

Evaluation of Design of the process: Ideation to Implementation

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Abstract. The evolution of the design process has been a subject of interest due to its impact on the role of designers, the tools they use, and the overall design outcomes. This paper investigates the evolution of the design process, focusing on the shift from segmented specialties to a more holistic approach, as well as the emergence of the evolutionary design process model (EDPM). The objectives revolve around delving into the diverse methods and methodologies intricately woven into the design process. This involves a thorough exploration of how designs are conceptualized, developed, and refined. Additionally, it entails a critical analysis of the results obtained through these methods, seeking to unveil insights, strengths, and potential areas for improvement. By drawing meaningful conclusions from this analysis, the aim is to provide a comprehensive resource that offers both supportive and opposing viewpoints. This approach serves as a robust foundation to benefit designers, design teams, and organizations, empowering them to refine their design processes, fostering innovation, and encouraging continuous improvement in the realm of design methodology.

1 Introduction

1.1 Motivation

The exploration into the evolution of the design process is sparked by a notable observation of substantial changes in the role played by designers and the tools integral to their work. The motivation behind this inquiry stems from a profound realization that there have been significant shifts reshaping the fundamental aspects of a designer's responsibilities and the essential instruments utilized throughout their creative journey. The quest to understand this evolution is fueled by the recognition that the landscape within which designers operate has undergone a notable transformation, prompting a comprehensive examination of the tools, methodologies, and frameworks that have become pivotal in modern design practices. This investigation is driven by the need to comprehend how these changes have altered the very essence of a designer's role and the strategies they employ, ultimately influencing the creative process and outcomes in contemporary design practices.

1.2 Problem Statement

The evolution of the design process in the software industry has seen a shift from segmented specialties to a more holistic approach, as well as the emergence of the Evolutionary Design Process Model (EDPM). Evolutionary Design focuses on starting with a simple design that works and then enhancing it to meet future needs. It follows an iterative approach, avoiding over-design and wastage of effort, and designs just in time to deliver current value and incorporate relevant feedback[1]. Moreover, The software evolution process comprises key activities such as analyzing changes, planning releases, implementing systems, and delivering the finalized systems to users. This process is indispensable due to fluctuating requirements, environmental shifts, heightened security risks, and the constant demand for new functionalities and features in software. Product design is a highly involved, often ill-defined, complex, and iterative process, and the needs and specifications of the required artifact get more refined only as the design process moves toward its goal[2].

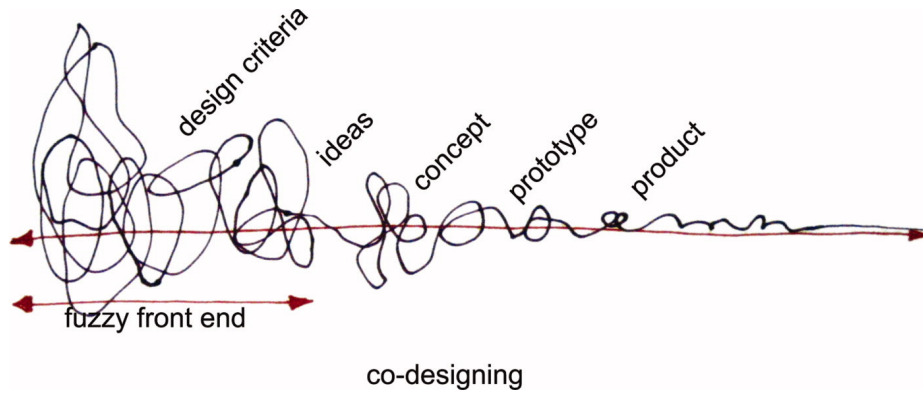


Fig. 1. Visual Representation of the problem of process design[10]

A prolonged examination of software design methods has revealed shifts in how software is designed and the usage trends of modeling languages like UML. This study showcases how software design practices and models have changed over a ten-year span. The progression of software development approaches has introduced diverse prototyping models and methodologies like joint application development, user design, and rapid construction. These methodologies underscore iterative processes and focus on building software in stages centered around specific features.

1.3 Objective

The aims and aspirations driving this investigation encompass a multifaceted exploration:

Firstly, the profound desire to comprehensively fathom the diverse methods and methodologies intricately interwoven within the intricate tapestry of the design process. This involves a meticulous expedition into the varied techniques utilized, dissecting their applications and nuances across the spectrum of design creation.

Secondly, to delve into the depths of the results procured from this design process under a myriad of conditions and constraints. It necessitates a meticulous analysis, scrutinizing the outcomes obtained through the application of these methods. The aim is to unearth insights and observations that manifest under different contexts, allowing for a nuanced understanding of the impact of varying conditions on design outcomes.

Lastly, a critical endeavor involves the holistic assessment of the design process's quality and its practical applicability within real-world scenarios. This evaluative pursuit seeks to gauge the efficacy and relevance of the design methodologies in practical, real-life settings. It involves an exploration of how these methodologies translate into tangible outcomes and solutions that align with the complexities and demands of real-world applications.

2 Background Material

2.1 Evaluation of Design process

The evolution of the design process marks a substantial transformation wherein designers have moved towards specialized roles, focusing on distinct facets like wireframing, prototyping, and visual design. Notably, these once-distinct realms have seamlessly merged into a more comprehensive and interconnected approach. This shift signifies a departure from siloed practices towards a more integrated and holistic design methodology.

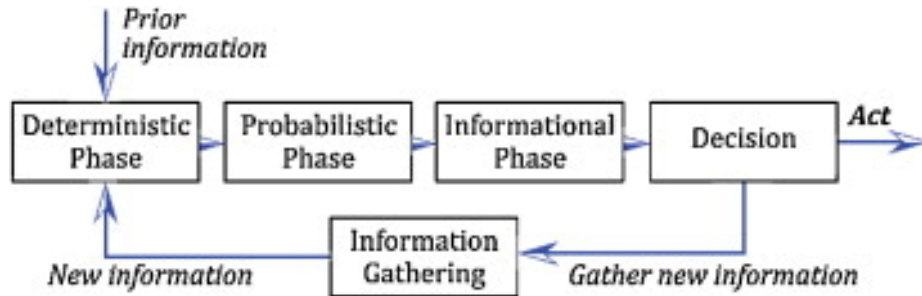


Fig. 2. Phases of process of design

Alongside this evolution, the tools integral to the design process have undergone a parallel transformation. These adaptations in toolsets cater to and complement the amalgamation of design roles, reflecting a reimagined suite of

tools tailored to the contemporary designer's multifaceted needs and workflow demands.

2.2 Evolutionary Design Process Model (EDPM)

The evolutionary process design model is a software development approach that involves making an initial product and then evolving the software product over time with iterative and incremental changes. It is a combination of the iterative and incremental models of the software development life cycle. The model divides the development cycle into smaller, incremental waterfall models, allowing users to access the product at the end of each cycle. The evolutionary process design model epitomizes a progressive paradigm in software development, diverging from conventional methodologies by advocating a dynamic approach to product refinement. At its core, this model signifies an iterative and incremental journey, commencing with the inception of a rudimentary product and subsequently nurturing its growth through gradual enhancements.

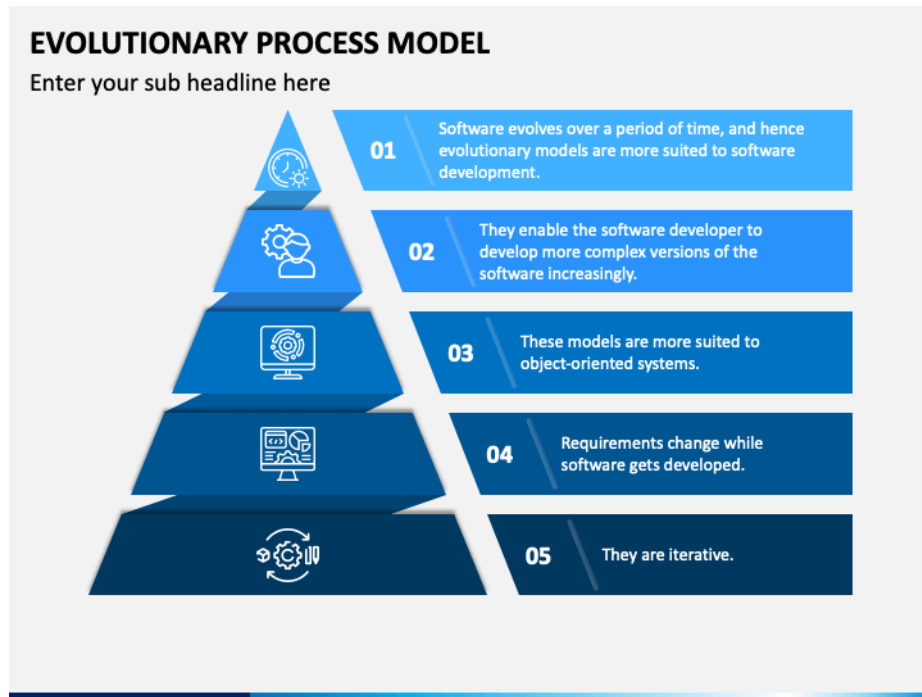


Fig. 3. Evolutionary process model[3]

This methodology amalgamates the foundational tenets of iterative and incremental models, delineating the conventional software development life cycle

into a sequence of smaller, more manageable phases. Each phase, akin to discrete waterfalls, unfolds incrementally, affording users access to an evolving product at the conclusion of each cycle. This deliberate structure facilitates invaluable user feedback, serving as a pivotal compass guiding the planning of successive cycles.

This approach embodies a philosophy of adaptability and responsiveness, aligning seamlessly with the dynamic landscape of contemporary software development. Its agility permits swift adjustments, aligning the software's evolution with the evolving needs and preferences of its end-users. Consequently, it stands as a cornerstone methodology in the repertoire of strategies tailored for substantial projects, offering adaptability, responsiveness, and a nuanced understanding of user expectations. It allows for iterative development and provides feedback for the planning stage of the next cycle. This approach is suitable for software products with redefined feature sets during development due to user feedback and other factors. It is commonly used in large projects where modules can be easily found for incremental implementation, and when the customer wants to start using the core features instead of waiting for the full software.

2.3 The Evolution of design Methods

The idea behind the word “design” is relatively recent. The concept was established in the modern era, before the Industrial Revolution. It became characteristic of this period, not only in the restrict sense of product design, house design or urban planning, but also in the sense that all dimensions of life could be planned.[4] The essence of design within Architecture, Industrial Design, and Engineering embodies distinctive attributes that extend beyond technical facets to encompass social and political dimensions. Irrespective of the field, engaging in design endeavors entails addressing a multitude of demands concurrently. This multifaceted engagement significantly influences not just the functionality and user-friendliness but also has ramifications on the environment and society at large. The concurrent consideration of various aspects within design isn't novel; it has been a prevalent subject since the 1970s. This approach underscores a holistic viewpoint that acknowledges the interplay between requirements like ergonomics and technology, recognizing their mutual impact on each other.

3 Methods and methodologies

3.1 Approach to the problem

The investigation encompassed a thorough review of varied literature sources, spanning academic papers, industry publications, and case studies, aiming to dissect the evolution of design processes. By delving into this extensive pool of resources, the focus was on identifying pivotal trends and methodologies shaping the transformation within the design landscape. This analysis concentrated

on discerning patterns, historical shifts, and the integration of user-oriented approaches, investigating how traditional models evolved into contemporary frameworks. The scrutiny aimed to understand the underlying principles steering the evolution of design methodologies and their practical implications in modern design practices.

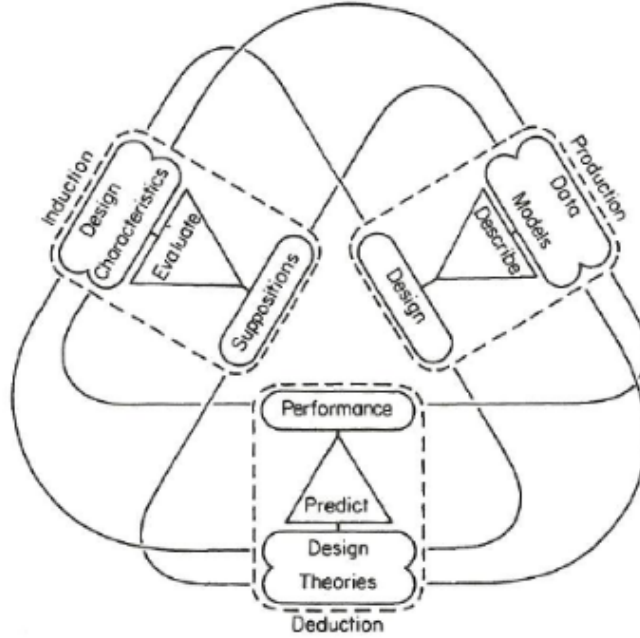


Fig. 4. Phases of process of design[4]

Through this meticulous examination, the investigation sought a comprehensive understanding of the intricate mechanisms embedded within the evolutionary design process model. It involved dissecting the systematic frameworks and operational strategies characterizing contemporary design paradigms, such as design thinking and agile methodologies. By intertwining theoretical insights with practical applications, the study aimed to unravel the fundamental principles driving the evolution of design practices, offering a nuanced view of the transformative trends and methodologies shaping the design domain.

3.2 Technique Used In Analysis Of Result

The analytical phase of this study was dedicated to an in-depth examination aimed at uncovering recurrent themes and discernible patterns inherent in the

evolutionary trajectory of the design process. This rigorous analysis encompassed a meticulous review of diverse instances and historical shifts within design methodologies, focusing on identifying overarching themes that persisted across various stages of design evolution. Furthermore, this phase entailed a comprehensive evaluation to gauge the suitability and adaptability of the evolutionary design process model across a spectrum of design scenarios.

This critical analysis involved an extensive exploration into the intricacies of design evolution, aiming not merely to recognize surface-level changes but to unearth fundamental recurring elements that have shaped the design landscape. The investigative lens was finely attuned to discerning consistent trends and underlying principles threading through the diverse manifestations of design evolution. Additionally, the evaluation phase aimed to ascertain the practicality and versatility of the evolutionary design process model, scrutinizing its potential applications and efficacy in varying design contexts and scenarios.

4 Critical Thinking

Supporting Arguments : The evolution of the design process toward a more holistic approach has garnered substantial support within the design community. Advocates assert that the transition from segmented specialties to an integrated approach fosters interdisciplinary collaboration and synergistic creativity. For instance, the amalgamation of wireframing, prototyping, and visual design into a unified workflow enables designers to conceive and refine concepts more cohesively, exemplified in Adobe’s integrated Creative Cloud suite [5]. This integration minimizes silos, streamlines communication, and nurtures a more efficient and iterative design process.

Moreover, proponents highlight the significance of the Evolutionary Design Process Model (EDPM) in facilitating iterative refinement. The model’s emphasis on multiple iterations leads to natural and informed outcomes, exemplified by the application of EDPM in architecture through iterative design stages that progressively refine architectural concepts [6]. Such iterative practices allow for user feedback integration and continuous improvement, aligning with contemporary demands for adaptable, user-centric design.

Opposing Arguments : However, detractors of this evolution cite challenges stemming from the broadening scope of design roles. The integration of diverse design aspects may dilute specialized expertise, potentially hindering in-depth mastery in specific design domains. For instance, the convergence of various design roles into a singular, multifaceted role might dilute expertise in specialized areas such as user experience (UX) or interaction design. This can result in a lack of depth in addressing intricate user needs, as exemplified by cases where broadening job roles may diminish specialized skill sets [7].

Additionally, critics argue that while EDPM encourages iterative exploration, this model might inadvertently foster a perpetual state of flux without definitive closure. In fields like product design, this continuous exploration might delay the delivery of final, market-ready solutions. For instance, the iterative nature

of EDPM could potentially lead to prolonged design cycles, delaying product launches and market entry [8].

Real-World Examples Supporting arguments find validation in the evolution of design tools such as Figma, a collaborative design tool that integrates various design stages into a unified platform [4]. Conversely, opposing arguments find resonance in the challenges faced by multi-disciplinary design agencies attempting to balance broad expertise while maintaining specialization in niches.

This critical analysis underscores the complex landscape surrounding the evolution of the design process, wherein integrated approaches offer efficiency and collaboration but also pose challenges in maintaining specialized expertise and timely deliverables.

5 Results

5.1 Under Varied Condition

The evolution of the design methodology occurred amidst a mosaic of influences, adapting to shifts catalyzed by technological strides, fluid industry dynamics, and the ever-evolving landscape of design responsibilities. Technological advancements played a pivotal role, spearheading inventive approaches within the design sphere. Notably, the introduction of intuitive design software revolutionized collaboration, expediting iterative processes among design teams. Moreover, the demand across industries for adaptable frameworks and user-centric solutions fueled an iterative transformation in design methodologies, reshaping problem-solving strategies across diverse sectors. Simultaneously, the paradigm shift from isolated design specializations to collaborative, interdisciplinary roles heralded a surge in creativity and innovation within the design framework.

5.2 Constraint & Quality Assessment

The pursuit of refining the design process brought forth significant constraints necessitating deliberate attention for successful implementation. Alignment with overarching objectives emerged as a foundational prerequisite, ensuring each facet of the design journey seamlessly intertwined with the organizational goals. A systematic and methodical approach, characterized by structured frameworks and well-defined workflows, stood as the linchpin for effective design execution. Additionally, meticulous attention to detail emerged as an indispensable aspect, facilitating the infusion of nuanced perspectives into every phase of the design expedition. While these constraints were pivotal, they posed formidable challenges, demanding concerted efforts and strategic cohesion for effective navigation.

The evaluation of the design process delineated its efficacy and inherent limitations. Evidently, the process exhibited commendable momentum, nurturing an environment conducive to iterative enhancements and innovation within the design sphere. Nevertheless, within this upward trajectory, anomalies surfaced in instances characterized by discordant problem definitions. Ineffectiveness often

stemmed from the erroneous delineation of problem statements, leading to misguided endeavors and subpar outcomes. Rectifying these misalignments emerged as a pivotal intervention to augment the overall effectiveness and significance of the design process, aligning it more harmoniously with the envisioned objectives.

6 Conclusion and Future Works

When envisioning progress, the imperative lies in refining objectives and embedding a structured framework within design strategies. Cultivating an environment conducive to transparent goal alignment and meticulous attention to detail within the design paradigm stands as pivotal in refining approaches. The iterative nature of revisiting and fine-tuning the core problem ensures adaptability in navigating a landscape fraught with ever-evolving challenges.

While these strategies hold promise, potential impediments may surface within environments lacking cohesive, unified goals or structured methodologies. Ambiguously defined problems pose a risk of stagnation and ineffective outcomes. Overcoming these barriers is paramount in harnessing the full potential of design processes.

The insights gleaned from this exploration stand ready for integration into design teams and progressive organizations. Their assimilation promises a more streamlined operational landscape, closer synchronization with organizational objectives, and, on a broader spectrum, fosters a more harmonized and potent approach to design.

Reflecting on the trajectory of design evolution unveils substantial transformations in designers, tools, and achievements. A salient takeaway emerges - the perpetual refinement and evolution of design processes serve as the linchpin for ensuring ongoing relevance and efficacy amid the ever-changing dynamism of our surroundings.

The process of evolution in the natural world is nowadays seen as driven by a reaction to a surprise (change in environment), rather than a gradual changing of a phenotype and genotype in an ever closer approximation to an optimum in the fitness function. We suggest that creativity in the design process can validly be compared to such ‘bursts of development’[7].

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