) ● Highlight performance tool to optimize tape drive performance (marketing requirement)
Med. Customer Importance	<p>--- <i>Threshold</i> ---</p>	<ul style="list-style-type: none"> ● Verify successful installation using software tool (customer requirement) 	<ul style="list-style-type: none"> ● Successfully install tape drive within 15 minutes (customer requirement)
Low Customer Importance		<ul style="list-style-type: none"> ● Quick reference card for troubleshooting tape drive operation (marketing requirement) 	<ul style="list-style-type: none"> ● Re-use as much of generation 1 front panel design as possible (technical requirement) <p>---</p>
	Low importance to Business	Med. importance to Business	High importance to Business

Figure 6: Matrix used to prioritize business, marketing, technology, and customer requirements. Any requirements above the blue threshold lines would be considered candidates for final design requirements.