



# The Science Behind User Experience Design

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**Abstract.** Planning and conducting User Experience (UX) activities in a structured and scientific manner has many advantages. It is important that UX Professionals understand the scientific basis of UX methods and leverage them to enhance the UX of the application being designed. It would also be easier for the UX designer to get a buy-in from the stakeholders if his design recommendations are based in scientific logic and whetted by supporting data. In this course, UX relevant social sciences based scientific concepts and methods will be presented to the audience in a way which is simple to understand and easily to assimilate.

**Keywords:** User Experience · Empirical Research · Scientific methods · UX · Experimental Design · Logic · Data collection and analysis · Data representation · Measuring user performance · Biases in research

## 1 Introduction

The underlying purpose of employing a scientific method in the User Experience profession is to make sure we, as User Experience (UX) Practitioners, have not been misled into thinking we have deduced something which is far from correct while making a design/process recommendation which in turn would adversely impact the application being built. In such situations, the credibility of the UX designer in an organization would be affected while the confidence of the stakeholders in the UX profession itself would erode.

Planning and conducting UX activities in a structured and scientific manner has many advantages. The primary end user would be the direct beneficiary – the application being built would be the designed and built for the user’s ease-of-use while the stakeholders would also see the maximum returns on their investment in UX. The cost of development would also decrease drastically due to reduced rework when the primary end user has been thoroughly understood; screens have been logically designed and have been empirically tested by a UX designer.

## 2 Learning Objectives

It is important that UX Professionals understand the scientific basis of UX methods enough and leverage them for improving the UX of the application being designed. When the UX process and design recommendations are based on empirical evidence and irrefutable data, then they will be received well.

By learning how to scientifically conduct UX studies, methodically analyzing data collected during such studies and subsequently providing sound design recommendations, the UX Professional will not just increase his own credibility within the organization but he will be easily able to evangelize and implement UX processes with a fair degree of ease across the organization.

Based on a deeper understanding of UX relevant scientific concepts and processes, the UX Designer would be able to better plan and conduct UX activities such as strategizing UX approach for solving the specific design problem, planning for and setting timelines of UX deliverables, planning and conducting User Research, creating and validating Personas, Heuristic Analysis of existing applications, planning and conducting Usability Tests, analyzing data obtained from User Research and Usability Tests and subsequently designing or proposing re-designs of applications/products.

### 3 Course Content and Schedule

My intent is to present some UX relevant social science based scientific concepts and process to the audience in a way which is simple to understand and easily to assimilate. With the knowledge and expertise gained from this course, the UX Professional would be able to take their UX practice a notch higher and by making recommendations which are scientific, and data driven – in other words, recommendations which are credible and irrefutable. I will cover the essential fundamentals of the course in two 90-min sessions. The course content is detailed below:

- Origins and background of User Experience Design (30 min)
  - Introduce the audience to the principles of Human Factors and Human Computer Interaction which were precursors of the field of User Experience Design. This would enable the user to understand the origins and the scientific rationale behind some of the methods employed in UX Design
- Principles of Applied psychology in relevance to UX Design (90 min)
  - Introduce the audience to concepts of Cognitive Psychology, the Information Processing model, Memory, Sensation, Perception, Affordance and Attention in the contexts of Human Computer Interaction with specific examples.
- The concept of Empirical Research and takeaways for UX Design (40 min)
  - Introduce the concepts of Empirical Research, Hypothesis, Theory, Law, Experimental Design, Measuring Human Performance and Empirical Methods of Data collection & analysis.
- Data Science in the context of UX (20 min)
  - One of the goals Data Science is to communicate insights obtained from data gathering and analysis in the form of simple stories/visualizations that a layman can understand and come to conclusions on. Conducting UX activities in a structured and scientific manner yields plenty of data with invaluable insights hidden within it. When this data is cleaned up and visualized in a way which makes sense, deep awareness of end-user preferences and behaviors come to light. The last module focuses on Data Visualization Methods where insights obtained from analysis of data can be represented in a way which the stakeholders can easily derive meaning out of.

## **4 Background of Attendees**

The course would be interest to

- i. UX Practitioners who want to understand the scientific basis behind the profession and to also understand how to logically and scientifically base their arguments for the designs or design process they will be proposing to stakeholders coming from varied backgrounds.
- ii. Project Managers who want to get insights on the decision-making process of UX practitioners and also to understand the importance of the scientific methodology behind some of the UX processes.
- iii. Designers who are from a graphic design or content writing background and are not familiar with the core fundamentals and the empirical origins of the User Experience Profession
- iv. The course would not be useful for someone who is well versed with the methodologies of social science research.

## **5 Presentation Format**

A set of presentation decks will be used to deliver the course contents to the audience. I am envisioning a workshop model with mini assignments and experiments within the course content to enable the audience to grasp the core takeaways from the course.

## **6 Audience Size**

Anything around or above 20 participants would be a good audience size.