UX Research / Human-Centered Design Methodologies

Please find a list of common UX research / human-centered design methodologies, including descriptions, when to use them, who to involve, as well as additional resources on how to conduct each type of methodology. These methodologies can be applied to a variety of settings, including digital and non-digital areas of practice. When these methodologies follow an iterative approach to allow for the continuous refinement and assurance that the user and/or priority population is kept in mind and incorporated throughout the entire research/design project. Finally, this list does not define *every* UX research, rather, it provides a high-level introduction to how human-centered design methodologies can be incorporated within projects:

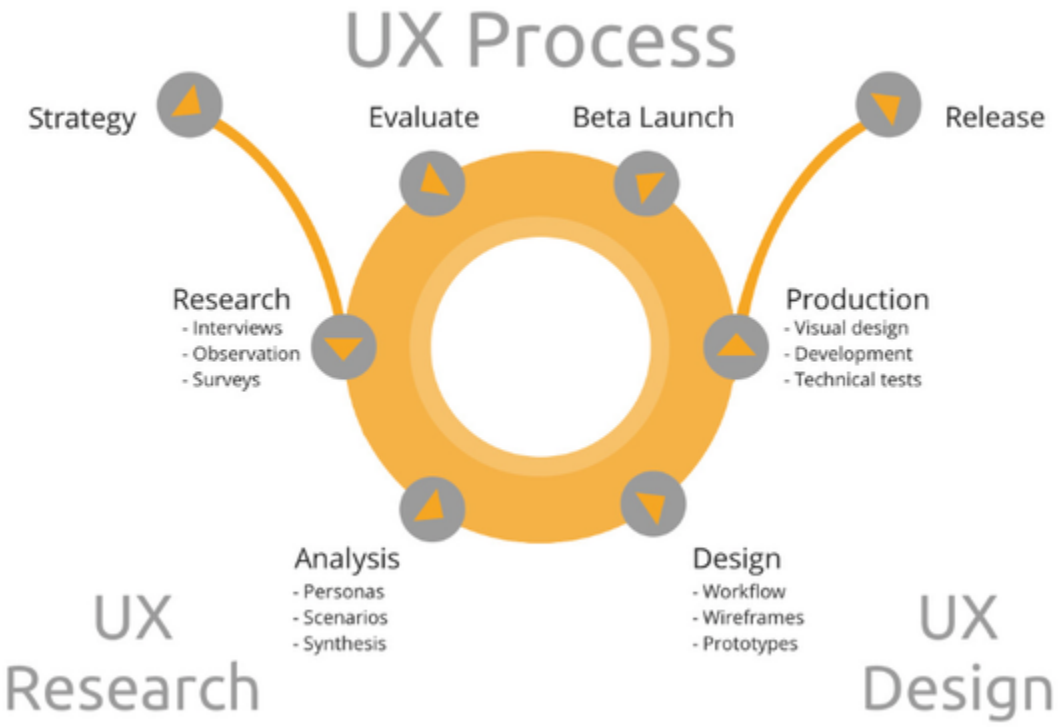


Image Resource: Perpetual. (2016). "Delightful User Experiences: Great UX Research and UX Design." Retrieved from: https://www.perpetualny.com/blog/ux-research-vs-ux-design

>If you're trying to understand/better understand your users...

DISCLAIMER: You will want to *first* conduct initial user research through interviews/observations/notes/affinity diagrams, as this evidence will assist you in the following methods.

Empathy Mapping

Description: An Empathy Map is a four-quadrant diagram that allows designers to succinctly define their users, based on interviews/observations/notes/affinity diagrams and other learnings that have been gathered during initial interactions with users (see image and example below). As the name implies, the map is intended to allow the design team to begin empathizing with their user population.

When to Use/Create: Typically, empathy maps are developed at the beginning of the design process, as these maps provide a deeper dive into the user population. Maps can be developed for users that may be represented through specific personas (see below) or for a general description

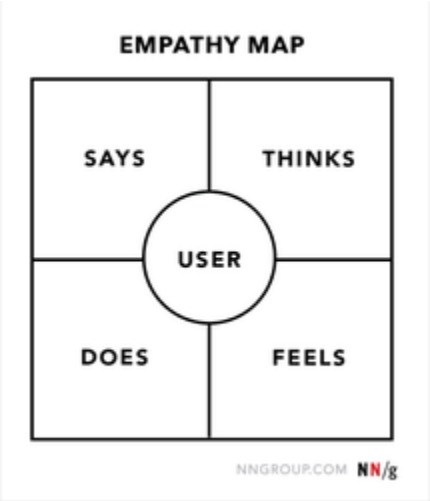
of all users that may use the product. If the latter is used, it is important to understand that not *every* feature of the standard user may be defined within the empathy map and that this will need to be addressed in future personas.

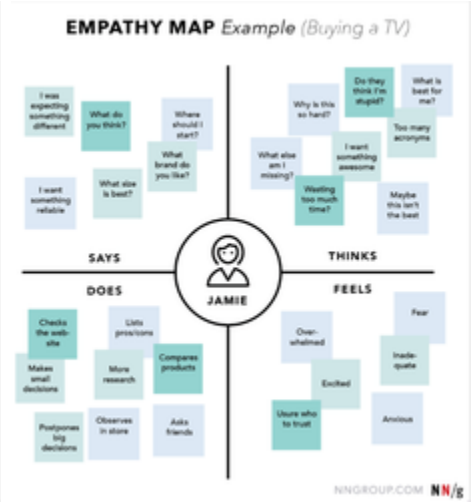
Who to Involve: Anyone on the design team can be involved in the empathy mapping; however, it is suggested to refrain from inviting end users/priority population members to be involved, as you do not want their bias to interfere with how the team is defining the users based on previous interviews/observations/notes.

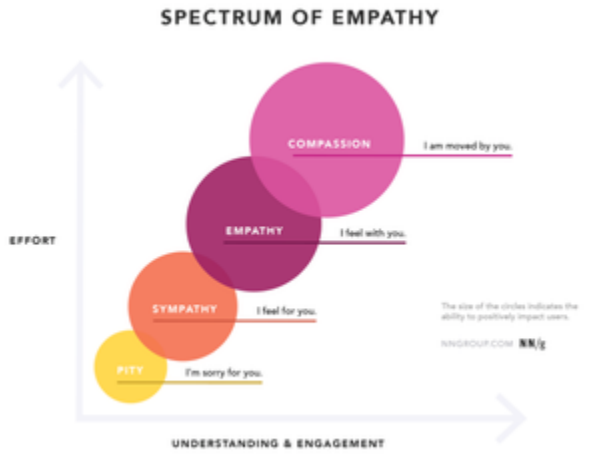
Resources:

- Interaction Design Foundation. (2018). "Empathy Map - Why and How to Use it." Retrieved from: https://www.interaction-design.org/literature/article/empathy-map-why-and-how-to-use-it
- Nielsen Norman Group. (2018). "Empathy Mapping: The First Step in Design Thinking." Retrieved from: https://www.nngroup.com/articles/empathy-mapping/

Figures:







Personas/Scenarios

Description:

- A **Persona** is a fictitious representations and generalizations of a possible user that would use the product under development and is used by the design team throughout the design process to ensure the product is centered around the persona. As there may not be one, *single* type of user that interacts with a product, personas allow the design team to capture a small array of users to ensure the majority of users are incorporated within the product's design. Personas are established based on observations/interviews/notes and other user research methodologies.
- A **Scenario** is a fictitious statement that identifies the user's goals, frustrations, motivations, and/or needs that they may encounter/express when using the product. The general format for scenario construction is as follows: *As a [role], I want [feature]*

because [reason].

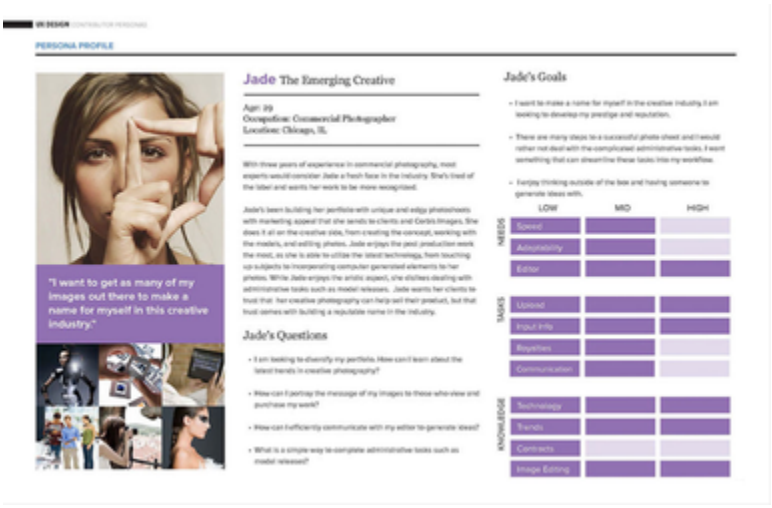
When to Use/Create: While personas/scenarios can be created/re-evaluated at any point in the design process, it is recommended to develop them early in the design process to ensure the product's development is continuously meeting the needs of the user population. If empathy maps have been established, these can be used to assist in generate the personas/scenarios, as well.

Who to Involve: Anyone on the design team can be involved in the empathy mapping; however, it is suggested to refrain from inviting end users/priority population members to be involved, as you do not want their bias to interfere with how the team is defining the users based on previous interviews/observations/notes.

Resources:

- JustinMind. (2017). "Defining user personas, user stories and storyboards. What's the difference?" Retrieved from: https://www.justinmind.com/blog/user-personas-scenarios-user-stories-and-storyboards-whats-the-difference/
- Nielsen Norman Group. (2018). "Why Personas Fail." Retrieved from: https://www.nngroup.com/articles/why-personas-fail/
- Spool, J. M. (2018). "When It Comes To Personas, The Real Value Is In the Scenarios." Retrieved from: https://medium.com/user-interface-22/when-it-comes-to-personas-the-real-value-is-in-the-scenarios-4405722dd55c
- Usability.gov. (2018). "Scenarios." Retrieved from: https://www.usability.gov/how-to-and-tools/methods/scenarios.html
- Usability.gov. (2018). "Personas." Retrieved from: https://www.usability.gov/how-to-and-tools/methods/personas.html
- Siniscarco, K. (2018). "Personas aren't the problem...your methodology is." Retrieved from: https://uxdesign.cc/personas-arent-the-problem-your-methodology-is-5c020f88561b

Figures:



User Journey Maps

Description: A Journey Map is a timeline version of a user's goals and actions the user may face when completing a certain task/interaction.

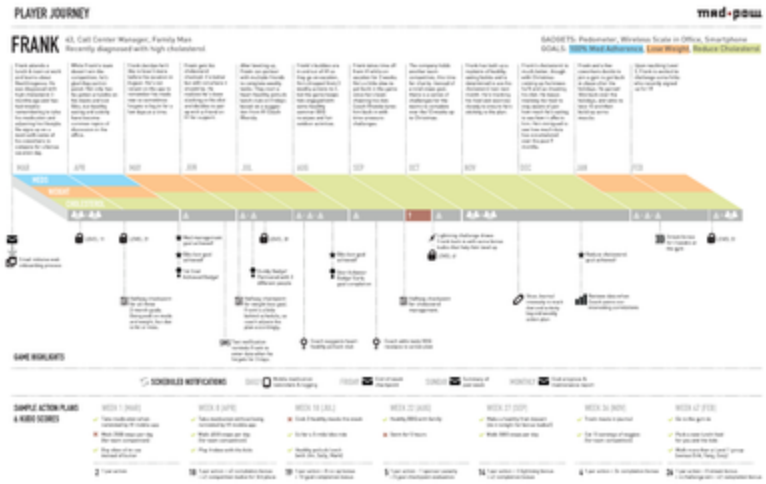
When to Use/Create: The journey map can be used at any time during development to understand how a user may be interacting with a product and what pain points or benefits the user may be experiencing at each step in the process. Personas/scenarios and empathy maps are also excellent resources to use when developing journey maps, as well.

Who to Involve: Anyone on the design team can be involved in the empathy mapping; however, users may want to be shown the map to validate whether it is capturing every process in the user's experience.

Resources:

- Nielsen Norman Group. (2016). "When and How to Create Customer Journey Maps." Retrieved from: https://www.nngroup.com/articles/customer-journey-mapping/
- UXMastery. (2014). "How to Create a Customer Journey Map." Retrieved from: https://uxmastery.com/how-to-create-a-customer-journey-map/

Figures:



Service Blueprints

Description: A Service Blueprint is an expansion of the user journey map, in which business processes/interactions are included to showcase how the business delivers the user experience through human-to-human and human-to-computer interactions.

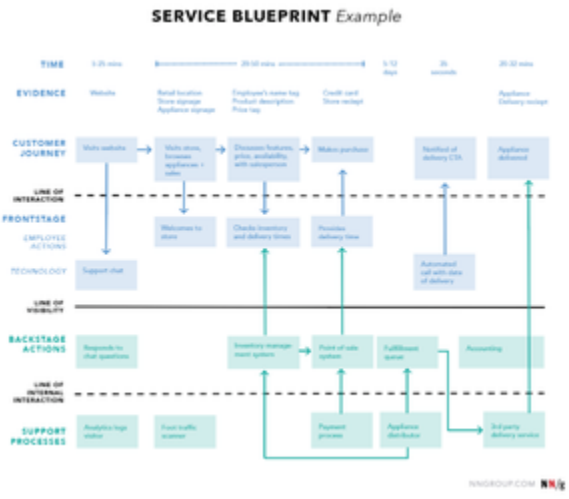
When to Use/Create: The service blueprint can be made at any point in a project; however, it has been recommended to produce this product after the user journey map is designed. They are highly beneficial when a business has multiple user/customer touchpoints, so that the employee's and user's experiences are directly and indirectly impacted. Overall, the service blueprint provides opportunities to understand gaps/weaknesses/pain points in the business' structure.

Who to Involve: The research/customer experience/design team is typically involved during the development of the blueprint; however, it could be validated with users and other stakeholders.

Resources:

- Gibbons, S. (2017). "Service Blueprints: Definition." Retrieved from: https://www.nngroup.com/articles/service-blueprints-definition/

Figures:



>If you're trying to understand/evaluate your product to meet user's needs...

Interaction/Site Mapping

Description: An Interaction/Site Map is a 2-D model of an app/website/information system's possible interactions through web/app pages.

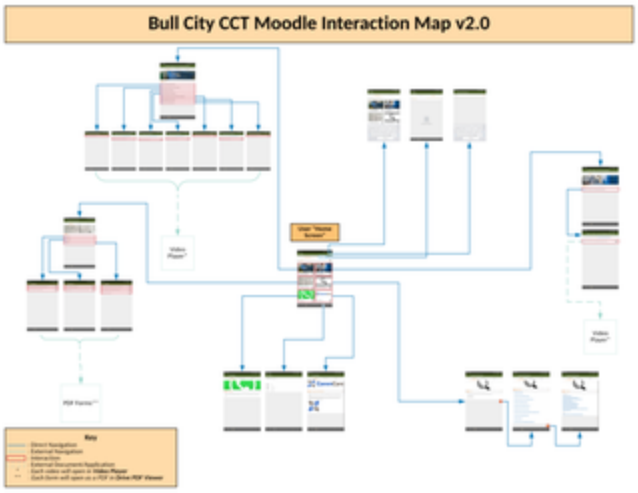
When to Use/Create: It is best to establish an interaction/site map when the first version of a digital product is released; however, the map should be continuously updated to reflect feature updates and/or changes in the product's layout. This map can also be used to evaluate the information/content architecture of specific navigational pathways and/or content nodes.

Who to Involve: The map is typically created by the design team and used as an internal resource to prioritize user research and/or introduce new team members/stakeholders to the high-level layout of the product; however, it can be used as a usability test / interview resource when discussing the product's layout with users.

Resources:

- Nielsen Norman Group. (2008). "Site Map Usability." Retrieved from: https://www.nngroup.com/articles/site-map-usability/
- Ward, T. J. (2010). "UX 101: The Site Map." Retrieved from: https://www.viget.com/articles/ux-101-the-site-map/

Figures:



Heuristics Evaluation

Description: A Heuristics Evaluation is a critical review of a product by design team members or a panel of usability experts to assess potential usability issues by comparing the product to a set of 10 heuristics.

When to Use/Create: This type of evaluation can be done at any point in the design process, however, it is best to evaluate a first version/release of the product to receive a thorough evaluation.

Who to Involve: Anyone on the design team or a panel of usability experts can be included in the evaluation.

Resources:

- Interaction Design Foundation. (2016). "How to Conduct a Heuristic Evaluation for Usability in HCI and Information Visualization." Retrieved from: https://www.interaction-design.org/literature/article/how-to-conduct-a-heuristic-evaluation-for-usability-in-hci-and-information-visualization
- Usability.gov. (2018). "Heuristic Evaluations and Expert Reviews." Retrieved from: https://www.usability.gov/how-to-and-tools/methods/heuristic-evaluation.html
- Wong, E. (2018). "Heuristic Evaluation: How to Conduct a Heuristic Evaluation." Retrieved from: https://www.interaction-design.org/literature/article/heuristic-evaluation-how-to-conduct-a-heuristic-evaluation

Figures:

Comparative Analysis

Description: A Comparative Analysis is a method used to evaluate strengths and weaknesses of products that are competing and/or potentially competing with the product under development. The comparison will allow for better, evidence-based decision-making in the design strategy of the product under development. Competitors can be defined as *direct, indirect, analogous*, or *niche* and it is best to pick three to five different types of competitors when completing the comparative analysis.

When to Use/Create: This method can be used at any stage in the product's design. For instance, a comparative analysis conducted at the beginning of a design cycle can assist in informing the initial layout/outline/brainstorm of a product. On the other hand, a comparative analysis can be conducted after user research demonstrates poor usability of the product to understand better ways to re-design the product and meet the user's needs. Further, the analysis can be presented in a table, chart, or even Excel spreadsheet.

Who to Involve: In general, anyone on the design team can be involved in the comparative analysis, whereas end users would provide feedback on the re-designed product. Key stakeholders may also want to be included in the presentation of the comparative analysis, as they may be providing funding and/or resources to the product's re-design and/or development.

Resources:

- Dalrymple, B. (2018). "Competitive Analysis - User research for beginners and pros." Retrieved from: https://medium.com/user-research/competitive-analysis-b02daf26a96e
- Danforth Media. (2014). "Conducting a Solid UX Competitive Analysis." Retrieved from: http://danforth.co/pages/2014/03/01/conducting-a-solid-ux-competitive-analysis/
- Grifft, D. (2017). "How to Talk About Your Competitive Landscape In Your Investor Pitch." Retrieved from: https://medium.com/the-mission/how-to-win-your-competitive-landscape-in-your-startup-pitch-2519210864bb
- Lachapelle, D. (2017). "A Designer's Guide to Competitive Research." Retrieved from: https://medium.com/wayfair-design/a-designers-guide-to-competitor-research-914b0deee25a
- Needham, K. (n.d.). "Competitive Analysis." Retrieved from: https://www.cmu.edu/swartz-center-for-entrepreneurship/assets/Olympus%20pdfs/Competitive%20Analysis%20.pdf

Figures:

>If you're trying to understand/better understand how to incorporate user research...

Card Sorting

Description: Card sorting is a method in which the product's information architecture is organized into categories by users. These categories can be pre-defined (a "closed" sort) or left up to the user's decision (an "open" sort).

When to Use/Create: A card sort can be conducted at any time in the design cycle. For instance, if a card sort is performed at the beginning of a product's development, the sorting completed by users will assist in understanding how the product's information should best be outlined to meet the user's needs. Likewise, if users reveal that a product's information is difficult to navigate/identify, a card sort can assist in understanding how to re-structure the information. Typically, content topics are written on post-it notes/paper and handed to the test participant. If the card sort is "closed", then categories will also be written on post-it notes/paper and given to the participant, in which the participant will be asked to organize the content topics into the pre-defined categories based on their perception. If the card sort is "open", content topics will still be written on post-it notes/paper and handed to the participant; however, categories will not be written on post-it notes/paper, rather, blank pieces of paper and a pen will be handed to the participant, so that they can organize content into user-identified categories.

Who to Involve: Typically, a moderator and note-taker from the design team should be present during the test to assist the test participant in completing the activity. The test can also be completed in a group setting; however, results may not be as clear due to varying levels of input. Further, this type of study can also be completed remotely through a variety of online tool (e.g., OptimalSort.com).

Resources:

- ExperienceUK. (n.d.). "What is card sorting?" Retrieved from: https://www.experienceux.co.uk/faqs/what-is-card-sorting/
- Sherwin, K. (2018). "Card Sorting: Uncover Users' Mental Models for Better Information Architecture." Retrieved from: https://www.nngroup.com/articles/card-sorting-definition/
- Usability.gov. (2018). "Card Sorting." Retrieved from: https://www.usability.gov/how-to-and-tools/methods/card-sorting.html

Figures:

Tree Testing

Description: Tree testing is a method in which the hierarchy of a category (i.e., "tree") on website/application is evaluated.

When to Use/Create: A tree test can be completed at any point in the design cycle; however, it is best used whenever you can establish a "tree" or hierarchy of categories and sub-categories and tasks that instruct the user to find specific items within the trees. Ideally, the tree should consist of all of the main categories and sub-categories. For instance, a tree test would be an excellent follow-up activity to evaluate a card sort. The actual tree test can be performed on paper, however, online tools can offer ease in data collection and analysis (see Userzoom and Tree Jack for demos and prices). The following figure is an example of how the categories and sub-categories should be outlined in Excel:

	A	B	C	D
1	Home			
2		Citizen		
3			Education	
4				Higher Education
5				K-12
6				Libraries
7				Students and Families
8				Teachers
9			Health and Wellness	
10				General Health and Wellness
11				Health Care
12				Insurance Providers
13		Visitor		
14			Culture and Art Resources	
15			Parks and Outdoor Resources	
16			New Mexico History Resources	
17			Travel	
18				New Mexico Travel Resources
19				New Mexico Tourism Department
20				Museums and Monuments
21			Popular Visitor Links	
22				Plan your trip to New Mexico through the Tourism Department
23				Cultural Affairs, New Mexico Department of
24				Visit the National Hispanic Cultural Center
25				New Mexico Transportation Services and Road Advisories
26				Expo NM
27				New Mexico Department of Game and Fish
28		Business		
29			Economic	
30				Economic Development Resources
31				Starting a Business
32			Taxes	

This spreadsheet illustrates the tree, or menu hierarchy, for the New Mexico State government website. Each category appears on a separate row, and subcategories are placed in columns to the right of the parent category which contains them.

When you perform the test with users, your tasks should be phrased according to the following examples:

- *You're trying to find information on restaurants in New Mexico. See if there is any information on this site that can aid in this request.*
- *You're curious how to maintain a healthy lifestyle in New Mexico. Click on where you believe this information is stored.*

In general, the test should last 15 to 20 minutes and should include 10 to 15 tasks.

Who to Involve: Typically, a moderator/tester, note-taker/timer, and tester are present in the in-person test setting. If the tree test is completed remotely, then several users may complete the tree test in their own accommodations.

Resources:

- Whitenton, K. (2017). "Tree Testing: Fast, Iterative Evaluation of Menu Labels and Categories." Retrieved from: https://www.nngroup.com/articles/tree-testing/
- ExperienceUX. (2019). "What is tree testing?" Retrieved from: https://www.experienceux.co.uk/faqs/what-is-tree-testing/
- Ratcliff, C. (2018). "What is tree testing and why is it important for your site's UX?" Retrieved from: https://www.userzoom.com/blog/what-is-tree-testing-and-why-is-it-important-for-your-sites-ux/

Usability Testing

Description: Usability testing is a method that evaluates a product's "ease-of-use" by testing specific tasks within/on the product through the participation of users. Through the observation of researchers/moderators/testers, a product's pain points and areas of success can be identified and re-designed to better meet the user's needs.

When to Use/Create: A usability test is typically conducted after a design mock-up/lo-fi/hi-fi prototype or first version of a product has been established, so that a user can interact with the product and complete the set of tasks prescribed by the tester. Usability tests can be conducted remotely or in-person and can be moderated or unmoderated. **The exact methodology of usability testing is complex and it is *highly* recommended to review several resources that provide background and/or step-by-step instructions.**

Who to Involve: Typically, a moderator/tester, note-taker/timer, and tester are present in the test setting. A group of researchers may be viewing the usability test from a remote setting. If the usability test is completed remotely, then several users may complete the usability test in their own accommodations. Remote usability testing can be completed through several tools, including Skype, Google Hangouts, UserTesting.com, or UserZoom.com. Finally, user feedback on a product's "ease-of-use" typically reaches saturation after completing usability testing with three to five users.

Resources:

- Mortensen, D. (2018). "The Basics of Recruiting Users for Usability Testing." Retrieved from: https://www.interaction-design.org/literature/article/the-basics-of-recruiting-users-for-usability-testing
- Nielsen, J. (2000). "Why You Only Need to Test With 5 Users." Retrieved from: https://www.nngroup.com/articles/why-you-only-need-to-test-with-5-users/
- Usability.gov. (2018). "Usability Testing." Retrieved from: https://www.usability.gov/how-to-and-tools/methods/usability-testing.html
- UXPin. (n.d.). *The Guide to Usability Testing.* Available at: https://www.dropbox.com/s/gd9tf5xq9z11b0n/uxpin_guide_to_usability_testing.pdf?dl=0

Figures:

A/B Testing

Description: A/B Testing is a methodology that tests two different versions of a product by randomly showing the versions to users and statistically comparing conversion rates (or another metric that can be measured through a web-based analytics program like Google Analytics) of each version. Across the two versions of the product, one feature (i.e., heading size, color scheme, organization of one content topic, icon location, etc.) is changed and monitored throughout the evaluation.

When to Use/Create: A/B Testing can be used to re-design specific features of a product if data is showing minimal use/contact by users. **As correlation is not causation, it is also recommended to triangulate your findings with additional user research prior to switching to a version that has a higher conversion rate.**

Who to Involve: Typically, the design team specifies the scope of the A/B test, including creating and testing the hypothesis, as well as interpreting the results. Users may be selected to be randomly shown the versions of the product.

Resources:

- Crady, A. (2018). "A/B Testing your Designs." Retrieved from: https://uxdesign.cc/a-b-testing-your-designs-b648e413b124
- Nielsen, J. (2005). "Putting A/B Testing in Its Place." Retrieved from: https://www.nngroup.com/articles/putting-ab-testing-in-its-place/
- VWO. (n.d.). "A/B Testing - The Complete Guide to A/B Testing." Retrieved from: https://vwo.com/ab-testing/

Figures:

>Other common approaches to user research...

- **Surveys**
- **Interviews**

- **Focus Groups**
- **Photovoice**

>Other resources:

- UX Research Templates (provided by Danyell Jones from ZS Associates at ConveyUX Conference March 2019)
- IDEA HCD Course Materials
- Design Thinking (Meet-Up Event)