



Interdisciplinary Collaboration: A Case for Good Project Management

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Introduction

The precise nature of this process of design is infinitely varied and therefore difficult to summarize in a simple formula or definition. It can be the work of one person, or of a team working co-operatively; it may stem from a burst of creative intuition, or from a calculated judgment based on technical data or market-research investigations, or even, as some designers maintain, be determined by the taste of a managing director's wife.

John Heskett, 1980

Industrial Design

Some twenty-two years after John Heskett penned his axiom about the process of industrial design, it remains relevant, and even poignant. The role of industrial design has changed over the years, however, and this trend is likely to continue in the new millennium. The ever-expanding role of technology in industry and manufacturing demands an increasing collaborative effort in the business arena. Fewer and fewer designers work alone, depending on the proverbial "burst of creative intuition" to fuel their livelihoods. It is now commonplace to work collaboratively on projects from the initial brainstorming of the ideas all the way through the manufacturing process. As a profession, industrial designers have developed solid relationships and business practices for co-operative work with mechanical engineers, product and brand managers, marketing personnel and manufacturing groups. Designers have acquired a competency in specifying materials and processes and they have learned to compromise with engineering to meet price points and manufacturing limitations while still maintaining the integrity of their design. The collaborative relationships aren't without difficulties at times, but industrial designers, engineers and marketing have become comfortable and fluent with the collaborative process over the years.

As technology continues to advance at an accelerating pace, business seeks ways to capitalize on these advances. Industrial designers and engineers are forced to shoulder new burdens. They are continually pressed to embrace new technology; to make their products faster, cheaper, and smaller. The race to be first to market is the bottom line for business. In this emerging business landscape, industrial designers are finding themselves working in nontraditional interdisciplinary teams with physicists, psychologists, computer programmers, anthropologists, multimedia designers and other specialized professionals. This collaboration affords exciting new opportunities for the profession but it also offers an equal number of challenges as design teams search for that familiar fluency of collaboration that hasn't yet evolved. Design education and professional practice are struggling to develop coping strategies for effective and productive collaboration within these varied interdisciplinary teams. The struggle can be minimized however, with a solid strategy involving basic tenets of good project management.

Priorities

The first step toward developing a successful strategy for interdisciplinary collaboration is the realization and acceptance that each discipline (and team member) has a different priority in regards to the project at hand. Acceptance of this concept is integral to the ultimate success of the team and the project. As early as possible in the project, the designer(s) must ascertain the priorities of each member of the interdisciplinary team. The laundry list of priorities should include identification of individual time commitment to the project, personal expectations for the project and the team, and a notion of the nature and type of final project deliverable.

The primary benefit of this exercise is to establish a preliminary project timeline with an overview of deliverables, dependencies and time commitments. This overview can identify potential project

bottlenecks and conflicts before they materialize. The exercise can also assist the group in coming to a consensus on the resolution of the project and the type of deliverables the group will produce.

Bottlenecks and conflicts typically occur when one team member's involvement in the project is dependent upon the completion of a task or series of tasks by another team member. These situations can become sources of great personal anxiety and tension if they are not averted or planned for appropriately. This is particularly true when a dependency occurs between team members with disparate time commitments to the project. Awareness of project dependencies allows the team to work cohesively and to plan the workload and workflow effectively. This, in turn, greatly reduces the potential for any team member to be the unknowing victim of a rapidly approaching deadline and an impossible workload.

Nontraditional business collaborations are fertile breeding grounds for misunderstandings of priorities and a failure to foresee conflicts and problems if not addressed openly at the beginning of the project. Members of successful teams use the same playbook even when they are on different pages.

Project Management Principle #1: As soon as possible, establish an overview of the project scope including timelines, deliverables and individual roles and responsibilities.

Process & Practice

[Industrial designers] came from diverse backgrounds, and their methods and achievements were very varied, but as a result of their work, design came to be recognized as an essential feature of commercial and industrial activity, a specialist element within the division of labor implicit in mass-production and sales.

John Heskett, 1980
Industrial Design

The second step toward achieving effective collaboration is learning to respect the process and contribution of all members of the team however varied and diverse. As simple as it seems, this is often the most challenging aspect for the team to overcome. Each discipline brings its own established methodologies to the project. These are time tested, valuable steps in the process of finding solutions to design and manufacturing problems. The variety of methodologies employed by the team members must be taken seriously even if they are not always fully understood.

Psychologists, for example, engage in practices that are steeped in academic rigor. For a psychologist, the design process will invariably begin with a literature review of books and articles published in peer-reviewed journals. The ultimate deliverable for a design project will often be an extensive written document describing the design in detail for the client. Psychologists will submit white papers describing the design process and outcome for publication as a matter of course too.

As a profession, psychologists are interested in very specific task and function analysis. Research is conducted in a scientific manner and design decisions are backed up with research findings. As the user tasks and product functions are understood, elaborate, factual scenarios about the product's usage including errors and exceptions are generated. The scenarios are cross-referenced with the product characteristics and benefits. Later in the design process, these scenarios will be used to test and evaluate the design solution in a quest for quantitative data that will verify the success of the design solution.

In contrast to the methodologies employed by psychologists, industrial designers are visually oriented and engage in iterative sketching and diagramming from the very beginning of a design project. Like psychologists, designers will generally perform a literature review although it will probably be less in depth. Similarly, designers will compare and contrast existing, competing products and will perform a

cursory task analysis. Scenario writing will also be employed by the designer although designers are prone to editorializing the scenarios in an attempt to establish ethnographic context for the design rather than simply generating stories of purely factual usage. Designers use scenarios to immerse themselves in the design and to understand the intended user. The ultimate deliverable for the designer is more likely to be a functional, three-dimensional prototype with appropriate technical drawings and renderings rather than a textual document. Industrial designers are also more likely to be concerned with the materials and processes used in the manufacture of the product – issues psychologists rarely consider in their design process.

The methodologies employed by both groups are valid and serve specific purposes. The ultimate goal of both disciplines is to provide an appropriate, user-centered design. Project management must allow all of the represented disciplines to work through the key and essential processes that will enable the design solution to formulate and mature. Respect for these varied processes is important within the team. Although psychologists typically don't draw, they still consider their process to be a design process. Likewise, designers typically do not engage in academically rigorous design practices of the type common to psychologists but this should not diminish the value of the industrial design methodology to the project.

Project Management Principle #2: Allow each discipline to engage in the appropriate design methodology to reach a mature design solution.

Accountability & Ownership

Once the priorities and contributions of each team member and discipline have been identified, the third step toward successful interdisciplinary collaboration can be tackled. Establishment of individual accountability to the team and the project is essential for success. All teams benefit from defined accountability. Ownership of a project or a portion of a project establishes personal responsibility and an opportunity for acknowledgement. Ownership is important to every member of the team and allows each person to establish personal goals and to prioritize individual tasks.

Adoption and implementation of a 360-degree performance review system for team members will further reinforce their role and commitment to the project. This type of performance review works equally well in both academic and business environments, allowing team members, managers (professors) and clients to assess the progress of the project and the individual performance of each team member relative to their responsibilities. This type of review should be performed in the middle of the project and again at the conclusion of the project. The middle review can assist the team in their attempt to correct problems and to keep the project collaboration flowing smoothly.

Project Management Rule #3: Successful planning and implementation of the project can only happen with individual accountability.

Vocabulary

Another often-daunting hurdle faced by interdisciplinary teams is one of language. In order for interdisciplinary collaboration to be successful, a common technical language must be accepted by all members of the team. It's of critical importance to realize that some disciplines, like psychology, anthropology and physics, place tremendous value on language and invest very explicit meaning in terminology while other disciplines, such as industrial design, generally do not.

An industrial designer and computer programmer working together may be able to easily discuss user navigation of an interface and may see the development of a navigation diagram as a critical component to the design of a cohesive interface. A psychologist on the team may feel that an interface design requires a product usage task flow analysis for completion rather than a navigation diagram. These conflicting needs among team members can create friction and frustration especially

when the team members do not realize that the navigation diagram and the product usage task flow analysis are essentially the same thing.

Similarly, when a psychologist designs a product or interface, errors, exceptions, and error recovery become critical components of the design. These error sequences will become the basis for the establishment of a protocol for warnings, cautions, advisories and acknowledgement of errors. Psychologists assume that users will make mistakes and will need guidance to correct their mistakes. Industrial designers tend to think and talk in terms of improving the product or interface in order to eliminate the potential for user mistakes rather than designing for user mistakes.

Differences in language manifest themselves in other ways too. Written documents become the hallmark of the design process for disciplines that do not use models, illustrations, diagrams and flow-charts to the extent that designers do. When asked to create a software design document (SDD), a statement of requirements document, a function and task analysis document, a mission element matrix (MEM) or an operator-machine interface specification (OMIS) document, a designer might struggle. These documents are foreign and do not exist in the typical designer's repertoire of design, research, and presentation tools. In fact, designers often fail to see the value of written reports and functional descriptions of problems. This is largely due to the fact that designers are educated to create visual, dimensional solutions. Clients typically do not hire industrial designers to produce copious analysis of existing product problems, rather they are hired to eliminate problems in a demonstrable, visual way. Designers show the client the solution. Other disciplines describe the solution.

Differences in language and meaning almost always result in immediate confusion for someone on the team. Team members should be encouraged to ask for clarification as soon as they become unsure of the demands being placed on them. Assumptions should be discouraged. Additionally, team members must learn to accept and appreciate the variety of mediums for communication. There is an Esperanto and it can be found.

Project Management Principle #4: Strive to find a common method for communication of needs, ideas and results among team members. Keep communication channels open at all times. Clarify confusion immediately.

Dynamic Methodology

Here is Edward Bear, coming downstairs now, bump, bump, bump, on the back of his head, behind Christopher Robin. It is, as far as he knows, the only way of coming downstairs, but sometimes he feels that there really is another way, if only he could stop bumping for a moment and think of it. And then he feels that perhaps there isn't. Anyway, here he is at the bottom and ready to be introduced to you. Winnie-the-Pooh.

A.A. Milne, 1926

Winnie-the-Pooh

The final component for success within an interdisciplinary team is the development of a methodology for working with the other disciplines represented. The methodology will be derived from the established process that is the core of the industrial designer's education and professional practice. It must represent the design steps that are key and essential to the designer's typical process. However, it will need to be adapted to include elements and processes that are critical to other team members as well. There must be flexibility among all involved with the project because the price of teamwork and modifications to established processes is compromise. Designers may need to learn and employ new terminology. Psychologists may need to learn to accept images rather than extensive textual documents. Physicists and other scientists may have to back away from some research and analysis or accept ideas that cannot be defended through experimentation.

One of the great advantages of interdisciplinary collaboration is the opportunity for continuing education from exposure to new ways of thinking. Positive professional growth can occur only when

individuals are willing to accept the notion that there might be a better way of doing things. Like Winnie-the-Pooh, acceptance of new ideas occurs most readily when not banging one's head repeatedly in defense of a known process. Elements of a modified methodology developed for particular teams and projects can easily become incorporated as standard practice for future work, thus enriching the designer's tool palette.

Project Management Principle #5: Provide fertile ground for all team members to harvest the best methods and processes other disciplines bring to the project.

Conclusion

Designers should embrace opportunities to work with new disciplines collaboratively. The breadth and scope of the projects can be larger and more impressive. The opportunity to learn new methods and practices can only enrich the designer's process and methodological approach for future projects.

Proper planning and project management throughout the project will make the experience rewarding and successful for all team members in spite of the myriad of potential difficulties. Consensus understanding of roles, responsibilities, expectations and deliverables from the earliest stages of the design are the keys to success. Open lines of communication will minimize personal stress and anxiety allowing the project to be personally fulfilling for individual team members. The final 360-degree review of the project and individual participation should include a post-mortem wrap up documenting the successes and failures experienced throughout the project. This is critical for smoother collaboration in the future. Good project management is the ultimate design tool regardless of professional discipline. Project management is the Esperanto that all teams seek

Project Management Principle #6: Document the successes and failures of the collaborative effort in order to build a stronger foundation for future interdisciplinary collaboration.

References

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